39. Xuan Z, Babor T. Perceptions of alcohol advertising content by vulnerable populations: is industry self-regulation sufficient? Paper presented at: 135th Annual Meeting of the American Public Health Association; November 6, 2007; Washington, DC.

40. Dejong W, Atkins CK, Wallack L. A critical analysis of "moderation" advertising sponsored by the beer industry: are responsibility drinking commercials done responsibly? *Milbank Q.* 1992;70(4): 661–678.

41. Diageo. *Corporate citizenship report.* London: Diageo; 2009. Available at: http://www.diageo.com/Lists/Resources/Attachments/218/Diageo_CR09.pdf. Accessed June 21, 2011.

42. Diageo. *Diageo calls on alcohol industry to support "We Don't Serve Teens Campaign"* [press release]; March 1, 2007. Available at: http://hispanicprwire.com/News/in/8150/7/diageo-invita-a-la-industria-del. Accessed March 23, 2011.

43. Babor T, Caetano R, Casswell S, et al. *Alcohol: No Ordinary Commodity.* 2nd ed. New York: Oxford University Press; 2010.

44. Jernigan D. *Confusion, Contention and Collaboration: Alcohol Producers and Global Public Health.* Baltimore, MD: Center on Alcohol Marketing and Youth; 2011.

45. US Department of Health and Human Services, Office of the Surgeon General. *The Surgeon General's Call to Action to Prevent and Reduce Underage Drinking.* Washington, DC; 2007.

46. Wagenaar AC, Harwood EM, Toomey TL, Denk CE, Zander KM. Public opinion on alcohol policies in the United States: results from a national survey. *J Public Health Policy.* 2000;21(3):303–327.

47. Cohen JB. Playing to win: marketing and public policy at odds over Joe Camel. *JPP&M.* 2000;19(2):155–167.

48. Freudenberg N, Galea S. The impact of corporate practices on health: implications for health policy. *J Public Health Policy.* 2008;29(1):86–104.

49. Glantz S, Slade J, Bero L, Hanauer P, Barnes D. *The Cigarette Papers.* Berkeley: University of California Press; 1996.

50. Harris JL, Pomeranz JL, Lobstein T, Brownell KD. A crisis in the marketplace: how food marketing contributes to childhood obesity and what can be done. *Annu Rev Public Health.* 2009;30:211–225.

51. Nestle M. *Food Politics: How the Food Industry Influences Nutrition and Health.* Berkeley: University of California Press; 2002.

52. Hornik R. Evaluation design for public health communication programs. In: Hornik R, ed. *Public Health Communication: Evidence for Behavior Change.* Mahwah, NJ: Lawrence Erlbaum Associates; 2002:385–405.

53. Freudenberg N, Bradley SP, Serrano M. Public health campaigns to change industry practices that damage health: an analysis of 12 case studies. *Health Educ Behav.* 2009;36(2):230–249.

54. Biener L, Siegel M. Tobacco marketing and adolescent smoking: more support for a causal inference. *Am J Public Health.* 2000;90(3):407–411.

Inventing Conflicts of Interest: A History of Tobacco Industry Tactics

Confronted by compelling peer-reviewed scientific evidence of the harms of smoking, the tobacco industry, beginning in the 1950s, used sophisticated public relations approaches to undermine and distort the emerging science.

The industry campaign worked to create a scientific controversy through a program that depended on the creation of industry–academic conflicts of interest. This strategy of producing scientific uncertainty undercut public health efforts and regulatory interventions designed to reduce the harms of smoking.

A number of industries have subsequently followed this approach to disrupting normative science. Claims of scientific uncertainty and lack of proof also lead to the assertion of individual responsibility for industrially produced health risks. (*Am J Public Health.* 2012:63–71. doi:10.2105/AJPH.2011.300292)

Allan M. Brandt, PhD

ANY SYSTEMATIC INVESTIGATION of the modern relationship of medicine and science to industry must consider what has become the epiphenomenal case of the tobacco industry as it confronted new medical knowledge about the risk of cigarette smoking in the mid-20th century. This, of course, is not to argue that the approach and strategy undertaken by big tobacco are necessarily typical of conventional industry–science relationships. But the steps the industry took as it fashioned a new relationship with the scientific enterprise have become a powerful and influential model for the exertion of commercial interests within science and medicine since that time.

As a result, industrial influence on scientific research and outcome has been a powerful legacy of the tobacco story. In this sense, the tobacco industry invented the modern problem of conflicts of interest at midcentury.[1] Before that time, there had been a widespread perception, both within science and among the public, that scientific endeavors constituted a set of activities that were in large measure insulated from "interests." Institutions have struggled over recent decades to discern new policies and approaches to mitigate the increasingly powerful influence of industries as they affect scientific investigation and the public good.[2]

THE TOBACCO INDUSTRY IN CRISIS MODE

By late 1953, the tobacco industry faced a crisis of cataclysmic proportions. Smoking had been categorically linked to the dramatic rise of lung cancer. Although health concerns about smoking had been raised for decades, by the early 1950s there was a powerful expansion and consolidation of scientific methods and findings that demonstrated that smoking caused lung disease as well as other serious respiratory and cardiac diseases, leading to death. These findings appeared in major, peer-reviewed medical journals as well as throughout the general media.

As a result, the tobacco industry would launch a new strategy, largely unprecedented in the history of US industry and business: it would work to erode, confuse, and condemn the very science that now threatened to destroy its prized, highly popular, and exclusive product. But this would be no simple matter. After all, in the immediate postwar years—the dawn of the nuclear age—science was in high esteem. The industry could not denigrate the scientific enterprise and still maintain its public credibility, so crucial to its success.

The tobacco industry already had a long history of innovative advertising, marketing, and public relations that had centered on making smoking universal. Starting in the late 19th century, the industry transformed itself to

become a model of modern industrial organization and consumer marketing. The industry took a product that had existed at the cultural periphery and remade it into one of the most popular, successful, and widely used items of the early 20th century. The basic tenet of the highly articulated public relations approach the companies deployed centered on the notion that if the current cultural context was inhospitable to the product, one could—through shrewd and creative public relations interventions—change the culture to fit the product.

In the course of this transformation, the tobacco companies successfully defined and exploited critical aspects of a new consumer culture. Within the industry, marketing experts had developed a powerful notion of social engineering, what early public relations theorist Edward Bernays had called the "engineering of consent."[3] According to the logic of this approach, society and culture could be manipulated through public relations to create a marketing environment that favored a particular product, in this instance the cigarette. Individuals' purchase of a particular product constituted their consent to the underlying meaning-centered campaigns.

It was this approach to "engineering" that would fundamentally inform the industry's approach to the crisis of the 1950s. After all, if public relations could engineer consent among consumers, so too could it manage the science that was now threatening to undermine the tobacco industry's product and the entire industry itself. And yet, as subsequent history would show, the management of culture and social meaning was considerably different from the management of science.

ENGINEERING SCIENCE

The tobacco industry's program to engineer the science relating to the harms caused by cigarettes marked a watershed in the history of the industry. It moved aggressively into a new domain, the production of scientific knowledge, not for purposes of research and development but, rather, to undo what was now known: that cigarette smoking caused lethal disease. If science had historically been dedicated to the making of new facts, the industry campaign now sought to develop specific strategies to "unmake" a scientific fact.[4,5]

Such a campaign required new tactics and strategies.[6,7] The goal was to disrupt the normative processes of knowledge production in medicine, science, and public health. In the conduct of this public relations campaign, the tobacco industry would markedly alter the historical trajectory of industry–science relationships. Although medicine and science had never been sacrosanct from a range of social and commercial interests,[8–11] the tobacco industry campaign crossed into new terrain to build a powerful network of interests and influence.

Today, as a result of litigation, journalistic exposure, and historical investigation, this story is relatively well known.[3,12–15] Here I deploy what we know about the tobacco industry science program to suggest why and how it would become so influential after its development. Indeed, the tobacco industry constructed a program that had a number of effects within the broader culture of science, knowledge, and policy. For this reason I make the somewhat provocative claim that the industry invented the modern conflicts of interest that now are the subject of such intensive contention in the world of science and medicine as well as media, politics, law, and policy.

The industry well understood the power of interests and the levers of influence. Indeed, the ability to use interests and influence had been key aspects of its past success. Early-20th-century tobacco advertisements centered on the endorsement of public figures of influence and authority who would help to bring smoking into the mainstream. In this respect, the tobacco industry played an important role in constructing a culture of celebrities who would help influence social mores and consumer spending through brand endorsements.[3] Although the industry brought extensive experience to the manipulation of culture, its public efforts to control tobacco science had been relatively limited and mostly promotional.

INDUSTRY RESPONSE TO EMERGING TOBACCO SCIENCE

By the early 1950s, the emerging science on tobacco's harms documented in the elite peer-reviewed literature, especially the causal linkage to lung cancer, threatened to undo more than a half century of unprecedented corporate success. With considerable anxiety and rancor within the tobacco industry, the industry's highly competitive CEOs came together in December 1953 at the Plaza Hotel in New York City to map a strategy. They realized that the threat they now faced was unprecedented and would require new, collaborative approaches and expertise. Not surprisingly, given their history, they turned again to the field of public relations that had served them so well in the past. They called upon John W. Hill, the president of the nation's leading public relations firm, Hill & Knowlton.

The public confidence the industry required could not be achieved through advertising, which was self-interested by definition. It would be crucial for the industry to assert its authority over the scientific domain; science had the distinct advantage of its reputation for disinterestedness.[16] Hill shared with his public relations predecessor Bernays a deep skepticism about the role of advertising in influencing public perceptions of tobacco. To those schooled in public relations, advertising ran the risk of exposing corporate self-interest. Good public relations relied on scrupulous behind-the-scenes management of media. As Bernays had demonstrated in the 1920s and 1930s, the best public relations work left no fingerprints.[3]

Hill offered the companies powerful advice and guidance as they faced their crisis. Hill understood that simply denying emerging scientific facts would be a losing game. This would not only smack of self-interest but also ally the companies with ignorance in an age of technological and scientific hegemony. So he proposed seizing and controlling science rather than avoiding it. If science posed the principal—even terminal—threat to the industry, Hill advised that the companies should now associate themselves as great supporters of science. The companies, in his view, should embrace a sophisticated scientific discourse; they should demand more science, not less.

Of critical importance, Hill argued, they should declare the positive value of scientific skepticism of science itself. Knowledge,

Hill understood, was hard won and uncertain, and there would always be skeptics. What better strategy than to identify, solicit, support, and amplify the views of skeptics of the causal relationship between smoking and disease? Moreover, the liberal disbursement of tobacco industry research funding to academic scientists could draw new skeptics into the fold. The goal, according to Hill, would be to build and broadcast a major scientific controversy. The public must get the message that the issue of the health effects of smoking remains an open question. Doubt, uncertainty, and the truism that there is more to know would become the industry's collective new mantra.

Hill was above all a cynic, deeply committed to the instrumental ideals of public relations. He was profoundly confident that public relations strategies, well developed and implemented, could effectively serve the needs of his clients. He believed—and he convinced the companies' leadership—that by calling for more research and offering funding, they could take high ground in their public pronouncements. Although he had quit smoking himself, he had no interest in examining and assessing the data or the emerging science. For Hill, science would be a means to a public relations end. The executives of the 5 major companies endorsed his strategic plan and hired Hill & Knowlton to manage their burgeoning corporate crisis.

THE TOBACCO INDUSTRY RESEARCH COMMITTEE

Hill and his colleagues set to work to review the full range of approaches open to them. Dismissing as shortsighted the idea of mounting personal attacks on researchers or simply issuing blanket assurances of safety, they concluded instead that seizing control of the science of tobacco and health would be essential to seizing control of the media. Although public relations practitioners had considerable experience manipulating the media, what was radical about Hill's proposed strategy was the desire to manipulate scientific research, debate, and outcomes. It would be crucial to identify scientists who expressed skepticism about the link between cigarettes and cancer, those critical of statistical methods, and especially those who had offered alternative hypotheses for the causes of cancer.

Hill set his staff to identifying the most vocal and visible skeptics of the emerging science of smoking and disease. These scientists (many of whom turned out to be smokers themselves) would be central to the development of an industry scientific program in step with larger public relations goals. Hill understood that simply denying the harms of smoking would alienate the public. His strategy for ending what the tobacco CEOs called the hysteria linking smoking to cancer was to insist that there were 2 sides in a highly contentious scientific debate. Just as Bernays had worked to engineer consent, so Hill would engineer controversy. This strategy—invented by Hill in the context of his work for the tobacco industry—would ultimately become the cornerstone of a large range of efforts to distort scientific process for commercial ends during the second half of the 20th century.[3,6,7]

Individual tobacco companies had sought to compile information that cast doubt on the smoking–cancer connection even before Hill & Knowlton became involved. One R.J. Reynolds official announced to other industry executives in November 1953 that the company had formed a bureau of scientific information to "combat the propaganda which is being directed at the tobacco industry."[17] At the same time, American Tobacco began to collect the public statements of scientists who had expressed skepticism about the research findings indicting tobacco. The company's own public relations counsel understood that it would be critical to create questions about the reliability of the new findings and to attack the notion that these studies constituted proof of the relationship of smoking to cancer.[18]

Pooling these efforts, Hill & Knowlton produced a compendium of statements by physicians and scientists who questioned the cigarette–lung cancer link. This compendium became a fundamental component of Hill & Knowlton's initial attempts to shape and implement its public relations strategy.

After the December 15 meeting that formally brought Hill & Knowlton into the picture, its executives spent the next 2 weeks meeting with various industry staff. During this time, Hill & Knowlton operated in full crisis mode. Executives and staff canceled all holiday plans as they worked to frame and implement a full-scale campaign on behalf of the industry.[19,20] They made no independent attempt to assess the state of medical knowledge, nor did they seek informed evaluations from independent scientists. Their role was exclusively limited to serving the public relations goal of their collective clients.

During these meetings, both Hill & Knowlton staffers and tobacco executives continued to voice the conviction that the industry's entire future was threatened by the medical and scientific findings linking cigarette smoking to lung cancer and the consequent widespread public anxieties about smoking and health.

> Because of the serious nature of the attack on cigarettes and the vast publicity given them in the daily press and in magazines of the widest circulation, a hysteria of fear appears to be developing throughout the country,

Hill wrote in an internal memorandum. "There is no evidence that this adverse publicity is abating or will soon abate." According to his media intelligence, at least 4 major periodicals (*Look Magazine, Cosmopolitan, Woman's Home Companion,* and *Pageant*) were planning articles on smoking and health.[21a]

It was Hill who hit on the idea of creating an industry-sponsored research entity. Ultimately, he concluded, the best public relations approach was for the industry to become a major sponsor of medical research.[21b] This tactic offered several essential advantages. The call for new research implied that existing studies were inadequate or flawed. It made clear that there was more to know, and it made the industry seem a committed participant in the scientific enterprise rather than a self-interested critic.

The industry had supported some individual research in recent years, but Hill's proposal offered the potential of a research program that would be controlled by the industry yet promoted as independent. This was a public relations masterstroke. Hill understood that simply giving money to scientists—through the National Institutes of Health or some other entity, for example—offered little opportunity to shape the public relations environment. However,

offering funds directly to university-based scientists would enlist their support and dependence. Moreover, it would have the added benefit of making academic institutions "partners" with the tobacco industry in its moment of crisis.

The very nature of controlling and managing information in public relations stood in marked contrast to the scientific notion of unfettered new knowledge. Hill and his clients had no interest in answering a scientific question. Their goal was to maintain vigorous control over the research program, to use science in the service of public relations. Although the tobacco executives had proposed forming a cigarette information committee dedicated to defending smoking against the medical findings, Hill argued aggressively for adding research to the committee's title and agenda. "It is believed," he wrote, "that the word 'Research' is needed in the name to give weight and added credence to the Committee's statements."[21a] Hill understood that his clients should be viewed as embracing science rather than dismissing it.

Hill also advised the industry that continued competitive assertions about the health benefits of particular brands would be devastating. Instead, the industry needed a collective research initiative to demonstrate its shared concern for the public. Rather than using health research to create competitive products as they had been doing, the companies needed to express—above all else—their commitment to public well-being. Hill believed that the competitive fervor over health claims had harmed the industry's credibility. No one would look for serious information about health from an industry that was making unsubstantiated claims about its product.

The future of the industry would reflect its acceptance of this essential principle. From December 1953 forward, the tobacco companies would present a unified front on smoking and health; more than 5 decades of strategic and explicit collusion would follow.[22] The Tobacco Industry Research Committee (TIRC), a group that would be carefully shaped by Hill & Knowlton to serve the industry's collective interests, would be central to the explicit goal of controlling the scientific discourse about smoking and health. The public announcement of the formation of the committee came in a full-page advertisement run in more than 400 newspapers across the country, soon known as the "frank statement." The ad promised that the companies would aggressively pursue the science of tobacco and ensure the well-being of their consumers:

> We accept an interest in people's health as a basic responsibility, paramount to every other consideration in our business. We believe the products we make are not injurious to health. We always have and always will cooperate closely with those whose task it is to safeguard the public health.[23]

The frank statement remains a powerful illustration of how Hill was prepared to use science in the interest of his clients. It is a model of the "new" public relations that he established at midcentury.

Hill carefully outlined the plans for a research program before a single scientist was consulted. The utility of such a strategy was its apparent commitment to objective science and its search for the truth. As one colleague argued,

> A flamboyant campaign against the anti-smoking propagandists would unquestionably alienate much of the support of the moderates in both scientific and lay publics.[24]

Instead, tobacco companies had to respect the moral valence of science in American culture at midcentury. If science now threatened the industry, the industry must "secure" science.

The TIRC, from its inception, was dominated by its public relations goals. Alton Ochsner, the well-known thoracic surgeon who had conducted research on the relationship of smoking to heart disease, saw his own hopes for funding support from the industry fade as the TIRC's research agenda quickly became clear. He noted,

> Of course, the critical areas of investigation, as every research scientist knows, have to do with the problem of how to make smoking a less lethal agent in lung cancer incidence and a less deadly killer in heart disease. . . . Yet it is precisely these areas that apparently have been declared out of bounds for the industry's research committee.[25(p72)]

Internal industry assessments confirmed Ochsner's view. As one internal industry evaluation would conclude a decade later, "most of the TIRC research has been of a broad, basic nature not designed to specifically test the anti-cigarette theory."[26] From the outset, Hill & Knowlton exerted full control over the industry's collaborative research program. The TIRC administrative offices were even located at Hill & Knowlton's New York office. W.T. Hoyt, executive director of the TIRC, came to the position with no scientific experience whatsoever. Before joining Hill & Knowlton, he sold advertising for the *Saturday Evening Post.* At Hill & Knowlton, where he began work in 1951, he had run the iron and steel industry's Scrap Mobilization Committee. In early 1954, he assumed a dominant role in the day-to-day operations of the tobacco industry research program. Ultimately, Hoyt would become a full-time employee, remaining integral to the TIRC until he retired in 1984.[27]

Tobacco company leaders also played important roles in the organization. In the early months of operation, Paul Hahn of American Tobacco and Parker McComas of Philip Morris served as its acting chairs. The first full-time chairman of TIRC was Timothy Hartnett, the retired CEO of Brown & Williamson. The press release announcing his appointment read, in part, as follows:

> It is an obligation of the Tobacco Industry Research Committee at this time to remind the public of these essential points:
> 1. There is no conclusive scientific proof of a link between smoking and cancer.
> 2. Medical research points to many possible causes of cancer. . . .
> 5. The millions of people who derive pleasure and satisfaction from smoking can be reassured that every scientific means will be used to get all the facts as soon as possible.[28]

Hartnett and his successors would reiterate this message for the next 40 years.

The first scientific director of the TIRC was noted biologist, geneticist, and eugenicist Clarence Cook Little. Little came to the position as an aggressive and uncompromising skeptic of the epidemiological work that had demonstrated the relationship of smoking to lung cancer. He had strong a priori views that cancer must be essentially genetic and that ultimately this would be demonstrated. Given his scientific pedigree, national standing, and propensity for public conflict, he was extremely well chosen from a public relations perspective. Although Little favored basic science

investigations into the mechanism of cancer, often using animal models, he never confronted the critical issue of the relationship of translating such research from the laboratory to humans.[3]

Cancer researchers reacted to Little's appointment as scientific director of the TIRC with surprise and distaste. "You may be surprised to know that Dr. C. C. Little was willing to become the chairman of that Committee," noted Evarts Graham, a leading American thoracic surgeon in a 1956 letter to A. Bradford Hill, whose research had been crucial to linking smoking to lung cancer.

> It seems astonishing to me that a man of his eminence in the field of cancer and genetics would condescend to take a position like that.[29]

Graham went on to express his frustration with Little's persistent skepticism in the face of mounting scientific evidence. "Isn't the evidence at hand sufficient to convince anybody with an open mind?" asked Graham.

When the TIRC had announced its first set of grants almost 2 years earlier in November 1954, Ochsner called the TIRC program "tapeworm research into the physical and chemical composition of tobacco." According to Ochsner, the industry "sought to postpone a day of reckoning for the irresponsible advertising and sale of its products."[30(p23)] The industry had demonstrated the power of its influence over science in its ability to secure Little to lead its program. Blurring the boundaries between industrial public relations and academic science was critical to the industry's interests.

SECURING ACADEMIC SUPPORT

In 1954, the committee's first year of operation, the TIRC budget approached $1 million, almost all of which went to Hill & Knowlton, media ads, and administrative costs. Funding for the grant program increased substantially in later years, reaching $800 000 by 1963. Under Little's leadership and with the meticulous interventions of the Hill & Knowlton team, the Scientific Advisory Board (SAB), made up mostly of academic researchers, conducted peer reviews of grant proposals after they had been carefully screened by the staff. The SAB had been hand-picked by Hill & Knowlton, which was always on the lookout for skeptics (and, even better, skeptics who smoked).

The TIRC settled into a program of funding research principally on the basic science of cancer, with little or no relevance to the critical questions associated with the medical risks of smoking. Most of the TIRC's program centered on basic questions in immunology, genetics, cell biology, pharmacology, and virology. This focus apparently suited all concerned. It was certainly ideal from a public relations standpoint because research unrelated to smoking would not condemn cigarettes. SAB members could assert that they were offering valuable resources to important scientific questions yet distance themselves from the specific question of the harms of tobacco and thus avoid accusations of bias.

SAB members frequently told the TIRC staff that they did not wish to be associated with the TIRC's frequent public statements about smoking and health. They were generally skeptical or agnostic concerning the harms of smoking but believed that their direct association with the frequent TIRC statements asserting "no proof " would make them appear ignorant, prejudiced, and partisan.[3]

In February 1958, a number of SAB members communicated that they were "disturbed by a misunderstanding of the relationship between the TIRC and the SAB." Several board members expressed concern about the public statements of the TIRC. Physiologist Julius Comroe apparently threatened to resign because he and other SAB members had been placed in the "awkward position of unwittingly endorsing everything that the TIRC said." Leon Jacobson of the University of Chicago, another SAB member, echoed this worry and, according to the minutes of the meeting, explained that "he did not wish to be linked with any of the statements made by the TIRC."[31]

Although the founding members of the SAB would steadfastly defend their independence from the industry, the reality is that under the Hill & Knowlton plan, they had been manipulated for effective public relations, a fact they periodically acknowledged with some bitterness.[32] Indeed, the very structures of scientific advisory boards—now ubiquitous in industry–science activities—were largely the invention of the tobacco industry under Hill's careful guidance. The SAB cemented the relationship between academic researchers and industrial interests.

By steering funds away from the effects of tobacco toward basic science in cancer, the TIRC avoided the implication that it served industry interests. SAB members were frequently in a position to secure funding from the industry to support the work of colleagues and associates, as well as other research at their home institutions. Such arrangements gave them considerable influence and clearly sustained their loyalty to the TIRC. As Hill anticipated, researchers associated with the TIRC typically avoided taking any position on the tobacco controversy. The companies had effectively "chilled" a major scientific and public health finding through the distribution of research funding. At the same time, the funds provided by the TIRC had purchased both entrée and legitimacy for the industry within the academic science community.

Little and his Hill & Knowlton colleagues constructed a basic science research program into aspects of carcinogenesis that had no potential to resolve the question that the tobacco industry had promised the American public would be at the center of attention: do cigarettes cause serious disease? Little became the industry's primary spokesman in obscuring this question. The sharp disjuncture between the research agenda of the TIRC and the commitment to resolving the controversy about smoking and health is a major indicator of the committee's essential public relations goals. In the end, the TIRC was designed to direct attention away from the issue of immediate concern to the American public and American medicine: the health effects of smoking.

In this way, the tobacco industry managed to sustain the widespread perception of an active and highly contested scientific controversy into the 1960s despite overwhelming evidence and scientific consensus that smoking caused serious disease. According to the TIRC, many independent and responsible scientists continued to voice opposition to these findings. In reality, over the course of the decade, such views were increasingly marginal and limited to those with financial ties to the TIRC.

But skepticism does not indicate that there is not consensus. With each passing year, skepticism concerning the relationship between smoking and cancer was increasingly dominated by industry resources and public media. Doubt was no longer a matter of culture or training but the carefully crafted centerpiece of an industry effort to sow confusion and heighten debate through explicit attempts to disrupt the process of normative science. The TIRC marks one of the most intensive efforts by an industry to derail independent science in modern history. And, as shown subsequently, others would follow the tobacco industry's road map, drawn in the 1950s.[33]

In 1974, Alexander Spears, then director of research and development at Lorillard (he became CEO and chairman in 1995), offered this assessment:

> Historically, the joint industry funded smoking and health research programs have not been selected against specific scientific goals, but rather for various purposes such as public relations, political relations, position for litigation, etc. Thus, it seems obvious that reviews of such programs for scientific relevance and merit in the smoking and health field are not likely to produce high ratings. In general, these programs have provided some buffer to the public and political attack of the industry, as well as background for litigious strategy.[34]

The industry–science connection was the foundation of Hill's public relations architecture; it was crucial to the ability of the industry to influence the media, public opinion, policy, regulation, and the law.

THE MEDIA

At the same time that Hill and his colleagues were establishing the TIRC, they worked aggressively to reshape the media environment. Hill & Knowlton's public relations strategy relied on intensive contact with authors, editors, scientists, and opinion makers. Hill understood that the success of any public relations strategy was highly dependent on face-to-face interpersonal relations with important media outlets. Each time the TIRC issued a press release, the Hill & Knowlton organization would initiate a "personal contact." The firm systematically documented the courtship of newspapers and magazines wherein it could urge balance and fairness to the industry.

In these entreaties on behalf of the industry, the firm's staffers repeated several key themes. First, they would note that the industry completely understood its important public responsibilities. Second, they would affirm that the industry was deeply committed to investigating all of the scientific questions relevant to resolving the controversy. Third, they urged skepticism regarding statistical studies. Finally, they offered members of the media a long list of "independent" skeptics to consult to ensure balance in their presentations.[3]

The primary independent skeptic, of course, was the TIRC's Little. Given the penchant of the press for controversy and its often naive notion of balance, these appeals were remarkably successful. Hill & Knowlton expertly broadcast the arguments (typically not based on substantive research of any kind) of a small group of skeptics as if their positions represented a dominant perspective on the medical science of the cigarette. In this sense, the public relations campaign advantaged 2 critical aspects of midcentury media practice. First, journalists favored reporting on controversy. Second, by providing opposing positions (as if they were equal) they affirmed their commitment to balance.

The problem in this formulation was that science was treated as the analog of common political debate and social controversy. At that time, few journalists had any sophisticated scientific education or training. By fashioning a controversy, Hill & Knowlton successfully secured media coverage that maintained, by its very nature, that tobacco science was "unresolved."[35]

Another strategy deployed throughout the 1950s by the firm was to learn about new scientific findings and consensus reports and to be ready to attack when they were released. The agency took pride in its extensive network of scientific informants. At its headquarters in New York, the TIRC developed a large, systematically cross-referenced library on all issues tobacco related. As one Hill & Knowlton executive explained:

> One policy that we have long followed is to let no major unwarranted attack go unanswered. And that we would make every effort to have an answer in the same day—not the next day or the next edition. This calls for knowing what is going to come out both in publications and in meetings.[36]

In many instances, the TIRC offered a rebuttal of new findings even before they had become available. They could be so nimble because they aggressively solicited a small group of doubters and broadcast their misgivings as if they were based on rigorous and systematic research. So long as skepticism survived (and of course it would), the industry possessed the basis for its aggressive defense. By 1962, after nearly a decade of work, Hill & Knowlton was eager to be able to explicitly demonstrate the impact of its interventions on its client's behalf.

> Now—can we, from this experience, answer this fundamental public relations question: Is such preparation and effort for simultaneous comment on attacks on your client worth the effort it requires?
> We say the answer is unequivocally yes!
> Proof? Well, how do you prove it?
> From time to time, man-on-the-street interviews ask about the smoking question. In almost every one of these, there will be a quotation that is almost an exact paraphrase of some statement issued for the tobacco accounts.[36]

INDUSTRIAL BENEFITS OF SCIENTIFIC UNCERTAINTY

Hill & Knowlton had successfully produced uncertainty in the face of a powerful scientific consensus. So long as this uncertainty could be maintained, so long as the industry could claim "not proven," it would be positioned to fight any attempts to assert regulatory authority over the industry. Without their claims of no proof and doubt, the companies would be highly vulnerable in 2 crucial venues: regulatory politics and litigation.[37]

John Hill thus advised the establishment of another unit, separate from the TIRC, that would explicitly act as a trade association and lobby for the industry's growing political and public relations needs. After all, the TIRC had been explicitly developed to sustain claims of independence, commitment to science, and pursuit of the "truth" about tobacco. Its credibility and influence rested on perceptions of restraint and a narrow scientific mission. As noted, the scientists Hill & Knowlton had recruited to serve on the

SAB had expressed repeated concerns about the board's independence and their personal credibility among scientific peers. In the words of an industry attorney,

> the creation of a separate organization for public information was hit upon as a way of keeping Little inviolate and untainted in his ivory tower while giving a new group a little more freedom of action in the public relations field.[26]

This approach would protect the public relations capital invested in the TIRC while creating an unencumbered unit that could engage in both political lobbying and a more aggressive brand of public relations. Freed of the constraint of the TIRC's scientific mission, Hill & Knowlton worked to create a state-of-the-art political and public relations operation to address the regulatory initiatives on the horizon in the wake of early congressional hearings. After its founding in 1958, the Tobacco Institute quickly emerged as one of Washington's most powerful, well-heeled, and effective political lobbies. Just as the industry had made critical innovations in advertising and public relations, it now pioneered new and aggressive approaches to managing its regulatory and political environment.

In 1964, using a combination of skills, resources, and Washington insiders, the Tobacco Institute assiduously prepared for the political fights that would follow in the wake of the first surgeon general's report on smoking and health. The institute anticipated that the ground on which the tobacco wars were fought would shift, at least in part, from the scientific realm to the political. Certainly, these battles would engage scientific questions, but Congress would be the new primary site of conflict. It was terrain that greatly favored the tobacco industry, with its lobbying largesse and the strong geopolitical interests of tobacco-growing states.

Indeed, looking back at the half-century that followed the path-breaking science clearly linking cigarettes to disease and premature death, it is striking to note the utter lack of serious and effective regulatory action on the part of the federal government. It is also critical to note that the lobbying and public relations efforts of the Tobacco Institute rested fundamentally on the claims of the scientific doubt and uncertainty generated by the TIRC.

LAW

Without regulatory intervention, some smokers turned to the courts for redress. By 1964, more than 30 lawsuits accusing the industry of negligence and other malfeasance had been filed in American courts. Although most had been dismissed or dropped, the risks associated with liability litigation were considered potentially disastrous. Again, the efforts of the Hill campaign were used on behalf of the legal program of the companies. The SAB and other physicians and scientists identified by the TIRC, including C.C. Little himself, were frequently deployed as expert witnesses in the industry's uniformly effective legal defenses in civil litigation. Defending such litigation required that the companies continue to rely on the no-proof strategy. According to 2 British tobacco executives:

> In consequence of the importance of the lawsuits, the main power in the smoking and health situation undoubtedly rests with the lawyers. . . .The leadership in the U.S. smoking and health situation therefore lies with the powerful Policy Committee of senior lawyers advising the industry, and their policy, very understandably, in effect is "don't take any chances." It is a situation that does not encourage constructive or bold approaches to smoking and health problems, and it also means that the Policy Committee of lawyers exercises close control over all aspects of the problems.[38]

After the 1964 surgeon general's report, even as some industry executives (including lawyers) offered proposals for modifying the decade-old "not proven" claim, the Policy Committee strongly resisted any deviation from this traditional position, which it deemed crucial to an effective defense against liability actions. The committee feared that any discussion of modifying the product or openly researching its biologically active properties could be viewed in the courts as an "implied admission" that the manufacturer knew the product was harmful.[38]

Any move away from an agnostic public posture could, it was argued, lead to high-risk litigation. Even as the industry's insistence on a continuing controversy became increasingly untenable from a scientific and public relations perspective, the companies remained wedded to it for legal reasons.[39,40] This dilemma would shape tobacco politics into the 21st century.

THE CHILLING EFFECTS OF INDUSTRY FUNDING

In their work to control the science, the companies had also found that they had secured considerable advantages in the realms of media, law, and public opinion. All of this was dependent on maintaining the notions of controversy, uncertainty, and doubt. In 1961, Hill & Knowlton celebrated its successes on behalf of its tobacco client. The total number of cigarettes sold annually had risen from 369 billion in 1954, the company's first full year of service to the industry, to 488 billion. Per capita consumption had risen from 3344 a year in 1954 to 4025 in 1961, the highest ever. "From a business standpoint," Hill & Knowlton crowed, "the tobacco industry has weathered this latest spate of health attacks on its products."[36]

In less than a decade, the industry had been stabilized and was thriving. As noted journalist Joseph Lelyveld concluded in the *New York Times*,

> Surprisingly, the furor over smoking and health failed to send the industry into a slump. Instead, it sent it into an upheaval that has resulted in unforeseen growth and profits.

He went on to quote an unnamed American Cancer Society official who claimed,

> When the tobacco companies say they're eager to find out the truth, they want you to think the truth isn't known. . . . They want to be able to call it a controversy.[41(p59)]

The TIRC, under Hill & Knowlton's guidance, had turned tobacco science into yet one more political controversy on which people could differ. So long as it could maintain this "liberal" notion of scientific knowledge, the industry remained free to promote tobacco use aggressively without regulation or liability. This explains, in part, why the industry would so tenaciously cling to the notion of scientific controversy.

CONCLUSIONS

By the early 1960s—despite categorical research findings indicating the harms of smoking—a significant "controversy" had arisen (at the behest of the tobacco

industry) over the validity and meaning of these findings. Indeed, given the widespread acceptance of the conclusion, especially among those who had analyzed and evaluated the research most closely, the persistence of debate about the harms of smoking is a striking demonstration of the powerful impact of the tobacco industry's public relations campaign. The industry insistence, at the direction of Hill & Knowlton, on the notion of no proof and the need for more research was an inspired if cynical manipulation of the natural tendencies within science to encourage skepticism and seek more complete answers to important questions.

Hill & Knowlton had served its tobacco clients with commitment and fidelity and with great success. But the firm had also taken its clients across a critical moral barrier that would have 2 important effects on American science and society. Trust in science, confidence in the media, and the social responsibility of the corporate enterprise were all substantially harmed by Hill & Knowlton's efforts on behalf of the tobacco industry. By making science fair game in the battle of public relations, the tobacco industry set a destructive precedent that would affect future debates on subjects ranging from global warming to food and pharmaceuticals.[33] In addition, by insinuating itself so significantly into the practice of journalism, Hill & Knowlton compromised the legitimacy and authority of the very instruments upon which public relations depended.

The tobacco industry's public relations campaign permanently changed industry–science relationships and public culture. Their disinformation campaign, built on a foundation of conflicts of interest, demonstrates a series of problems that continue to evolve regarding the relationship between medical science and industrial influence. Indeed, the exposure of this strategy is among the factors that have drawn such suspicion and mistrust to industry-sponsored science since the 1990s. Certainly every industry does not have the attributes and character of big tobacco, deeply committed to continuing to market a deadly product throughout the world. In this sense, tobacco is unique. At the same time, however, the significance of industrial interests in shaping scientific discourse and outcomes remains undeniable.

Conflicts of interest—such as those invented by the tobacco industry—have the potential to undermine and corrupt the scientific enterprise in ways that do significant damage to what we know and how we deploy the knowledge we possess. The impact of the relationships that the industry built and developed during the 1950s (and afterward) were of truly great significance for public health. The industry had bought not only critical time but a new generation of smokers who would succumb to the multiple harms of its product.[42] The industry program disrupted normative scientific processes at the same time that it generated new legitimacy and credibility for the companies by associating them with "university-based" science, an irony not lost on John Hill and his corporate clients.

While undermining public health and regulatory intervention, the convention of scientific uncertainty also possessed one other critical advantage for the industry: it served to reify the notion that smoking is an "individual" risk taken on at the discretion of the smoker. If, in fact, it could not be known whether smoking was a serious risk to health, the companies argued that it would be up to consumers to decide whether to smoke in this context. As a result, the companies insisted that any risks associated with their product were now the responsibility of the individual smoker.[43]

In other words, creating scientific uncertainty permitted the companies to attribute the very risks imposed by their product to individuals rather than to the companies themselves. In this framework, all liabilities would rest with the individual smoker, who now "agreed" to assume all risks that "might" be associated with the product. The companies would repeatedly use this argument to avoid liability in litigation as well as regulation. The presumption of personal responsibility for the harms of smoking has underscored all tobacco promotion and sales since the 1950s. This cultural assumption, which the tobacco industry has aggressively promoted, rests heavily on the Hill & Knowlton scientific campaign of the 1950s. Without a robust notion of scientific uncertainty, such claims would have been impossible.[3]

The story of the tobacco "controversy" and the industry's deliberative attempts to disrupt science is now, fortunately, fairly well known. In large measure, this story emerged only as a result of whistle blowers and litigation that led to the revelation of millions of pages of internal tobacco documents that both laid out this strategy and documented its implementation.[39] But what has often gone overlooked in the assessment of the tobacco episode was the highly articulated, strategic character of seizing the scientific initiative, the engineering of science. This, however, was a factor well understood by John Hill and the public relations teams that advised the companies. They carefully documented what the scientific investment would buy and how best for the companies to protect and defend that investment.

A wide range of other industries have carefully studied the tobacco industry strategy. As a result, they have come to better understand the fundamentals of influence within the sciences and the value of uncertainty and skepticism in deflecting regulation, defending against litigation, and maintaining credibility despite the marketing of products that are known to be harmful to public health. Also, they have come to understand that the invention of scientific controversy undermines notions of the common good by emphasizing individual assessment, responsibility, and judgment. ■

About the Author

Allan M. Brandt is with the Department of the History of Science and the Department of Global Health and Social Medicine, Harvard University, Cambridge, MA.

Correspondence should be sent to Allan M. Brandt, PhD, Office of the Dean, GSAS, 3 University Hall North, Harvard University, Cambridge, MA 02138 (e-mail: brandt@fas.harvard.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints/Eprints" link.

This article was accepted May 10, 2011.

Acknowledgments

This article was supported in part by a grant from the Flight Attendant Medical Research Institute and by the Institute on Medicine as a Profession and the American Legacy Foundation.

Parts of this essay appear in different form in my book *The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product That Defined America* (New York: Basic Books, 2007).

I am grateful to participants of the November 2009 Drug, Alcohol, Food, and Tobacco Symposium for their

insightful comments on an earlier version of this article.

Human Participant Protection

No protocol approval was needed because no human participants were involved.

References

1. Thompson DF. Understanding conflicts of interest. *N Engl J Med.* 1993; 329(8):573-576.

2. Brennan TA, Rothman DJ, Blank L, et al. Health industry practices that create conflicts of interest. *JAMA.* 2006;295(4): 429-433.

3. Brandt AM. *The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product That Defined America.* New York, NY: Basic Books; 2007.

4. Fleck L. *Genesis and Development of a Scientific Fact.* Chicago, IL: University of Chicago Press; 1979.

5. Proctor RN, Schiebinger L. *Agnotology: The Making & Unmaking of Ignorance.* Stanford, CA: Stanford University Press; 2008.

6. Oreskes N, Conway E. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues From Tobacco Smoke to Global Warming.* New York, NY: Bloomsbury Press; 2010.

7. Michaels D. *Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health.* New York, NY: Oxford University Press; 2008.

8. Swann JP. *Academic Scientists and the Pharmaceutical Industry: Cooperative Research in Twentieth-Century America.* Baltimore, MD: Johns Hopkins University Press; 1988.

9. Servos J. The industrial relations of science: chemical engineering at MIT, 1900–1939. *Isis.* 1980;71(4):530-549.

10. Rosner D, Markowitz G. *Deceit and Denial: The Deadly Politics of Industrial Pollution.* Berkeley, CA: University of California Press; 2002.

11. Greene JA. *Prescribing by Numbers: Drugs and the Definition of Disease.* Baltimore, MD: Johns Hopkins University Press; 2007.

12. Kluger R. *Ashes to Ashes: America's Hundred-Year Cigarette War, the Public Health, and the Unabashed Triumph of Philip Morris.* New York, NY: Vintage Books; 1997.

13. Hilts PJ. *Smokescreen: The Truth Behind the Tobacco Industry Cover-Up.* Reading, MA: Addison Wesley; 1996.

14. Kessler D. *A Question of Intent: A Great American Battle With a Deadly Industry.* New York, NY: PublicAffairs; 2001.

15. Cummings KM, Brown A, O'Connor R. The cigarette controversy. *Cancer Epidemiol Biomarkers Prev.* 2007;16(6): 1070-1076.

16. Miller K. *The Voice of Business: Hill & Knowlton and Postwar Public Relations.* Chapel Hill, NC: University of North Carolina; 1999.

17. Hanmer HR. Luncheon meeting—November 5, 1953, representatives of industry, Yale Club. American Tobacco. Bates No. 950167334/7335. Available at: http://legacy.library.ucsf.edu/tid/bqh54f00. Accessed October 20, 2011.

18. Hill JW. Re: revisions to white paper by Mr. Hanmer. Available at: http://tobaccodocuments.org/ness/5306.html. Accessed October 20, 2011.

19. Hill & Knowlton Inc. Draft of proposals for cigarette makers for discussion. American Tobacco. Bates No. 950259748/9756. Available at: http://legacy.library.ucsf.edu/tid/bbz34f00. Accessed October 20, 2011.

20. Hill & Knowlton Inc, Cigarette Research and Information Committee. A frank statement to the public by the makers of cigarettes. Ness Motley Documents. Bates No. 4720. Available at: http://legacy.library.ucsf.edu/tid/lby66b00. Accessed October 20, 2011.

21a. Draft Recommendations for Cigarette Manufacturers. December 22, 1953. John W. Hill Papers, State Historical Society of Wisconsin, Archives Division. Available at: http://www.ttlaonline.com/HKWIS/0296.01. Accessed November 6, 2011.

21b. Hill & Knowlton Inc. Preliminary recommendations for cigarette manufacturers. American Tobacco. Bates No. 950259748/9756. Available at: http://legacy.library.ucsf.edu/tid/bbz34f00. Accessed October 20, 2011.

22. United States v Philip Morris et al., Civil Action No. 99–2496 (GK) (2004).

23. Tobacco Industry Research Committee. A frank statement to cigarette smokers. Lorillard. Bates No. 86017454. Available at: http://legacy.library.ucsf.edu/tid/qxp91e00. Accessed October 20, 2011.

24. Thompson C. Meeting with representatives of TIRC members. Ness Motley Documents. Bates No. 4637. Available at: http://legacy.library.ucsf.edu/tid/fyx66b00. Accessed October 20, 2011.

25. Ochsner A. *Smoking and Cancer: A Doctor's Report.* New York, NY: Julian Messner; 1954:25.

26. Public relations in the field of smoking and health. American Tobacco. Bates No. 966047163/7176. Available at: http://legacy.library.ucsf.edu/tid/zcw51a00. Accessed October 20, 2011.

27. Gertenbach RF. Deposition of Robert F. Gertenbach. Council for Tobacco Research. Bates No. CTRMN000001/0268. Available at: http://legacy.library.ucsf.edu/tid/nlq30a00. Accessed October 20, 2011.

28. Hill & Knowlton Inc. Press release, re: Timothy V. Hartnett. Depositions and Trial Testimony Archive. Bates No. USX263293–USX263294. Available at: http://legacy.library.ucsf.edu/tid/ppw36b00. Accessed October 20, 2011.

29. Graham EA. Evarts A. Graham to A. Bradford Hill. Graham Papers, Washington University, St Louis, August 9, 1956, Box 45, Folder 354.

30. $82,000 is granted to study smoking. *New York Times.* November 8, 1954:23.

31. Report On Meeting Of Scientific Advisory Board Charleston, S.C. February 14-15, 1958. American Tobacco. Bates No. 950259598/9602. Available at: http://legacy.library.ucsf.edu/tid/naz34f00. Accessed October 20, 2011.

32. Tobacco Industry Research Committee. Report on meeting of Scientific Advisory Board, New York, N.Y., May 10–11, 1958. American Tobacco. Bates No. 961003439/3443. Available at: http://legacy.library.ucsf.edu/tid/kpr94f00. Accessed October 20, 2011.

33. Brownell KC, Warner KE. The perils of history: big tobacco played dirty and millions died. How similar is big food? *Milbank Q.* 2009;87(1):259-294.

34. Spears AW. Brief review of the organizations contributing to research into tobacco. Lorillard. Bates No. 01421596/1600. Available at: http://legacy.library.ucsf.edu/tid/lmf20e00. Accessed October 20, 2011.

35. Kleidman S. Blowing smoke. In: *Health in the Headlines: The Stories Behind the Stories.* New York, NY: Oxford University Press; 1991:182-228.

36. Hill JW, Darrow RW, Thompson C, Hoyt WT. Smoking health and statistics: the story of the tobacco accounts. Lorillard. Bates No. 98721513/1551. Available at: http://legacy.library.ucsf.edu/tid/ksn33c00. Accessed October 20, 2011.

37. Proctor RN. Everyone knew but no one had proof: tobacco industry use of medical history experts in US courts, 1990–2002. *Tob Control.* 2006;15(suppl 4): iv117–iv125.

38. Rogers PJ, Todd GF. Report on policy aspects of the smoking and health situation in U.S.A. Philip Morris. Bates No. 2048925980/6014. Available at: http://legacy.library.ucsf.edu/tid/prq74e00. Accessed October 20, 2011.

39. Glantz S, Slade J, Bero LA, Hanauer P, Barnes DE. *Cigarette Papers.* Berkeley, CA: University of California Press; 1996.

40. Kyriakoudes LM. Historians' testimony on "common knowledge" of the risks of tobacco use: a review and analysis of experts testifying on behalf of cigarette manufacturers in civil litigation. *Tob Control.* 2006;15(suppl 4):iv107–iv116.

41. Lelyveld J. Cigarette makers prosper despite debate on hazards. *New York Times.* November 29, 1963:59.

42. Cummings KM, Morley CP, Hyland A. Failed promises of the cigarette industry and its effect on consumer misperceptions about the health risks of smoking. *Tob Control.* 2002;11(suppl 1): i110-i117.

43. Chapman S. Blaming tobacco's victims. *Tob Control.* 2002;11(3):167-168.