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Critics of pesticides: whistleblowing or suppression of dissent?

Brian Martin

Many dissident experts are subject to dismissal, transfer and blocking of appointments, research grants, and publications. Cases of attack on critics of pesticides illustrate the advantages of analysing this phenomenon using the concept of "suppression of dissent" rather than the concept of "whistleblowing."

Since the early 1970s, the concept of whistleblowing has been increasingly used in the analysis of disputes and also in legislation, especially in the United States. A broad meaning of whistleblowing is any speech that challenges vested interests, but it is usually defined more narrowly, such as "the disclosure by organization members (former or current) of illegal, immoral or illegitimate practices under the control of their employers, to persons or organizations that may be able to effect action."¹ Using such a restrictive concept, only some dissenters qualify as whistleblowers: they must be correct, fully ethical and motivated only by the public interest.² Typically, they must first try internal channels for raising concerns before "blowing the whistle" against wrongdoing in a public forum. The concept of whistleblowing draws attention to the dissident and the dissent, and thus is individ-

Dr. Brian Martin, Department of Science and Technology Studies, University of Wollongong, Australia 2522, is a member of the Editorial Board of *PSA* and president of Whistleblowers Australia.

ualistic.³ There are numerous studies that use the perspective of whistleblowing.^{4 5 6 7 8 9 10}

An alternative to the concept of whistleblowing is to talk about the suppression of dissent. Suppression of dissent can be said to occur when, first, a person or group threatens the vested interests of a powerful group—typically a corporation, government, or profession—through their speech (in the broad sense, which includes research and teaching), and, second, there is an attempt by supporters of the position of the powerful group to stop the speech or to attack the people making it.¹¹

Terminology in this area is not standardised. Here, the term “suppression” is used to refer to methods for inhibiting or restraining people or their actions without the use of physical violence—examples are censorship or dismissal—reserving “repression” for violent methods such as beatings and killings. Both these terms imply active efforts against the target. By contrast, the term “oppression” refers to a lack of freedom or justice due to social structures. Of course, there is a considerable degree of overlap between the processes to which these concepts refer.

Compared to whistleblowing, the concept of suppression draws greater attention to the opponents of this dissent and their activities to restrain or penalise it. Since many cases of whistleblowing lead to suppression, there is considerable overlap in the activities highlighted by the two concepts. But there are also activities covered by each concept that are not covered by the other. In some cases of whistleblowing, there is no suppression: the people speaking out about corruption or hazards to the public are not penalised for doing so. On the other hand, most cases of suppression are not responses to whistleblowing in the narrow sense. Many of those who have their papers blocked from publication are not whistleblowers; nor are most of those who are blocked from appointments. The most common methods of inhibiting dissent are not usually targeted at whistleblowers at all, but at potential dissenters.

A focus on whistleblowing can divert attention away from the systemic aspects of the issue. It gives little encouragement to study areas where certain groups are so dominant that there is no overt attempt at dissent, or where media and public receptivity to dissent is minimal. By contrast, the concept of suppression highlights both individual actions, by both dissidents and those who act against them, and a struc-

Brian Martin

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Pesticides

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Brian Martin

tural analysis, in the form of the interest groups involved, such as governments and corporations.

To illustrate the value of the concept of suppression of dissent, I examine the issue of pesticides, focussing on cases in which dissident experts have come under attack. One case study is given in some detail: that of Melvin Reuber, a leading scientist critic of pesticides. Then a number of other pesticide cases are sketched, in order to show some of the other techniques of suppression. The paper concludes with comments on the value of the concept of suppression of dissent for areas such as pesticides, on the inevitability of partisanship in any treatment of suppression, and on some implications of suppression for policy.

Pesticides

The debate over the risks, benefits and appropriateness of pesticides, which has raged for decades, might be said to symbolise a clash of world views.¹² On the one hand, there is high-technology agriculture and forestry, with monocultures, heavy use of artificial fertilisers and hybrid species, which require pesticides for success. On the other hand, there are "organic" methods that rely on mixed farming, natural fertilisers, and physical or biological controls on pests, with little or no use of pesticides.

The hazards of pesticides became a major public issue with the 1962 publication of Rachel Carson's book *Silent Spring*, a key trigger in the rise of the contemporary environmental movement.¹³ Carson signalled the importance of harmful effects of pesticides on the natural environment and also raised concerns about risks to human health. In both these areas, wealthy chemical companies have been challenged by community groups. Governments and their agencies have been drawn in and have sponsored studies, introduced regulations, and taken sides in the debate. Although the critics of pesticides have won some notable victories, such as the banning of DDT in many countries, global use of pesticides has dramatically increased since the publication of *Silent Spring*.

In the struggle over pesticides, scientific experts have played a crucial role, serving either to legitimate or to undermine positions taken. A large fraction of pesticide research is carried out by scientists working for or providing consultancies to the chemical companies making the pesti-

cides. This introduces a structural bias working against community-based critics of pesticides, who have no funds to sponsor research.¹⁴

Nevertheless, the existence of this structural bias has seldom been raised in debates over pesticides. Rather than criticising the organisational arrangements for scientific research, most critics have accepted the general framework and struggled within it. They have searched out scientists and scientific reports critical of pesticides and used these to argue against the proponents. There have been enough scientific critics available for this to be a viable strategy. One of these critics is Melvin Reuber.

The Case of Melvin Reuber

Melvin Dwaine Reuber is one of the world's leading critics of pesticides as a result of his crucial studies of pesticides and cancer. In 1981, with no warning, Reuber was subjected to a concentrated attack on his work and his credibility that left his career in tatters. His experiences provide an object lesson in the exercise of corporate power against expert critics of pesticides.^{15 16 17 18 19}

Reuber studied at the University of Kansas, receiving his M.D. in 1958. He entered a research career, doing pathology work at University of Maryland and Harvard Medical School before spending most of the 1960s at the National Cancer Institute, part of the National Institutes of Health. In the early 1970s he was an associate professor at the University of Maryland School of Medicine. He spent a year at the National Institute of Hygienic Sciences in Tokyo, and then joined the Frederick Cancer Research Center (part of the National Cancer Institute) in Maryland in 1976 where his work led to his appointment in 1979 as head of the Experimental Pathology Laboratory.

During these years Reuber established himself as a conscientious and productive worker. By 1980 he was the author or co-author of over 130 publications in journals such as *Carcinogenesis*, *Journal of the National Cancer Institute*, *Cancer Research* and *Archives of Environmental Health*. Reuber's boss, Dr Michael G. Hanna, Jr., the Director of the Frederick Cancer Research Center, was very impressed with Reuber's work, granted him promotions and raises, and gave him highly favourable reports. In 1980, Hanna gave Reuber an outstanding rating and raised his salary to \$50,000.

How, then, to explain March 1981? It is necessary to consider the impact of Reuber's research work involved looking at experimental animals, thousands of slides of which showed malignant tumours, results from industry tumours where Reuber, in the 1970s, Reuber's studies of important pesticides like DDT and chlor.

In the late 1970s, Reuber was taken by the National Cancer Institute, disagreed with their research on cancers that put chemical discrepancies was the industry scientists, the in some cases.

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Reuber received Hanna's blistering indictment. Hanna's previous end of letter are as follows:

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Brian Martin

How, then, to explain Hanna's fierce attack on Reuber in March 1981? It is necessary to look at the content and social impact of Reuber's research work. A large fraction of his work involved looking at the impact of various chemicals on experimental animals, especially rats. Reuber studied many thousands of slides of rodent tissues, assessing whether they showed malignant tumours. He often came up with different results from industry scientists, who diagnosed benign tumours where Reuber assessed malignancy. In the mid-1970s, Reuber's studies were important in the banning of the important pesticides aldrin, dieldrin, chlordane and heptachlor.

In the late 1970s, Reuber reviewed rodent studies undertaken by the National Cancer Institute, and in 16 of 18 cases disagreed with their results, finding that they had missed cancers that put chemicals in a bad light. Underlying these discrepancies was the possibility of fraud by some chemical industry scientists, the reality of which later became public in some cases.

Perhaps most sensitively of all, Reuber's studies were being taken up by opponents of pesticides around the country. A scientific study suggesting that a pesticide is carcinogenic is a potent tool. Reuber sent reprints of his publications to hundreds of people who requested them. In addition, he was prepared to write letters to individuals about his results, knowing these letters would be used in local campaigns.

The attack came on 25 March 1981. Reuber was called in by his boss, Hanna, and informed that a severe reprimand was being prepared and put on his personal file. Hanna accused Reuber of using the letterhead of the Frederick Cancer Research Center to write a letter to the director of the California Department of Food and Agriculture, Richard Rominger, about some of Reuber's private research work, giving the impression that it had the endorsement of the Center. The research in question was Reuber's finding that the major pesticide malathion had carcinogenic potential.

Reuber received Hanna's letter the next day. It was a blistering indictment of Reuber, in striking contrast to Hanna's previous endorsements of his work. Portions of the letter are as follows:

The allegations which have been brought against you (which I have investigated and have found to be true) are that you have reinterpreted slides that were part of

several bioassay carcinogenicity tests including those tests associated with malathion, malaoxon, and picloram. With regard to malathion and malaoxon, your statement in a letter to Mr. Rominger, the Director of the Department of Food and Agriculture in Sacramento, California, was that your reinterpretation was based on 'examination of every histological slide,' (up to 24,000 slides) of the three studies. Based on this statement, and assuming that a competent pathologist would spend a minimum of five minutes per slide in order to adequately reinterpret a previous diagnosis, you spent a total of 333 days in the repository reading these slides. I have checked the repository records and you have not spent that amount of time in the repository. Therefore, I can only assume that your statement regarding your thorough evaluation of these slides was incorrect and misleading. On the other hand, you may have spent considerably less time per slide, thus raising a question of whether your interpretation is scientifically valid.

In regard to the use of Frederick letterhead for his letter to Rominger, Hanna wrote,

I find this to be the most flagrant professional abuse that I have ever experienced in my scientific and administrative career... You exploited the privilege of scientific communication in an unrestrained manner. You have pontificated and criticized other scientists in a manner that excited the public in areas of immediate national concern. Rather than using the forum accepted by scientists, you have used an unreviewed forum to gain easy and immediate voice to the media where public health issues are most easily sensationalized.

At the end of his letter, Hanna tempered his harsh comments with the following:

You are a good pathologist and have a lot to offer the carcinogenesis testing program. My goal is to harness your efforts in a meaningful manner and direct them such that the taxpayer benefits from your expertise, rather than becoming excited or biased by your misuse of your position and your credentials...

Hanna said that Reuber's violation of Frederick's publication policies was grounds for dismissal, but that he would not proceed to this step since dismissal might be misinterpreted by others.

Reuber was stunned by the comments in reply. As for the claim that most slides required to study each cancer being investigated, he admitted that he did not have malathion research before a hostile review.

The worst was to the *Pesticide & Toxic Chemicals* "Dr. Mel Reuber, pathologist from his supervisor" Hanna's letter.²⁰ The chemical industry out the chemical industry U.S. Congress. See resigned his post on recover his bearings the National Cancer alleging conspiracy.

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Brian Martin

Reuber was stunned by this attack. He did not lack arguments in reply. As for the claim that five minutes would be required to study each slide, Reuber (and other pathologists) claim that most slides can be assessed for the particular cancers being investigated in a far shorter time. Reuber admitted that he did not seek Frederick peer review of his malathion research because he assumed that it would receive a hostile review.

The worst was to come. On 15 April 1981, the newsletter *Pesticide & Toxic Chemical News* published an article entitled "Dr. Mel Reuber, pathologist, gets sharp censure, warning from his supervisor" which quoted almost the entirety of Hanna's letter.²⁰ The article was quickly circulated throughout the chemical industry and to allies of the industry in the U.S. Congress. Seeing his reputation destroyed, Reuber resigned his post on 24 April. It took him until August to recover his bearings and take legal action against officials of the National Cancer Institute and the chemical industry, alleging conspiracy.

During the court case, the sequence of events leading to Hanna's letter became clearer. Reuber's work had been used since 1979 in the battle over malathion in California. Keith T. Maddy, a toxicologist in the California Department of Food and Agriculture, wrote to the National Cancer Institute on 31 January 1981 complaining about the damaging effect of Reuber's work on California's pesticide programme. Maddy also complained that Reuber's actions were "giving the impression that the Cancer Institute may be administering programs of questionable competency," referring specifically to the Frederick Center.²¹

Maddy's letter to the National Cancer Institute ended up with Richard Adamson, who undertook an investigation and then briefed Hanna, who undertook his own investigation. Hanna testified that he used laboratory vouchers to check the amount of time Reuber had spent studying rodent tissue slides, found that Reuber had published papers listing his Frederick Center affiliation without going through internal review processes, and learned from other scientists that Reuber's work had been central to a number of fiercely contested pesticide disputes in various parts of the country.

This was not the first time there had been a complaint made to the NCI about Reuber's work. There had been letters from pesticide supporters to the NCI on a number of previous occasions when Reuber's work was playing a crucial role in

local struggles. It was only in 1981 that such a letter became the trigger for a serious attack on Reuber. Reuber's letter to Rominger on Frederick letterhead was the pretext for the complaint. Some commentators at the time believed that Reuber's critics felt able to attack because the newly elected Reagan administration would be more sympathetic to industrial interests and less supportive of critics.²²

The most damaging thing to Reuber was the publication of Hanna's letter in *Pesticide & Toxic Chemical News* and its subsequent dissemination throughout the United States and to several other countries. Thereafter, at any time that Reuber's work was used by critics of pesticides, the article reporting Hanna's letter would be produced to attack his reputation.

Reuber's multi-million-dollar libel suit against the newsletter was settled in 1988; Reuber was awarded \$875,000. The owners of *Pesticide & Toxic Chemical News* appealed the jury verdict. In March 1990, three judges of the Court of Appeals in Richmond, Virginia upheld the verdict.²³ However, Reuber lost when the case was appealed to the full bench of the Court of Appeals, and the Supreme Court refused to hear the case.

If the verdict had been ultimately upheld, this could hardly have compensated Reuber for the loss of his scientific reputation. The *Pesticide & Toxic Chemical News* article has been used in different parts of the world to attack Reuber. For example, the Health Department of the state of Western Australia, in a 1988 submission about heptachlor to the Environment Protection Agency of Western Australia, rejected Reuber's research and reproduced the 1981 *Pesticide & Toxic Chemical News* story based on Hanna's letter to Reuber in support of this rejection. Reuber did not feel able to launch a court action every time this occurred.

During his years in limbo after leaving Frederick, Reuber has continued his scientific research and continued to publish papers. He works out of his home, supported by a few consultancies. He has not been able to obtain a job commensurate with his qualifications and experience.

Other Cases

One interpretation of Reuber's case is that it is an anomaly, an exception to the usual way in which scientific debates over pesticides are carried out. But there is evidence of other cases similar to Reuber's: the exercise of power by supporters

of pesticides to silence this perspective, Reuber's case is of a regular phenomenon. There have been no other such cases, but these contrasting interests are outlined in some cases which give support for the atypical. Due to space constraints, these cases can be given only a little detail, but in

Rachel Carson's *Silent Spring* and, as a result, fierce attacks on Carson and the publisher, Houghton Mifflin, claiming that there were "mistakes" and suggesting that *Silent Spring* was a "disaster". Attacks on Carson and her releases, plus a constant message. Much of the eloquence and accessibility of the "silent scientist" that "Rachel Carson's work was what she knew, but it was not for the public."²⁷

Robert L. Rudd, who wrote a book, *Pesticides*, many of the same before Carson's book, an exhaustive review of the University of Wisconsin, favourably received. promotion, and his threatened."²⁹

The Entomological Society of America heavily supported by the strongest critics of Egler wrote an article in *BioScience*,³⁰ the censuring Egler and his article to be published had just appeared. many of the S meeting.^{31 32 33}

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of pesticides to silence and discredit scientist critics. From this perspective, Reuber's case is a well-documented example of a regular phenomenon. It needs to be said at the outset that there have been no controlled, systematic studies to assess these contrasting interpretations. Here I give a very brief outline of some cases similar to Reuber's, which collectively give support for the view that Reuber's experiences are not atypical. Due to space limitations, only the barest outlines of these cases can be given here; the sources in some cases give little detail, but in others offer comprehensive treatments.

Rachel Carson's *Silent Spring*²⁴ was immensely influential and, as a result, fiercely attacked by the chemical industry.²⁵ Among other actions, the Velsicol Chemical Company wrote to the publisher, Houghton Mifflin, before publication, claiming that there were "inaccuracies and disparaging statements" and suggesting that publication be stopped.²⁶ After *Silent Spring* was published, there were numerous bitter attacks on Carson and the book in articles, speeches and press releases, plus a concerted publicity campaign to counter its message. Much of the antagonism focused on Carson's eloquence and accessible style. According to Frank Graham, Jr., the "silent scientists," who spoke only to each other, felt that "Rachel Carson's sin was not only her willingness to tell what she knew, but to tell it in such a way that it was grasped by the public."²⁷

Robert L. Rudd, a scientist at the University of California, wrote a book, *Pesticides and the Living Landscape*,²⁸ raising many of the same concerns as *Silent Spring*. Completed before Carson's book, the book went through a lengthy and exhaustive review process, with 18 reviewers, at the University of Wisconsin. On publication, it was very favourably received. Rudd himself had difficulties: "He lost a promotion, and his very position with the University was threatened."²⁹

The Entomological Society of America, a professional body heavily supported by pesticide manufacturers, was one of the strongest critics of Rachel Carson. When ecologist Frank E. Egler wrote an article critical of pesticides in the journal *BioScience*,³⁰ the Entomological Society passed a resolution censuring Egler and attacking *BioScience* for allowing the article to be published, even though that issue of *BioScience* had just appeared and would not yet have been available to many of the Society members attending the annual meeting.^{31 32 33}

At the University of Delaware, where the du Pont industrial influence is great, academics who criticised Carson met no obstacles. But when two academics proposed to testify at a pollution hearing (and were expected to be critical of industry), they were asked by the university administration not to appear in person, but to prepare their comments in writing.³⁴

Stephen Collins worked at the Agricultural Experiment Station in Connecticut. He said that "Many of the 'research programs' there were complete whitewashings of the true state of affairs. If evidence was uncovered that showed the pesticides were harmful, it was not released to the public."³⁵ Even with freedom of information legislation, creative techniques were developed by government officials to avoid complying with its intent. For example, "The formula of a pesticide or other chemical is a trade secret that is properly exempt under the act, but the agency applies the exemption to all of the other information provided by the manufacturer."³⁶

Robert van den Bosch of the University of California, a prominent critic of pesticides, had plenty of personal experience with attacks. He was called a charlatan, a disgrace to his university and a teller of half-truths, among other epithets.³⁷ After he received a contract from the Environmental Protection Agency to investigate standards for damage by insects to fruits and vegetables, van den Bosch was pressured by industry and university officials.³⁸ Because of his prominent confrontation with pesticide interests and his contacts with many other researchers, van den Bosch was informed of numerous attacks on critics and documented many of them in his book *The Pesticide Conspiracy*.

Entomologist L. D. Newsom of Louisiana State University was the subject of attacks from four chemical companies over many years. For example, when he found that a pesticide was no longer effective against the cotton boll weevil, the companies applied pressure on the university administration to take action against Newsom. When Denzel Ferguson of Mississippi State University opposed the programme to eradicate the fire ant, he was attacked by the Mississippi State Commissioner of Agriculture and the State Chemist, plus members of the University's College of Agriculture.³⁹

Charles Lincoln of the University of Arkansas opposed a chemical company's initiative for a cotton pest-control programme. The company applied pressure to a university

Brian Martin

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Brian Martin

vice-president, and Lincoln was also attacked in farm magazines and newspapers.⁴⁰ At the University of Arizona, pressure was applied by the state agricultural chemical association to stop a pest-management programme that involved lower levels of pesticide use.^{41 42}

Robert Fleet, a graduate student at Texas A&M University, "feels that he lost his research assistantship, was kicked out of his office-laboratory space, and was otherwise hassled and hounded by his superiors" because of his criticisms of the programme to eradicate the fire ant.⁴³

A colleague of van den Bosch's at the University of California did research on the levels of insect contamination in tomato juice. After pressure from tomato canners on the university administration, this entomologist decided not to publish his study. Other entomologists who van den Bosch knew well were willing to voice their criticisms of pesticides in private, but were afraid to speak out in public due to fears of reprisals, including withdrawals of research grants.⁴⁴

Van den Bosch also documents censorship of manuscripts by the US Department of Agriculture's Agricultural Research Service.⁴⁵ The pressure of the chemical industry was also applied to journals. Agricultural magazines would not publish criticisms of pesticides, since otherwise their advertising might be withdrawn. *Life* magazine failed to publish an article on integrated pest control following pressure from the chemical industry.⁴⁶

Dr Cate Jenkins, an environmental scientist with the U.S. Environmental Protection Agency, claimed that the chemical industry studies had consciously minimised the hazard from dioxin. She was transferred from her position, but won reinstatement by using whistleblower legislation.⁴⁷ Jenkins' allegations were reported by Peter Montague in a 1990 article in *Rachel's Hazardous Waste News*. This article led to Montague being sued for defamation, with millions of dollars of damages sought, by William Gaffey, co-author of the study criticised by Jenkins and a scientist at Monsanto Chemical Company, now retired. This legal action led to a sudden decline in media coverage of Jenkins' claims.⁴⁸

Just as critics of pesticides are attacked, so are researchers who promote alternatives to pesticides. Bob Dixon, who worked in the Agricultural Research Service of the US Department of Agriculture, developed the technique of land imprinting to resuscitate degraded land. After five years of harassment, Dixon was fired. His boss, Howard Morton, exten-

sively used herbicides in research and was supported by the chemical industry.⁴⁹

The United States is not the only country to have these sorts of cases. In 1971, University of Adelaide zoology professor Clyde Manwell and his wife Ann Baker wrote a letter to the *Adelaide Advertiser* making criticisms of the South Australian state government's fruit-fly spraying programme. Manwell was fiercely attacked in state parliament, and the senior professor of zoology wrote a letter to the head of the university making a series of charges. The attempt to dismiss Manwell lasted five years and included court battles and student protests. It was in the end unsuccessful.⁵⁰ Manwell also lost his research funding from an outside body, even though his research performance was outstanding.⁵¹

John Coulter was a researcher at the Institute of Medical and Veterinary Science in Adelaide who often spoke out on environmental issues. After he made comments about the pesticide dichlorvos on television, the manufacturer Bayer took legal action against the station. After he gave a talk about pesticides, including chlordane and heptachlor, Velsicol Australia complained to the Director of the Institute about Coulter. In 1980, Coulter was dismissed; the cross-examination during court proceedings against his dismissal showed the speciousness of the charges against him.⁵²

Of course, not every case listed here can definitely be shown to involve the use of power against critics of pesticides because they were critics of pesticides, since there may be other explanations for the actions, such as poor performance. Nevertheless, the evidence is sufficient to suggest that suppression of dissident experts is not a rare event.

Demonstration of the exercise of power against a critic of pesticides does not prove that the critic is right (or wrong). The debate continues: the critics of pesticides would argue that events have vindicated their views⁵³; defenders of pesticides would argue that the critics have been misguided.⁵⁴

The Phenomenon of Suppression

These cases illustrate many of the techniques that can be used to thwart dissident experts. The most prominent methods used in the cases cited here are dismissals and pressure applied to employers. There are many potential methods, including withdrawal of research grants, transfers, black-

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Brian Martin

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The published cases of suppression in the pesticide area are typical of those found in a wide range of other scientific and technological fields, such as nuclear power,^{55 56} fluoridation^{57 58} and automobile safety.^{59 60} There have been no systematic studies of the incidence of suppression but, nevertheless, the following generalisations are possible.

First, the cases reported are only a small proportion of the total number of instances. This is because many of those attacked prefer not to publicise their experiences, and because only some cases, and some types of cases, are suitable for description.

Second, the reported cases are atypical of the most common types of suppression. Dismissals are dramatic and relatively clear-cut; they are readily publicised. By contrast, blocked appointments, blocked promotions and blocked publications are extremely hard to document. Many critics of pesticides fear that their research grants will be cut off if they speak out, yet there are few documented cases of this occurring, most likely because it is so hard to show that denial of a research grant is due to other than normal criteria.

Third, as suggested earlier, the prime targets for attack are dissident experts rather than activists who lack credentials and employment status. Although there are quite a few cases in which nonscientist critics of pesticides have been treated harshly,^{61 62} it would seem that expert critics come in for special attention. For example, several individuals in Adelaide had written to the newspaper making criticisms of fruit fly spraying before Clyde Manwell and Ann Baker's letter appeared. None of these nonscientists was attacked, but the Manwell-Baker letter triggered a frenzy of outrage. Another factor here is the formal status of the individual. Manwell, a professor of zoology, was the target; Baker, a tutor, was not. Similarly, Reuber was attacked in his position in the National Cancer Institute. Although his resignation did not formally affect the quality of his findings, it greatly reduced his credibility as an expert.

Fourth, the pattern of attacks is influenced by the nature of the interest groups threatened by dissident expertise. The prime interest group promoting pesticides is chemical corporations, and they have been directly involved in many attacks. Not surprisingly, there have been no prominent pesticide critics from within the chemical corporations:

employees know they risk dismissal should they speak out, and so they typically work on the inside or leave the industry.

The industry may be able to control its own employees; outside critics are harder to handle. Employees in government bodies are often susceptible to pressure, especially those in agriculture departments that work hand in glove with industry. Most difficult are universities, which are relatively independent havens for critics, though reliance on corporate or government research funding is relevant here. The many cases where pressure has been applied to university administrations show that the industry does not have full control and that their pressure tactics are often unsuccessful.

Suppression in non-industry organisations works most effectively through the medium of industry allies in government and universities. Reuber's boss Hanna is a case in point. So is H. G. Andrewartha, the senior professor of zoology at the University of Adelaide who launched the university attack on Manwell; Andrewartha had strong links to the South Australian Department of Agriculture.

Fifth, the cold recitation of instances of suppression gives little indication of the incredible personal trauma involved in each case.^{63 64 65} Some individuals are virtually destroyed by the experience; others survive and become tougher fighters; some resolve to stick to "safe" research topics; virtually none shrug it off and carry on as before.

These features of the phenomenon of suppression each testify to its potential importance in science: suppression is much more common than generally realised; it is typically much more subtle and pervasive than suggested by dramatic cases like Reuber's; dissident experts are prime targets for attacks; the pattern of attacks and the inhibition of potential dissent reflect the types of interest groups involved and the sort of resources available to them; and the psychological effects of suppression, and also the fear of being suppressed, affect the extent and nature of participation in areas of scientific controversy.

Whistleblowing or suppression?

It should be obvious that many of the pesticide cases mentioned here do not fit the ideal whistleblowing pattern. Reuber, for example, was not engaged in any special expo-

sure of wrongdoing, through formal channels are better understood especially via the public *Pesticide & Toxic Chemicals* used against certain cannot be considered sense of the term, with attention to the attacks behind these attacks.

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It can be argued that not on the individual (substantial) but on the ability to speak out. Again, scientists decide either on controversial issues or to focus on the influence of whistleblowing.

The narrow definition of employees (or ex-employees) the employing organisation in conceptualising a public issue, community. Baker and Manwell about the activities of Adelaide, but the Australian Department would not qualify. The concept case much better, especially between pesticide safety. Given the existing complex array of

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sure of wrongdoing, nor does the issue of working first through formal channels apply to his case. His experiences are better understood as the exercise of corporate power—especially via the publication and later use of the article in *Pesticide & Toxic Chemical News*—to discredit expertise being used against certain pesticides. Similarly, Rachel Carson cannot be considered a whistleblower except in the broad sense of the term, whereas the concept of suppression draws attention to the attacks on her work and the interest groups behind these attacks.

The study of the Reuber case as an instance of suppression certainly highlights the plight of an individual, Reuber, but it also highlights the role of the chemical industry, especially via the publication and dissemination of Hanna's letter in *Pesticide & Toxic Chemical News*. Furthermore, studying a series of suppression cases in a particular area such as pesticides is necessary to provide evidence that an analysis in terms of vested interests is indeed plausible. By contrast, whistleblowing cases are typically studied as cases of individual dissent, without the necessity for an analysis of power structures.

It can be argued that the most important effect of attacks is not on the individuals attacked (although that may be substantial) but on those who might be considering whether to speak out. Again, the processes by which the majority of scientists decide either to support orthodoxy, to avoid controversial issues or to just keep quiet are better captured by a focus on the influence of power structures than on whistleblowing.

The narrow definition of whistleblowing restricts cases to employees (or ex-employees) speaking out against abuses by the employing organisation. This restriction is not required in conceptualising suppression: the dissent may be about a public issue, communicated to a public audience. For example, Baker and Manwell wrote a letter to the local newspaper not about the activities of their own organisation, the University of Adelaide, but about fruit-fly spraying by the South Australian Department of Agriculture. Hence, their case would not qualify as whistleblowing under a narrow definition. The concept of suppression of dissent captures their case much better, especially since it draws attention to links between pesticide supporters, inside and outside the university. Given the existence in the dispute over pesticides of a complex array of actors and power structures, including

transnational corporations, governments, social movements, and professional organisations, the concept of whistleblowing, with its restriction to protest against abuses by one's employer organisation, does not capture the full array of interactions involving power and expertise. The concept of suppression also has limitations on this score, but at least it is more open to various forms of power analysis.

The focus on whistleblowing is both a cause and consequence of a focus on one remedy proposed for the problem: whistleblowing legislation. Unfortunately, most whistleblowing legislation is flawed in conception as well as execution.⁶⁶ ^{67 68} Typical whistleblower legislation is restricted in coverage to employees who follow the "proper channels." The vast bulk of suppression is left unaddressed, and even many of those who fit the formal definition of whistleblower are left stranded. Such legislation can even be said to be a way for a government to present the appearance of taking action while leaving the situation unchanged or even worse off.⁶⁹

Of vastly greater value to those who are vulnerable to suppression are whistleblower support organisations, sympathetic media coverage, alternative employment opportunities, and a culture of dissent in which criticisms and debate are welcomed as healthy rather than as a problem to be dealt with.

Suppression Studies as Partisanship

The normal, taken-for-granted explanation for events is that given by administrators, supervisors, editors and others with power in science: decisions are made on the basis of merit and benefit to society. In other words, "nothing unusual is happening." It is difficult to find a single case in which an administrator has admitted to bias or discrimination. Rejections, transfers, dismissals and the like are invariably explained in conventional terms, as being justified by the quality or performance involved. Furthermore, there is nothing to indicate that administrators are anything but totally sincere in their explanations of their actions.

To describe something as "suppression of dissent" thus is to provide an interpretation that challenges the conventional one. If all reality is socially constructed,⁷⁰ then an account in terms of suppression is an attempt to reconstruct an otherwise unremarkable event as something involving the exercise of power against dissent. Since conventional accounts

Brian Martin

are also social constructions, the construction is more appropriate than the conventional construction. The most power in and the most terms of dissent are in the implication is that the dissent is to take the lives and interests.

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are also social constructions, the question is, which construction is more appropriate? The obvious answer is that conventional constructions are of value to those with the most power in and over science and that constructions in terms of dissent are of value to those with less power. The implication is that to describe something as suppression of dissent is to take the role of a partisan in a clash of perspectives and interests.

To accept the conventional account is also to be a partisan, namely a de facto partisan of the dominant interests in science, but in this case partisanship is far less obvious and seldom recognised.⁷¹ Most studies of science totally ignore the existence of suppression, and thus provide de facto partisanship for the existing power structure.

In my writings on suppression I have sometimes been asked to provide a more even-handed treatment, in other words a less partisan one, for example by telling how different "actors" perceive events. This sounds reasonable but is beset with difficulties. As noted above, the orthodox interpretation is that nothing unusual is happening. To seek the views of individuals such as Hanna (Reuber's boss) is to assume that there is something to be explained. More generally, to undertake any analysis using the concept of suppression is to select out certain events for scrutiny and to adopt an interpretation that challenges the standard one. Given that an account of suppression is, by its selection and construction, inevitably a partisan one, it is not obvious what even-handedness in such an account amounts to. After all, the viewpoint of dominant interests is constantly articulated, with seldom a demand for hearing the voice of subordinated groups.

This paper is undoubtedly partisan in presenting cases of suppression of critics of pesticides, whereas many other treatments of the pesticide debate are partisan by showing no awareness of the possibility of suppression. Partisanship in this sense, it should be said, it quite compatible with the highest standards of argumentation and evidence.

Policy implications

Most discussions of policy on issues such as pesticides ignore the existence of suppression of dissent. The typical assumption is that there are no systemic obstacles to the articulation of scientific knowledge claims. The evidence

outlined in this paper suggests that, at least in some policy areas, this assumption does not hold. There are a few dramatic examples of attacks on dissidents, arguably reflecting a deeper pattern of suppression through bias in appointments and publications, all of which serves to discourage those with certain views from articulating them or even entering the research field. Therefore, it cannot be assumed that the quality and strength of informed scientific opinion can be judged by a survey of publications in top journals or of scientists in top positions.

It is impossible to say how great an effect suppression of dissent has upon any particular debate, because few studies have been made of the phenomenon and it is difficult to know how deeply the patterns of power, of which suppression is a reflection, affect scientific work. In a scientific culture in which dissent is systematically discouraged, prohibition may become internalised as inhibition. C. Wright Mills commented on this in relation to university teachers: "the deepest problem of freedom for teachers is not the occasional ousting of a professor, but a vague general fear—sometimes politely known as 'discretion,' 'good taste,' or 'balanced judgment.' It is a fear which leads to self-intimidation and finally becomes so habitual that the scholar is unaware of it."⁷²

As long as some groups have the power to suppress, they are likely to use it. To change this situation, it is necessary to change the balance of power within and between scientific organisations. This is obviously is an enormous topic that cannot be traversed here.⁷³ Short of this, it is still possible to list a few implications of suppression for policy.

- Suppression should be assumed to be much more pervasive than indicated by the few cases which receive publicity.
- Suppression or the threat of it may result in certain perspectives being inadequately researched, published or articulated in scientific and public forums.
- Whistleblowing legislation is an inadequate response to the problem of suppression, since it helps only a small minority of whistleblowers and, in any case, most victims of suppression are not whistleblowers.
- To deal with the problem of suppression, the focus should be on reducing the power of interest groups and their supporters to dominate scientists and research agendas.

One reason why suppression has been so seldom studied is that it clashes with the standard image of science as a search

Brian Martin

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Brian Martin

for the truth that is not influenced by power politics. There is plenty of evidence to show that power politics does play a major role in the operations of science,^{74 75 76} but in science textbooks and media reporting this is still seen as an aberration rather than a regular occurrence. Cases of suppression are news items precisely because they conflict with the standard image of science. The first step in dealing with the problems of power in science is to recognise that power in science is important. The issue of suppression is one useful avenue for helping this process.

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