## Chapter 10: Scientism Rejected 1972-1974[1]

DURING HANDLER'S SECOND YEAR in college— only his fifth year of education outside his home— after reading *Arrowsmith* and listening to lectures about the marvels of biochemistry Handler became converted to the view that living things were biochemical machines. In graduate school, Handler was seized by a grand illusion that biochemistry could provide a full and complete explanation of life; he imagined the day would come when a selected mix of chemicals poured into a beaker would produce life.

At Duke University during World War II, Handler overcame what he later called his "social paralysis," and by dint of management skills, aggressive fund-raising for biochemical research, and a silver tongue, became the head of the biochemistry department. He contributed resources to the financially strapped society of biochemists which, in turn, helped Handler secure a coveted position at the National Institutes of Health where he had the authority to choose the investigators who would receive federal funds for biomedical research. Handler funneled essentially the entire federal largess for biomedical experimentation to his biochemical constituency — a community that shared his ideology concerning the supremacy of the reductive pointillist approach to biomedical research. Handler systematically blocked funding of integrative system-level research of emergent biophenomena in favor of molecular studies. As a consequence, exploration of the biomedical role of electromagnetic energy was blocked, which had a poisonous effect on biomedical research because electromagnetic energy is the only force in nature that acts at distance and therefore the sole physical means for synchronizing the numerous system-wide process that create life, health, and disease

In the years that followed, while functioning as the brain and mouth of the National Science Foundation, Handler proselytized science as mankind's greatest intellectual achievement, the solution to society's problems, and deserving of fifteen percent annual increases in federal funding for research. Handler argued that he, rather than the Congress or the Administration, was uniquely qualified to apportion the funds allocated by the Congress for biomedical research among biochemists, choosing the proposals, programs, and policies that best served the nation's interests.

Handler was a science advisor to President Nixon, and therefore in a formal position to advise to the Administration on any policy issue related to science or technology. The unsolicited advice he frequently offered to Nixon's assistants was almost always ignored because they considered it oratorical and self-serving

Handler's recommended solution to the problem of environmental degradation caused by technology was a cliché, "We need more technology," and a prescription for a regression pattern because new technology would also cause degradation, necessitating still more technology. Handler's approach to the issue of health risks was similarly lacked merit, and was politically offensive — he believed public concern about health risks was only an emotional reaction to modernity. However, he recognized that emotions were real and required political consideration rather than just the biochemical research he preached. Handler's putative

[1] This is a preprint of a manuscript that will undergo copyediting and review before publication in final form.

solution to the problem of assessing the health impact of technological programs was to balance political and economic factors, with science playing only a secondary role. He proposed treating health risks as a business rather than biomedical issue and expressed his proposal in the form of a doggerel: ”The issue should be resolved by balancing the public good against the risk to the individual.”

Handler’s initial policy for determining the environmental threats to health was to rely on the judgement of scientists because, he said, they were trained to analyze data produced in biochemical studies and human experimentation, and to evaluate the safety of suspected dangerous agents. Handler opposed basing decision-making regarding safe exposure levels on animal studies, claiming their biochemistry differed from humans. But Handler’s policy of reliance on biochemical studies gained no support outside the biochemical culture, and ethical concerns led to development of federal rules that greatly restricted use on controlled human experimentation in a laboratory setting. Handler responded by urging a policy that amounted to a form of involuntary human experimentation — the statistical analysis of data in public records to assess whether the death rate of humans who were likely to have been unknowingly exposed to a particular environmental agent was higher than expected. Under this policy, a committees of scientific experts would determine the risk to individuals by analyzing the results of actuarial data, and then subjectively balance the risks they perceived against what was they considered to be the public good. Handler believed that in almost all instances, the results of studies of involuntary exposure would show there was no meaningful health risk, inexorably leading to a judgment that concerns about health risks were nil. Such outcomes, Handler predicted, would enable the public to see that exposure to the environmental agent was safe.

Handler’s goal was to establish science as a preeminent institution in American society; despite chronic bad health, he worked unstintingly to bring about some version of his grand illusion. He was a science policy advisor to three Presidents and seven Congresses, before whom he testified more than hundred times, and he strongly influenced the policies of the major governmental agencies that supported biomedical research — the National Institutes of Health, one of which was his idea and was created in response to his incessant lobbying, the National Science Foundation, and the Veterans Administration. By virtue of his organizational skills, financial acumen, rhetorical capabilities, and a special arrangement with the outgoing president of the National Academy of Sciences, then the most prestigious position in the firmament of American science, Handler was unanimously elected as his successor,

Handler was employed as the chief executive officer and chairman of the board of the Academy, a private organization created by the government to provide science-related advice, when asked, but whose scope Handler enlarged to include advice he thought the government needed to hear. His authority at the Academy was absolute.

Handler controlled more than a thousand employees and more than five thousand volunteer scientists whom he appointed annually to about five hundred ad hoc committees that provided advice to federal agencies pursuant to negotiated contracts. Additionally, he appointed private committees that Handler convened to provide public advice on issues Handler deemed important, an enterprise Handler funded using the vigorish from the Academy’s government contracts. Handler maintained ultimate editorial control over every committee report produced under the aegis of the Academy; some of which were published, others remained secret if requested or required by the sponsor.

Handler also held other politically powerful positions. He remained the chairman of the National Science Foundation, which dispensed funds for research grants, but only regarding matters he considered appropriate unless the Congress or the President specifically directed otherwise. In his capacity as the head of the Academy, Handler was a member of the President's Science Advisory Committee, an office inside the White House that offered a direct connection to President Nixon, with whom Handler was constantly in conflict. He also remained a consultant to the National Institutes of Health and the Veterans Administration. The Institutes funded only biochemistry-based biomedical research but the Veterans Administration also funded biomedical research based on electromagnetic energy.

In Handler's eyes, such nonmolecular-based research was inconsistent with the advancement of scientific knowledge, and he opposed it whenever possible. Handler was also a board member of three drug companies, whose biochemical research was deeply important to him because it symbolized the power of biochemistry in a manner that the public could understand. Despite constant criticism, Handler saw no conflict-in-interest in appointing pro-drug-industry experts to Academy committees that provided advice about drug safety and efficacy because, he argued, the contracts were with federal agencies, not drug companies. The only agency Handler refused to serve as a consultant was the Department of Defense; doing so, he maintained would be a conflict-in-interest because the Department was the Academy's biggest customer.

Handler's scientistic campaign became more ardent after he became the head of the Academy, resulting in further loss of credibility within the Administration, and the risk of eviction of science from its privileged place within the White House became palpable. The shrunken political state of science awakened Handler from his dogmatic slumber, at least to the extent that he realized the halcyon post-war period of science's popularity had ended and the status of science in society was decreasing. Nevertheless, Handler remained undaunted. In press interviews and speeches, he increased his commitment to scientism and took even stronger policy stances on controversial issues, and reiterated his routine pretentious characterization of science — that it was proof of humanity's greatness and a universal solvent for its problems. Handler said he felt the public's pain regarding health risks and environmental degradation and offered advice, both personally and via Academy committees, that he said would resolve their concerns. He conceded that some Academy committees appeared to be biased in favor of business interests but claimed he had fixed the problem. Handler agreed the Institutes had made scant progress in finding the causes and cures for cancer and other diseases but blamed the Administration and the Congress because, he said, they chronically underfunded biochemical research.

During his rise in national prominence, Handler unceasingly proselytized about science as mankind's greatest intellectual activity and the solution to society's problems. But his crusade for the advancement of science was continually challenged politically and financially, and over the years the popularity of science constantly decreased. The exigencies of his time, particularly In response to the problems of side effects of technology and environmental degradation, Handler argued that financial support of biochemical research was the solution, but his policy was perceived as meritless. His next bite at the apple was to reconceptualize health risks and environmental degradation as business issues that touched the domain of science only lightly. He explained the new policy using a doggerel; "The issues should be resolved by balancing the

public good against the risk to the individual." That tactic was similarly ignored and his crusade encountered even more obstacles. Agencies and the Congress, acting for their own political purposes, commenced addressing questions to the Academy that it was required by its charter to address, but that had no answers which could credibly be provided any committee of science experts, leaving Handler and the Academy with hopelessly impossible tasks, like that of Sisyphus.

PRESIDENT NIXON ASSUMED OFFICE during the period Handler was in the process of consolidating his control of the National Academy of Sciences and beginning to use its ostensible authority to proselytize his opinions about science. Shifting cultural and political currents were jeopardizing its status in society, and the sustainability of publicly supported basic scientific research of the kind so dear to Handler was in doubt.
He told Nixon, in effect, that strengthening the scientific endeavor was critical to the health and welfare of the nation, and that the Academy was the foremost authority in propounding the requisite policies to achieve the goal. Nixon, however, was a pragmatist, in contrast to Handler, an ideologue whose ideas about science were pregnant with political implications regarding which he was essentially blind. To attract support for his gospel, Handler sought to associate the values of basic research with those of the wider American culture — a task he found progressively more difficult because the public no longer viewed scientists as an admirable priesthood. There was little he could point to as evidence that a biochemical approach to biomedical science was successful, so he surrounded himself at the Academy with physicists and engineers, who carried forward his exceedingly weak argument that, in modern times, technological progress depended on basic research, as shown by the development of the atomic bomb. Handler struggled to support his assertation that equated science with the advance of civilization, claiming it provided "the intellectual structure of our time" and "ranks among the most magnificent accomplishments of our civilization."

In his assertion of the cultural authority of science, Handler portrayed it as a rational activity implemented by an objective methodology that yielded a true understanding of reality in objective language, and provided a sound basis for decision making. Handler believed the distrust for science he saw among the middle and upper-middle classes could be overcome by educating them about the importance of science.
He said, "it is essential that the humanist, the artist, and all who follow careers outside the world of science have full cognizance and understanding of the nature of the world within which we live, a perspective that has been laboriously achieved over decades and centuries by scientists."

Handler expected that educated, thinking lay persons would accept the evidence and interpretations scientists produced as facts and, consequently, would respect their authority and pronouncements. When he made his annual pleas before House and Senate budget committees for federal funds to support research and education, he relied principally on anecdotal stories of past achievements and his dictum that technological progress rests upon advances in basic science. He lamented the utilitarian basis of the Administration's funding for science because, he said, it obscured the intellectual importance of science. Handler's rationale for public support went beyond asserting that all true knowledge was scientific in nature and

that basic research was the mother's milk of technological progress, he also declared that scientific research was necessary for solving social problems. His claims, however, were counterproductive politically and met with strong criticism from sociologists. They argued that Handler's perception of social reality was grossly simplistic, and that training as a biochemist could not supplant cultivation of habits and values that are important for the well-being of a community as the solution to societal problems in a democracy.

Handler thought Nixon was overwhelmed by the complexities and challenges he faced when dealing with issues involving science and technology, and considered the presidential aides as ignorant about science and incapable of forming effective national science policies. Handler used his position as a presidential science advisor in the White House science office as a vehicle for directly providing advice to presidential aides but had a negligible impact on Administration science policymaking. The aides viewed Handler as a loose cannon much more likely to hurt than help the Administration he nominally served as a science advisor and as head of the National Science Foundation. They also regarded Handler as an arrogant and ambitious zealot who was trying to usurp the constitutional power of the President to set national policy, and who ran the National Academy of Sciences in a personal fashion.

Handler used the Academy as a platform to volunteer advice about science policymaking — a radical change in practice compared with that of previous Academy heads, who spoke only when asked by the government. And adding to the antagonism he created within the Executive Department, Handler's advice as expressed in Academy reports often conflicted with the Nixon's plans and policies. In turn, he ignored what Handler had to say, and used him like a tool in instances when it was helpful to his Administration. Handler's appointment by Nixon to an Executive Department committee tasked to assess the impact of technology was an example. The committee recommended increased funding for biochemical research to assess health risks from technology, and that risk-benefit analysis be used to evaluate the social desirability of technology. Nixon not only declined to implement the recommendation for biochemical research Handler had a insinuated into the committee report, he also continued the trend of reducing the annual research budget of the National Science Foundation, which Handler headed. Additionally, Nixon sanctioned the policy of regarding health risks as a managerial rather than biomedical problem by adopting the recommendation of the committee's industrialists to support the risk-benefit analysis method for evaluating the risks of technology. Nixon further aggravated Handler by directing the Foundation to repurpose funds allocated for basic research to support development of an international group pf economists that was developing a business-management method for assessing health risks of technology. Nixon appointed Handler as the U.S. representative to the group — a time- and effort-consuming responsibility regarding a matter in which he had no interest whatever. Handler complained strongly about Nixon's decisions and predicted American scientific advancements would lag that of other nations, a claim presidential aides dismissed as out of touch with reality.

Handler believed the Administration's plan to reduce biomedical research funding was a political reaction to the public's misunderstanding of the relationship between science and technology. As Handler saw things, the public conflated science, an erudite intellectual activity, with technology, a collection of products and services, and wrongfully blamed science for environmental degradation and negative health impacts rather than the misuse of technology, which he said was the actual cause of any adverse consequences. Handler told presidential aids

that the Administration should acknowledge the public's misapprehension and correct it via specifically budgeted educational efforts overseen by the Foundation. He also told Nixon's aides they should refrain from using the public's attitude toward the negative impacts of technology as a reason to decrease federal support for basic biomedical research.
Handler's perception of science and that of the aides, however, were incommensurable, and they ignored Handler's advice.

In speeches at meetings of biochemical societies, Handler rallied his constituency to oppose the Administration's policies regarding lack of support for biochemical research, and to work toward dispelling the confusion in the minds of laymen concerning the distinction between science and technology. Handler modeled the relationship like that between parents and their children, implying that technology could not exist in the absence of continuing basic research. The Administration, in contrast, saw technology as means to a larger economy and a stronger nation, and maintained a focus on the practical applications of science. Basic research was regarded as an expensive pastime of a small self-regulating group that consumed the taxpayer's money in pursuit of intellectual satisfaction that had no foreseeable public benefit. The Administration's policymakers favored funding the applied research of engineers — the group of scientists that specialized in producing a foreseeable benefit and that, at the time, Handler was desperately trying to prevent becoming a permanent part of the corporate Academy.

Handler told the Administration that knowledge of how the environment reacted to various forms of large-scale pollution was unknown, and consequently, until appropriate research was done for each pollutant, predicting what regulatory strategy would be successful was impossible. He recommended that no regulatory or protective steps be taken until the necessary biochemical understanding had been achieved.
Doing otherwise, Handler said would likely result in more harm than good; he urged producing more biochemists to facilitate the elucidation of the needed information more quickly. Handler also advised the Administration that industry's a responsibility to warn the public about known hazards did not extend to warning about alleged health risks that had no known biochemical basis. He rejected the idea that the burden of responsibility for health risks from untried technologies or industrial practices should be on industry, choosing instead to place it on the public. According to Handler, biochemists should be funded to search for conclusive evidence of the biochemical mechanisms of toxicological hazards; he said biochemists should be relied upon to parse their data and identify the dose level at which a chemical became hazardous. In the meantime, to avoid damaging the economy and limiting the benefits of technology, Handler advised the Administration to adopt a policy of relying on statistical studies of ordinary citizens to identify catastrophes in the human population, as he had recommended earlier in his career regarding the hazards of smoking.

Speaking under the color of the Academy, Handler routinely volunteered policy advice regarding any matter that interested him. When he spoke, the prestige the Academy enjoyed at the time was often imputed to him personally, generating public pressure on the Administration to explain and defend its policy in the area when, often, none had been developed. Handler's strategy thus maneuvered the President into a defensive posture in areas not of its choosing—abortion was an example. Handler maintained that industry was unjustly blamed for the

consequences of side-effects and pollution, claiming the real cause was the uncontrolled growth of the population.
Handler urged the President to support national policies of destroying prenatal babies based on results of prenatal genetic tests, permitting elective abortion as determined by the physician, and funding biochemical research of reproduction aimed ultimately at eliminating the growth of the population.

Handler claimed that the inherent ability of scientists to provide objective information was the foundation for the policies he offered the Administration which, he believed, had no other reliable source of the knowledge needed to solve the nation's problems. However, his actions and persona undercut his credibility, revealing his limitations as a policy doyen and the impossibility that his goal —a role for scientists in governing society — could be realized. His extreme public-health and environmental policies, public language, and behavior set in motion counter forces that weakened both him personally and scientific itself.

A vivid example of his excesses was his version of risk-benefit analysis for identifying acceptable health risks created by technology. According to Handler, final decisions regarding public safety should be made by science experts who weighed their perception of the meaning of biochemical data against speculative benefits of technology. When Handler used his risk-benefit method and played the role of a science expert, he concluded DDT in the environment was harmless except for a few bird species, and that air pollution from automobiles was acceptable. Because of its elitism and subjectivity, Handler's egregious method of health-risk analysis had a negative impact on the Administration

Other actions by Handler also had undesirable consequences for his reputation and that of science. From the Academy bully pulpit, Handler attacked other scientists — invariably far better scientists than he — in revenge for their nonconformity with his opinions about the side-effects of technology and the health consequences of pollution. Handler believed the consequences were negligible and that the only meaningful problem was the public's emotional overreaction to wayward scientists who spoke out of ignorance. Handler's criticism of scientists who disagreed with him — hallmarks of his speeches and behavior throughout the 1970s — was not his only form or retaliation. He also employed the machinery of the Academy to block nationally prominent scientists from being admitted as members. His behavior toward other scientists belied the rationality of scientists which he maintained was the reason the Administration should rely on the judgement of scientists. Further, Handler's behavior undercut the validity of his proposed method for assessing acceptable health risks, which relied heavily on the judgement of experts ; his retributive actions made clear that he meant only the judgement of scientists who agreed with him, and his actions contributed to the public's adverse perception of science as an institution.

Handler advanced an extreme policy regarding the consequences of chemical technology that was politically untenable and detrimental. He assumed that anthropogenic environmental chemicals posed no meaningful threat to human health and the environment, contending that whatever harm they produced was outweighed by the good they provided. He sought to insulate chemical technology from governmental scrutiny for safety, thereby ensuring technology's true impact would remain unknown. The gist of his advice to the Administration was that concerns regarding health and environmental risks should be ignored unless and until results of biochemical research strongly indicated otherwise. His recommended reliance on

pointillist biochemical studies, even though they were generally recognized as having a nil possibility of resolving the ills of society and a high probability of exacerbating them by dissipating time and money. Regardless of whether Handler's preferred policy stemmed from ideology, expediency, or mental instability, it essentially amounted to a concession that science was irrelevant to the class of problems that most troubled people.

Even though there were no studies that indicated scientists were smarter or more ethical than other professionals, Handler theorized that scientists were intellectually and morally superior because only they had the methodology and integrity to discover true knowledge of the world. Handler himself, however, furnished abundant evidence against his theory. The research methodology he used was strictly descriptive, the meanest level of knowledge in science (see Chapter 1), and after leaving the laboratory he manifested dubious ethical behavior. For many years, Handler accepted a salary, through Duke, from the National Institutes of Health for research in North Carolina he did not perform or supervise because he mostly lived in Washington, D.C. He served as a director of a drug company while simultaneously using his influence to help drug companies escape federal regulation. When in authority at the Institutes and the Foundation, he favorably influenced research funding for his friends and blocked funding for scientists who refused to adhere to his ideology of science or who disagreed with his opinions. about the health risks of technology.

Academy committees Handler appointed were commonly identified as rigged because their members were economically bonded to the stakeholders or were selected because their opinions were foreseeable based on their prior publications and speeches, or both. The universal syntaxial style manifested in Academy reports was that a committee issue a judgement using one voice, with no disagreements, contrary opinions, or even an indication they existed. The uniformity of style was irrebuttable evidence the committees were manipulated, because a truly representative group of experts assembled to opine on an important issue would not credibly be expected to agree unanimously on every salient point. Typically, what the one voice had to say was foreseeable from an analysis of the historical positions of Handler's appointees.

Handler's Apocryphal Text (see Chapter 8) was a graphic example of a rigged deliberative process, as were his appointments of biased Academy committees to evaluate the safety of pesticides, food additives, air pollution from automobiles, and human exposure to electromagnetic energy of the type produced by powerlines and other technologies that inject electromagnetic energy into human living space.

Handler himself was a near perfect model of the kind of member he sought to appoint to Academy committees: his opinion on almost every subject was already known, his standard practice was to never debate an opinion but only express it, and he was aghast at the suggestion his position as a board member of a drug company might have any influence on his appointees to Academy committees tasked to opine on proposed national drug policies. The issue of committee-rigging brought into sharp focus Handler's limitations and those of science, revealing that, ultimately, it was governed not by knowledge but rather by values as reflect in political maneuvering. The message Handler quite inadvertently delivered to the Nixon Administration was that it didn't need a White House based committee of pro bono science experts to provide advice, he already had political advisors who were far more skilled than Handler.

Handler sharply opposed the Administration's research program to find a cure for cancer. He believed government health officials and the President's aides knew too little about science, and were hopelessly unable to create and manage such a program.
He believed the money budgeted for the program would have been far better spent for basic biochemical research at the nation's elite universities. Handler claimed that too much money was being spent on patient treatment and too little on university-based research and education of more biochemists. He said the President's cancer program was failing because of a lack of biochemical knowledge, a fact he claimed was obscured by the Administration in press interviews and public presentations. Handler claimed the program would result in a lowering in excellence of basic research, and advised the Administration to begin basing its biomedical policies on objective analysis rather than ideas that were popular with the public. On numerous occasions, Handler proposed creation of a national department of science that would control the nation's biomedical endeavors, but he never even came close to eliciting a serious response from the Administration or any group of capable scientists and administrators.

HANDLER ATTEMPTED TO INFLUENCE Administration science policy from inside the Administration — in his capacity as a member of the President's science advisory committee and head of the National Science Foundation — and from the outside as the head of the Academy. In the latter capacity, he organized a national revolt of scientists against President Nixon's decision to reject the recommendation Handler made to the President for appointment as chief administrator of the Foundation because that person had publicly opposed a particular Administration technology program.
Handler said he was shocked that politics was involved in the President's decision, and the resulting furor forced the President to approve Handler's choice — a rare instance of intentionally humiliating a President of the United States. Unknown to Handler at the moment, he would pay a great price for his hubris — President Nixon resolved that Handler's formal role in his Administration as a science advisor, and that of all other establishment scientists, would be eliminated.

Handler used his White House position as science advisor as well as his positions as head of the Foundation and the Academy to volunteer advice to the President in numerous areas of science, slipping seamlessly between his various platforms. But whenever he spoke, his objectives were to foster creation of a permanent structural presence for science in the government, exercise an influential voice for scientists in shaping the government's science policies, obtain more money for biochemical research, or secure the education of more biochemists —objectives that rankled Nixon and his aides. Even though scientists were well-treated financially and generally heard by successive administrations, Handler continued to advance his objectives, which he regarded as necessary remedies for what he saw as the inability of politicians to form effective national science policies because of their ignorance of science. Handler believed Nixon was morally obligated to consult the Academy and the Foundation in matters involving science policymaking, which essentially meant deciding how much money would be spent for science, what areas in science would be supported, and who would receive the funds, and how safety levels for anthropogenic chemicals and electromagnetic energy would be determined.

Handler never presented a rationale for the objectives he espoused nor offered evidence that their achievement would benefit society. He provided only a series of speeches infected with contradictions. In perhaps the most prominent example, he told an audience, "Our national apparatus for the conduct of research is falling into shambles," and a few months later he told another audience ,“Our scientific capabilities were never greater; our scientific productivity remains the marvel of the world."

President Nixon’s view of science differed profoundly from Handler’s, and the Administration acted accordingly. Nixon said science was “self-evidently among the high priories of the Administration," but he believed science policymaking was political and not in the domain of unelected scientists, and that only research which had a practical purpose should be supported by the government. He favored the use of science to produce societal benefits and opposed the use of federal funds solely to elevate the intellectual level of scientists. The White House’s budget office — the Executive Department’s most powerful planning tool — dismissed Handler’s cries for money for such a purpose as baseless and evidence of the financial insatiability of academic science.

Nixon looked to his principal science advisor, who headed a White House office on science and technology and chaired a committee of experts — which included Handler — that was expected to provided ideas about specific programs which could lead to industrial applications, technological improvements, and cures for disease, but he received none he considered worthwhile. But the ideas that led to projects which appealed to the President — finding a cure for cancer and developing a supersonic airplane, as examples— came from a White House aide. Nixon replaced his principal science advisor with a non-academic scientist, aggravating Handler who viewed the new advisor as a poor conduit of ideas to the Administration. Nixon also appointed an engineer to head a White House group charged to find new forms of technology that could promote economic growth. The appointment further upset Handler, who saw it as confirmation of Nixon’s  interest in technological innovation and relative disinterest in basic research.

Working in the inner circle of Presidential advisers, the engineer studied hundreds of federal projects whose objectives were to exploit technology for use in resolving major national issues, including healthcare. He assumed control of an ongoing but lethargic study by the science office for developing technology to serve social purposes, and broadened it to include other governmental projects engaged in evaluating the economic, legal, and political aspects of technological development. One of his recommendations was that the practice of supporting unfocused research in which each researcher decides what research would be done should be ended in favor of government supervision of what research was done using public funds. Nixon’s favorable response to the recommendation reinforced Handler’s fears that the technology initiative would advance the interests of the business community at the expense of academic science.

Handler’s conflict with Nixon spread to his science advisor — the head of the White House office that represented the interests of academic science inside the Administration — after he publicly opined that the National Academy of Sciences was not universally regarded as a source of objective advice in its role of scientific adviser to the federal government. The science advisor said the Academy was a quasi-governmental organization that earned almost all the payroll for its large bureaucracy from federal contracts and, consequently, had built-in

conflicts-of interest. He added there was a need for a means of "generating unbiased, authoritative positions on subjects which involve science and technology," and also said the Academy had "shades of advocacy" and that "the best which could be done was to get a balance of interests rather than have no conflicts of interests in advisory groups." The advisor concluded, "One thing that is missing is a credible group which can lay out in terms understandable to the public, Congress, and the Executive branch, too, what the scientific and technological facts are and to do it in an unbiased and credible way."

Handler exploded. In an intemperate personal letter to the science advisor, Handler attacked him for suggesting that the Academy was biased. When the advisor attempted to placate Handler, he was criticized by Nixon's closest aides, which resulted in his resignation. His decision, and the absence of an indication from the Administration that a successor would be appointed, further hardened Handler's belief that his opinions and the needs of science were being frustrated by what he considered to be an Administration that was hostile to science and basic research. Handler's pessimism was reinforced by ominous developments. The President replaced the entire upper levels of management in Department of Health — which controlled biomedical research in the U.S. — with officials who were sympathetic to his policies regarding research, indicating to Handler that money budgeted to the National Institutes of Science for basic biochemical research would be allotted to the President's War on Cancer, exactly the kind of government-specified research Handler hated. Additionally, the Administration's proposed budget for the new fiscal year included further reductions in spending for biochemical research.

Early in 1973, President Nixon, having decided science wasn't entitled to a special place in the White House, ordered elimination of his White House science office, which consisted of his science advisor and staff, and a committee of presidential science advisors chaired by the science advisor. Nixon assigned the duties of the science office to the National Science Foundation, a small second-rank agency created to finance research and education at universities, and he appointed its director not as presidential science advisor but as a science advisor for all non-defense-related technological research funded by the government, with instructions to report directly to the Secretary of the Treasury. The President's reorganization was generally accepted as a presidential prerogative; the only strong objection was raised by Handler and the amalgamated biochemical societies. They interpreted removal of the science office from the White House as a demeaning of the societal status of science. Handler viewed the choice of a replacement plan for the science advisory function as a trivialization of the function because the director of the Academy had no staff capable of providing advice about technological projects to the President's aides, budget assistants, or to first-rank agencies.

Handler complained into the wind that even if the Foundation director hired a staff with the requisite experience and knowledge, he was certain to be ineffective because he lacked the clout of a White House official who had direct access to the President. Assigning the duties of the science advisor to the director of the Foundation, Hander further said, would result in a conflict-of-interest because he could be asked to advise on the allocation of science funds to agencies that were competitors with his agency for those funds. Handler expressed fear the Foundation was being used as a tool to discredit science, making it appear to the public in what he called "a more political light" because of a perception its funding decisions were influenced by "directives from White House staff rather than being governed entirely by scientific considerations."

The President's reorganization of the advisory function in the Executive branch and the conspicuous absence of a role for the Academy in advising the government alienated Handler, and he reacted petulantly, publicly criticizing Nixon for downgrading science at time significant upgrading was vital to the nation. Handler said the reorganization reflected the President's ignorance about the relation between science and government: "I fear there is a lack of understanding of the pervasive role of science and technology in all areas of public policy. What also bothers me is the lack of an objective voice in the executive office viewing agency proposals from a technical point or view." The President's aides, however, did not share Handler's pretentious attitude about science; they maintained that the scientific advice provided by the eliminated office was unnecessary for policy formation by the White House, and that science, although important, was a lower-level activity appropriately performed at the department and agency level. A direct consequence of the reorganization was a heavy budgetary emphasis by the Administration on technological goals whose achievement would have immediate social importance, and a corresponding decrease in funding for Handler's dream — research that sought basic scientific knowledge for knowledge's sake.

Only a decade earlier, President Kennedy, who first brought Handler to Washington, D.C., said science needed "to be coordinated and shaped at the level of the Executive Office of the President" and that "staff efforts at that higher level are required for the evaluation of Government programs in science and technology." But times and presidents changed, and the culture of science was no longer seen by the public or the government as privileged over other cultures. When Handler was asked whether the shift of the advisory function from a White House office to the Foundation was a downgrading of science, he conceded, "it could be interpreted that way."

Handler crusaded for many years to secure recognition of science as a permanent independent establishment that was immune to the vagaries of the American political system. He envisioned a structure consisting of a government-funded agency that awarded research grants, and the Academy which provided guidance and policy advice to the polity and public, under contract to agency clients and on its own volition. Handler used the Academy advisory process to generate policy reports consistent with his ambitions, and he exploited his presence at monthly meetings of the White House science advisory committee to offer policy advice directly the President, mainly focused on budgets for biomedical research concerning the ever-increasing technology-related problems of side-effects and environmental degradation. President Nixon's termination of the science office evidenced his refusal to recognize an impactful role in policymaking for Handler or other academic scientists.

Around the time Handler was ousted from the White House, the Congress also turned away from reliance on his advice. He had testified before congressional budget committees numerous times, seeking funds to educate more biochemists and support their lifelong university research programs, which he claimed was the best step possible toward solutions to society's problems. His gilded language about the greatness and purity of science and his promises of the biomedical advances it would provide resulted in a financial largesse that raised Handler to exalted heights of popularity within his constituency, the amalgamated biochemical societies of America, whose membership grew to more a half-million scientists. But the benefits Handler promised and predicted they would deliver never materialized and his honeymoon with the Congress ended. It created its own think-tank to provide advice relevant to legislation

dealing with funding science and the environmental consequences of technology, marginalizing Handler and the Academy. The changed attitude toward science that developed in both the executive and legislative branches of government reflected changes that had occurred regarding the perception of what science was, its purpose, and the economic realities.

Nixon perceived no distinction between basic research and technological development; in his view, both were science, but only the latter was relevant to the public and thus deserving of public. funding. He believed the generation of new ideas, the ability to evaluate proposed technological projects, and the wisdom to make sound make funding decisions already existed in the White House and at the agency level, thereby obviating the need for a science office in the White House. Its elimination disposed of the troublesome science advisory committee, which had members like Handler who chronically irritated Nixon by advocating for the interests of university-based scientists and against administration policies. Handler, in contrast, believed *science* was basic research, particularly in biochemistry, and *technology* was one of its consequences, but his view was discounted to zero by Nixon. The Academy view was similarly ignored by the Administration for the obvious reason that its voice was the same as Handler's. He appointed each member of every committee, served as the ultimate judge of each appointee's expertise and objectivity, and implemented a star-chamber process in which all details regarding how the members arrived at their conclusion were permanently hidden from the public. There was a sameness in the narrative structure, reasoning, and conclusions of the Academy reports because they were written by Handler's staff in accordance with his instructions

Handler pleaded with audiences of biochemists to join him in insisting that society had an obligation to fund the pursuit of scientific knowledge for its own sake.
He claimed basic research was the parent of technology and, that unless the government funded more basic research, the Russians would forge ahead of the U.S. in biomedical science, the health of Americans would suffer, and American culture would decline. Handler could not say whether the research he wanted would yield useful knowledge or become a bottomless money pit; he was willing for the country to take that chance, but the Nixon was not. Handler was also ideologically committed to providing a free education, but only for science students. The President's aides decried the wisdom of such a policy, considering there was a rising level of unemployment among scientists. They also condemned the unfairness of continuing to provide a free education to aspiring biochemists and physicists but not to aspiring doctors, lawyers, and engineers, who received no direct federal assistance.

The dismantling of the science office was a fatal blow to Handler in his attempt to create a permanent independent science establishment. In a single stroke, the reorganization of the science office blunted Handler's influence on the government's science policy and largely vanished the possibility that his illusion of a society based on scientism could be realized. Another sharp blow to Handler's dream was administered by the legislative branch in the form of a decision to create a congressional science office with a staff of experts to advise senators and representatives regarding science issues, thereby obviating dependence on Handler's congressional testimony.

The rebukes Handler suffered at the governmental level only added to his ongoing difficulties regarding his credibility. He lost much of his earlier support in the press because he exaggerated the benefits to society of basic research and made false claims of a putative

national surfeit of scientists. Handler's ambition to advance science above all other human thought systems, and his incessant complaining about low budgets for basic research became a stereotype in the work of newspaper and science writers for the arrogance of establishment biochemists. He was harassed and satirized by in the press and in books but didn't respond, with one notable exception; when an article in the Washington Post called him the Idi Amin of science, Handler visited the editor and demanded a retraction. His influence among segments of the science culture not represented by biochemical societies drained away. The cumulative developments marked a precipitous decline to zero in the probability Handler's dream of science as a guiding and legitimizing force in American public policy would ever be realized.

HANDLER COMPLAINED BITTERLY ABOUT President Nixon's dismantling of the science advisory machinery in the White House. He said the President's aides had badly misguided him, providing advice that was "unsound", "abrupt and harmful," 'inept" and "not genuine," and that as a result, competent and knowledgeable scientists were no longer available to advise the President regarding science matters. Handler believed that even though some government agencies had staff scientists, the President could not personally evaluate their advice because he did not speak the languages of the various scientific disciplines. Objective scientists who could directly advise the President and serve as checks and balances to agency decisions were desperately needed, Handler asserted. Prominent among his specific grievances concerning biomedical research was what Handler called the "politization" of cancer research in which biochemists were "mandated" to seek the specific research objective of finding a cure for cancer. Handler said science advisors in the White House could have helped the Administration avoid the mistake of such mismanagement of cancer research. The absence of a science office, Handler said, meant that scientific viewpoints would be crowded out by those of "economists, lawyers, and businessmen," and he offered himself as an example — he said his direct access to the President was terminated when his governmental position as presidential science advisor ended.

Promotion of the elitism of science was Handler's main reason for seeking an official presence of spokesmen for science in the White House, and he had no intention of regarding Nixon's abolition of the office as final. The ideology he articulated proclaimed the superiority of scientists over laymen in the resolution of societal and political issues involving science, and he emphasized the primacy of the values of science over those from other sources. Moving the science advisory function out of the White House marginalized the scientific community, he complained, and said the decision was diametrically opposite to what was needed to show appropriate governmental regard for science. According to Handler, a mechanism within the White House that could insinuate the advice of scientists into national issues and federal policymaking was an absolute necessity. President Nixon, however, decided that despite the obvious importance of science, the direct influence of scientists qua scientists in societal matters was properly reduced in favor of a broader participation by laymen. He dismissed as unfounded, Handler's complaints that science had been downgraded, or that the integrity of presidential decisions was compromised. What had been downgraded, according to the President's aides, was the direct influence of scientists on societal matters, which the President viewed as a positive development.

The aides said the President regarded competition as vital in the world of science as in the economic realm, and they spurned Handler's notion that science policy should be made by an elite fraternity of scientists without the benefit of competition.

Handler believed science would become impure and lose its dedication to a strictly reductive approach to the study of nature if it were used by the various agencies independently of each other in furtherance of their respective missions, but without central synchronization from within the White House. He feared that if the government continued to follow a pluralistic approach to the funding and use of science, the endeavor itself would become polluted. Handler envisioned two central mechanisms that were potentially available within the American political system for the development of science in the direction he sought. One possibility was a law that created an independent federal agency which answered to the President but had statutory authority the President couldn't overrule, and a legislated budget which ensured its continued existence. Another possibility, less desirable to Handler but which he viewed as a useful first step toward creation of an independent scientific establishment, was a law that required the President to centralize science and seek an adequate budget to promote its growth and development.

In a stunning hubristic ploy, Handler mobilized the resources of the Academy to produce a report formally advising the Congress and the President to adopt a law that would create a science advisory office in the White House. He hired the staff of the defunct White House science office and appointed members of its science advisory committee to an Academy committee he created, and he directed it to produce a report that recommended adoption of such a law. After several months of private meetings, and consultations with Handler's senior staff, the Academy committee report dutifully reached the conclusion Handler sought and justified it by replicating the same ethereal language Handler commonly employed to praise science and technology. The committee report said science and technology provided "something more than material goods." Science and technology were "enterprises of the human mind and spirit" that not only "extended the reach of man's mind out to the furthermost galaxies" but also promised "to provide an intimate comprehension of man himself." In furtherance of these goals, the committee recommended creation of a science advisory structure within the White House that was protected by law against presidential hegemony and bureaucratic conflicts with other White House offices. The advisory body for science and technology, called a Council, would provide the President "with balanced judgments deriving from the pooled knowledge and insights of a small group of first-rate scientists and engineers." The Council would analyze all national science programs and policies, require that they be expressed in language the President could understand, formulate coherent research and development strategies, and set research priorities.

The Council would assist the President in the use of science to predict the future in areas like energy, environment, transportation, and urban development, and develop policies consonant with the predictions. The proposed law envisioned by the committee would authorize the Council to advise the White House budget office regarding the quality and technical feasibility of proposed programs and prioritize them, and it would require that the Council have a "strong presence" in all White House offices dealing with "domestic and national-security issues" and a role "in those areas of foreign policy strongly affected by scientific and technological considerations." The functions of the Council assigned by law could

be discharged independently of the President's wishes and without accountability to the public or to the federal agencies on whose areas of responsibility the Council would encroach. The committee declared that its advice was based on three pillars: recognition that science and technology as essential drivers of societal and economic advancement; the necessity for science experts to play a central role in presidential decisions; integration of advice from scientists into domestic and international policy arenas.

Like a proud father, Handler praised the report for asserting the view that science and technology were critical for social and economic progress, and were necessary tools for military, domestic, and foreign policymaking. He emphasized the importance of the panel's requirement that the proposed Council be composed of scientists who had operational responsibilities over federal science policy. Handler also lauded a committee recommendation that the entire Executive Office of the President itself be eliminated and replaced by a new organizational structure based on "modern techniques of policy research and analysis" and on "the method and spirit of the physical, biological, and behavioral sciences."

Handler's push for implementation of a Council mechanism in the White House was a desperate last effort to create an estate for science in the American political system. He had risen to positions of authority in the culture of academic biochemistry and expanded his influence after he moved to Washington D.C., where he honed his ambition to establish recognition and acceptance of eminent university scientists, including himself, as reliable purveyors of objective advice to the government about science. But as Handler's ambition, strategy, and goal became apparent, the likelihood he would achieve his goal became nil. Despite his efforts, scientists were recognized as no more reliable and trustworthy than any other class of professionals, and equally prone to questionable ethical behavior and self-interested decision making. Like virtually every other academic scientist on the defunct science advisory council, Handler had strong financial ties to industry, and his defense of an imagined inherent moral superiority of scientists was no more than ritualized speech divorced from reality. This history together with the personal acrimony that had developed between Handler and President Nixon accounted for the resounding thud of the committee report when it was sent to Nixon.

After Gerard Ford became President, Handler made a Hail-Mary attempt to resurrect interest in the recommendation of his committee's report. The designation by President Nixon of the head of the National Science Foundation as science adviser lapsed with the change in Administration, and there was a need to reaffirm or modify the existing arrangement, or else replace it. Handler sent the report to President Ford and lobbied in favor of replacing the existing arrangement in accordance with the reports' recommendations. Ford's chief aide advised the President that the present arrangement could provide "you and your senior staff with independent advice on scientific aspects of major policy issues," and that the present science advisor agreed.

He told President Ford that Handler's proposal to establish a full-time science adviser and a statutory agency in the White House were not warranted because they "overly represent in your immediate office the clientele interests of science and scientists; emphasize science and technology as ends in themselves rather than means of achieving national objectives, and do not recognize the necessity of integrating science advice with that from other fields." President Ford implemented the advice of his advisor.

In response to President Nixon's decision to eliminate of his White House science office, Handler developed a political strategy for recapturing his lost political influence over national science policy. He voiced an ideology that was clearly antagonistic to the fundamental assumption in the American tradition — that the privileges and responsibilities of political power could not be yielded to a single group. The ideas of liberty and self- government rested on an informed citizenry and the moral force of civic virtue, not upon a presumption of the primacy of scientific truth as part of the definition of good government. The public, consequently, was likely to put more trust in the processes of politics than in the opinions of unchallengeable scientists like Handler because the expectation in a democracy is that all important questions be answered by politics. In support of his committee's support of his ideas about the privileged role of science in society, Handler urged creation of machinery located in the Executive Department that was controlled by scientists with legal authority to regulate federal science policy but who were not politically responsible for their decisions. Handler's attempt to have large societal questions answered by science was tantamount to imposing his scientistic ideology and values on the political system, and his attempt was roundly rejected by both presidents to whom he appealed.