Chapter 7: Coronation 1969*

HANDLER DEVELOPED HIS philosophy of biochemistry and science into an ideology that included economic and social values, and strategies to implement them. The cornerstone of his beliefs was a perceived responsibility of the federal government to produce a class of scientists — most especially biochemists — by underwriting their education and subsequent freedom to conduct research to explore the frontiers of science. The superior truth of the rational, empirical knowledge produced by science, according to Handler, deserved the public's respect and unquestioned acceptance. He truly thought that the values of scientists, taken together with their core of objective knowledge, justified recognition by the public of the authority of scientists regarding the identification and resolution of political issues and policies that involved an element of science. His beliefs and behavior, as measured by the extent of his power and influence within science, made him the most successful science-policy ideologue of his time, and brought him to the threshold of what, at the time, was the most prestigious and influential position in American science.

On July 1, 1969 in the majestic Academy complex on Constitution Avenue in Washington DC, Handler was inaugurated as president of the National Academy of Sciences. In accordance with the by-laws of the Academy, which required all internal activities be held in strict secrecy and disclosed only to the president, and to Academy members on a need-to-know basis, the events that actually occurred in the complex that day were never officially described. But after studying Handler's countless opinion pieces and testimonies and gaining insight into his character, personality, and theatrical sophistication, and benefitting from discussion with some who knew Handler personally far better than I, especially some who knew Academy directors Handler favored, during a dream, everything I knew about Handler crystallized and I saw not what actually happened in the complex that day but rather what Handler thought he deserved in terms of recognition and adulation, and what he told those present he intended to do with the platform fate had given him.

The Academy's Board of Directors sent a memorandum to its staff and members announcing a conclave would be held in the Great Hall to inaugurate Philip Handler as the unanimously elected successor to the previous president who had departed. The Directors said Handler would have a free and open field regarding the pitch, tone, substance, and direction of the advice and consent the Academy provides to the government, which field Handler could traverse in the manner he judged best for the weal of the Academy. The Board disclosed its unanimous support for Handler's liberty to adopt measures and manage the business of the Academy in a manner that seemed to him best promoted its general interests. The policies of the previous leader were to be regarded as a realm of principle, but the surrounding land was virgin territory for Handler. The Board took cognizance of antagonisms that existed between Handler and both branches of government, and expressed a hope he would assume a more flexible attitude or perhaps even adopt a formal conciliation.

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

On the day of the inauguration, the elevated galleries along the east, south and west sides of the Great Hall were designated to seat invited guests which included the Board of Directors, Academy members, government officials, and native and foreign persons of distinction. The audience of invited guests was expected to eagerly support Handler, but public enthusiasm for science generally had decreased in recent years, widely attributed to the destructive technology it had produced. Consequently the possibility of a disruptive demonstration existed, even though the Academy was a private organization and neither the public nor the press were permitted to attend the ceremony that would result in Handler's coronation. Nevertheless, Handler chose to appear and be crowned before the audience in the Great Hall.

At half-past nine o'clock in the morning, Handler, surrounded by attendants, including one who carried a copy of his textbook on biochemistry, entered the Foyer and walked to the Board Room where two members of the Board of Directors awaited him. After Handler had been vested in full pontifical garb including a golden miter, he moved back to the Foyer where all the Directors were assembled and received their obeisance; they approached him one by one and kissed his hand, after which several staff employees kissed his foot while a few others simply nodded. A procession was formed, preceded by the vice-chairman of the Board, and Handler was carried in a chair, borne by eight strong staff members, through two arches between two pairs of pendentives to the north area of the Great Hall where a platform had been erected. Just as the procession passed through the first arch, the Academy historian, holding a rod at the end of which was attached a lock of dry flax, approached Handler's chair and lit the flax. As it burned quickly to nothing he said: "Dr. Handler, thus passeth away the glory of the world." No one who saw the events that unfolded could fail to be impressed by the solemnity and pomp of the occasion. A leader of the Academy was to be crowned: the great scientist; the leader of the Academy; heir to the great scientists of the past; foremost in science, policy, and education; an expert regarding chemistry, physics, biology, medicine, psychology, social science, and knowledgeable about literature, philosophy, and law.

Then the most solemn moment occurred. Handler left his chair and ascended to a throne in the center of the platform, and he was crowned. The first assistant removed the miter from Handler's head and a second assistant approached and placed on his head a high jeweled headband encircled with three crowns symbolizing Handler's triple power in science; father of biochemistry at Duke University, governor of biomedical policy at the National Institutes of Medicine, and vicar of science at the National Science Foundation. Handler then rose and delivered his speech:

"It is less than five years since I first joined this esteemed organization and walked through the corridors of this intellectual home of the nation's greatest scientists. Now, my brother scientists, even though I did not foresee that a biochemist could be elevated to the leadership of a society of the world's foremost physical scientists, I am about to undertake that great burden. Long reflection about the proper relationship between science and government has prepared me to undertake the design of a program for my time as the public head of this prestigious private organization which serves as the government's most reliable source of scientific advice. Henceforth, by means of rational thought, in which we confidently trust, the Academy's past efforts shall be continued and expanded with earnestness and attention to what science has accomplished and can accomplish, so that our efforts will foster a brighter future. First of all, we wish to point out the unceasing

importance of the plans for the future that have already emanated from this august body, and we accept the definite duty of assiduously bringing them into effect. Indeed, is not the scientific innovation of the last thirty years the event of the utmost importance in the almost two thousand year cultural history of the world? However, there is much more work to be done. This indeed we shall do in a way that is at once prudent and stimulating. We shall strive, in particular, to ensure that an appropriate mentality may flourish. It is necessary that the seeds of recent discoveries be nourished by further discoveries, sowed in good ground so that they bear fruit in that way which is characteristic of progress. Venerable Directors of this prestigious body, it is necessary for us to act with renewed and invigorating zeal, and to meditate on its nature and function as well as its way of being and acting.

"First and foremost, those of us who hold high office in the Academy must serve as a shining example of probity and morality in our thinking and in our actions, and manifest an unwavering obedience to scientific truth and what pertains to the doctrine of science. The objective importance of science must always be kept in mind and ever safeguarded because of the attacks which in our time are being levelled here and there against certain truths of science. Fidelity implies the observance of the norms laid down by scientific authority, and therefore has nothing to do with the practice either of introducing innovations of one's own accord and without approval, or of obstinately refusing to carry out what has been lawfully laid down and introduced into the scientific method. Fidelity also concerns the discipline of science. This discipline is not a limitation on freedom. It seeks to safeguard the right ordering of the body of science with the result that all the members of which it is composed be united to perform their duties in a normal and natural way. Moreover, fidelity signifies the fulfilment of the demands of the scientific vocation in such a way that what science has promised will always be carried out.

"The cause of supporting science is so lofty and important we may not keep silent about it. Therefore one can hardly credit the deplorable division that presently exists among scientists, and is a cause of embarrassment and perhaps of scandal to the public. And so, we wish to proceed along the road which has happily been opened, following the map we have charted, and to encourage whatever can serve to remove the obstacles, desirous as we are that through common effort full communion may eventually be achieved.

"First, we must recognize the spirit of our age. There is a specter of nuclear war, and the disparity in quality of life between those in the developed and developing nations grows ever larger. International tensions remain, and a war in a far distant country casts a continuing pall over every aspect of our society. Minority groups ever more forcefully demand translation of legislation into the reality of their daily lives. Widespread repugnance suddenly develops to the consequences of insufficiently regulated technologies, and the public complains about pollution and the hidden hazards of the products produced by industry. Universities find themselves subject to unanticipated pressures and problems they have been unable to satisfy. Led by its youth, the nation embarks upon a frenetic, sometimes destructive search for new values, for a clear sense of direction, and for some perception of new national purpose. This deepening national sense of despair has created a sense of a headlong rush into an uncertain future, and has generated a national desire for leadership, stability, and assurance that the problems of the day are understood by someone and are manageable. What

are the consequences for science and the uses of science? A biochemist would be a poseur indeed to address himself to the diverse aspects of these paramount problems, but it is within that turbulent landscape that one must view the current scientific scene. Implicit in their actions and explicit in their statements, five consecutive presidents and both political parties have made commitments to maintain our international scientific leadership, pursue a vigorous national biomedical research program, and increase utilization of the national technical capability to promote the general welfare. But the politicians have not delivered what they promised. The time could not be more propitious, the moment more appropriate, for a searching inquiry into the relationship between organized science and the federal government.

"Our national system for the conducting of research is falling into shambles. Morale of the scientific community is lower than at any time because it is not supported adequately by the government, even though new fields of scientific exploration and application clamor for attention and for funding. Funds are needed to educate more scientists, conduct more basic research, and supply our scientists with more equipment and facilities. The absence of this support bodes ill for our future national security and for the vigor of our economy. The effect on student attitudes of seeming federal disinterest in science is reflected in declining undergraduate enrollments in physics and biochemistry and will soon affect graduate enrollments in all other sciences. Unfortunately, this trend is reinforced by those who proclaim technology and the science which made it possible are guilty of despoliation of the environment and the creation of health hazards. A considerable fraction of our population believes that science and technology are irrelevant to the fashioning of a better life for future American citizens. These trends have been fashioned in large part by some scientists who are prophets of doom and exaggerate the environmental problems before us, and all-disruptive leftists who seek to redirect our national priorities but fail to comprehend the role of science in our society. This Nation will pay a high price for their self-indulgence in hyperbole.

"Public support for science is decreasing principally because there is confusion in the public mind regarding the difference between science and technology. The public see that the product of science can be used by government and industry for what are sometimes troublesome purposes such as weapons of mass destruction, and blames scientists rather than government or industry for those choices. Additionally, there is a sudden awareness that our environment has changed drastically from the pristine thing it once was as a consequence of myriad technological endeavors which were allowed to enter the stream of commerce in the absence of pre-market vetting. The public suddenly looks askance at our huge technological capability and no longer trusts the science that made it possible. Along with this, there is a great public feeling that things are not right in American society. We are in a war and see another war on the horizon. We haven't solved our racial problems, and we watch the cities decay. Science and technology have both been blamed for having created a fashion of national life we no longer cherish.

"Science and technology provide the only possible mechanisms to deal with all these problems, but not seeing this, public sentiment falls away from science, and our attempts at salesmanship have not staunched the bleeding. The Academy must attempt in every way possible to encourage the government to enlighten the public regarding this fundamental fact, notwithstanding that very few are now willing to listen. As we have explained, providing advice to the government of

the United States is the only reason the Academy exists.

"Both political parties must be held accountable for a retreat from adequate funding for science which began about four years ago and becomes more painful as the gulf widens between resources made available on the one hand and the scientific opportunities that exist on the other. The scientific enterprise may be imperiled. Important new scientific enterprises are deferred and our leadership in some disciplines, for example, radio astronomy, is being lost to other nations. Medical schools find themselves in desperate financial straits because their funds have been targeted to the delivery of health care rather than to scientific research that would lead to improvement in the quality of that care. And the morale of the scientific and academic communities, already seriously shaken by the problems of life on campus, may soon be broken. A level of apprehension has been generated which goes far beyond concerns about funding levels, much like a run on a bank in the great depression. Investigators so distracted are less creative than they otherwise might have been.

"Science is the principal tool that our civilization has fashioned to alleviate the problems of mankind. Despite all the criticism by environmental extremists, life was never longer, healthier, richer, or more comfortable for three-quarters of our citizens, thanks to science. While it is surely true that serious damage has been done to our environment by unregulated exploitation of technological capabilities, the situation is only serious rather than irreversible, and the damage can be repaired by means of yet more technology. The benefits of our civilization can be assured to all of our people, and a safe, stable equilibrium with the environment and with resources of this planet can be established utilizing our technological capability to assure the national security and improve the public health and welfare. Indeed, management of science-based technology is the very business of much of government.

"Undoubtedly, the public would be more willing to support science but for the chaotic condition of the campuses where both faculties and student bodies are in disarray. What is the public to make of professors who demand prohibition of DDT while arguing for the legalization of marijuana, or who oppose environmental pollution and health hazards, yet are quiet with respect to drug abuse on campus? The entrenchment on campuses of an adversary culture and the increasing number of neo-Luddite know-nothings is disharmonious with the culture shared by most of the tax-paying public. A dogmatic nihilistic doctrine, barbaric hostility to freedom of thought, and a will to believe the worst with a compulsion to make events speak to the necessity of revolutionary change, have combined to diminish the common will to support the university system, which is the heart of our science enterprise.

"Graduate students now reject research whose ultimate application to human affairs they cannot foresee. They follow the advice of Karl Marx who said the objective was to change the world, not understand it. It is the responsibility of the Academy to make it clear that one must first understand that world, and that doing so is possible only in the language of science. Those who reject science claim the technology it produced has caused our environmental problems, degraded the quality of life, limited our personal freedom, and has been the willing servant of the military. But the fact remains that there is no tool but additional science-based technology that can improve the human condition.

"Technology provides society the things it wants. The tin can, frozen foods, and mechanical refrigeration which liberated women from the thralldom of the kitchen were the product of technology. The advances in medicine which permit us to live out our lives free of pain or serious illness were the product of technology, as was DDT which abolished malaria and typhus. Satellite television communication was the product of technology.

"All of us are agreed that serious damage has been done to the environment by some forms of technology. But government regulatory policy cannot rest on a collection of horror stories. We need a quantitative, scientific description of the actual nature of the damage, appraisal of the social and health hazards entailed, understanding of the chain of events in each instance so that, by appropriate regulation and action, the hazards may be eliminated and the esthetically unpleasant corrected. We cannot hope to understand the details of environmental damage and plan remedial steps until we have mounted a huge effort in relevant fundamental physical, biological and social research. To suggest otherwise is cynical sophistry. We must gather extensive, detailed information about pollution and the unintended consequences of present-day technology. Not enough is presently known to provide clear and accurate predictions of the consequences of existing technology. Until that situation is remedied, the status quo regarding regulatory enforcement based on existing knowledge should be relied upon.

"Going against this rational approach is a growing body of opinion that demands the government exercise increasing protection of the public through its regulatory powers. But again, intelligent regulation must rest on hard, scientific information, which is missing. This is self-evident with respect to the markets for drugs, food and food additives, and a wide variety of products and services. In deliberately choosing to misread history, opponents of science and technology ignore the lesson of history, that one can undertake drastic measures only when a sympathetic reception has been generated among the public. Examples abound. The slaves in America were freed when they became a burden rather than an asset, which occurred long after public opinion found human slavery repugnant. Laws protecting women and children at work were passed only when the economy could afford it, and not when the public found it disgraceful. Man did not become kind to horses until living horsepower was no longer required. With regard to the current national mood concerning the consequences of technologies that have fouled the environment, there will be no public willingness to bear the remedial costs until the exact expense of the effort is defined. Rabid defenders of the environment, the attackers of the establishment, should understand this lesson. The necessary steps must be taken slowly and carefully, and in a manner that does not disrupt the economy. Precipitate action based on insufficient scientific understanding, for example, a total ban on the use of DDT, could do more harm than good. Now that the national mood has been established, let us proceed with the understanding which will make possible restoration of the environment without undue breast beating and recriminations.

"Nature is often hostile to man because of its wide fluctuations due to natural cataclysms. Although man may have exterminated some species it was the natural forces on this planet which extinguished at least 90 percent of all the species that have ever existed. Let us learn to use our knowledge and power wisely in the preservation of a balanced natural environment. But let us also understand the fact that we can do so rests squarely on the productive capabilities of our science-

based technologies, the management of which is the responsibility of the government. Only a continuing vigorous research program can provide the capabilities we urgently require and the understanding of man as a social creature which will permit us to use those capabilities wisely.

"Appallingly exaggerated statements have been made by some scientists with respect to the immediate seriousness of our environmental problems. Even the most acute problems can be managed now by appropriate regulatory measures and utilization of technology. But the intense emotion elicited in the public, especially students, by water and air pollution when they express so little concern for the possibility of nuclear war, for the hopelessness of our millions of rural poor, and for the 30 million Americans whose health is endangered by poor nutrition, is difficult to comprehend. How remarkable it is that students are determined to eliminate damage from what emanates from the tailpipes of automobiles, even though it is not medically serious, while remaining apathetic to the death of tens of thousands who were killed by the front ends of those vehicles. Nor do our students seem deeply concerned by the fact that about half of those fatal accidents involved drivers who were intoxicated, many of whom were students. If remedial action to clean the environment must be undertaken, we first require systematic acquisition of data which would permit evaluation of risks versus benefits. We need to know much more than is known today concerning pesticides, food additives, drugs, diverse industrial practices, radiation hazards, atmospheric phenomena, or the alleged fragility of ecosystems if we are to make sound judgements and establish rational public policy. In the meantime, we have a constructive suggestion to help relieve the pesticide problem, namely the invention of a new profession: pesticide applicators, a corps of specialists trained in entomology and proper usage of pesticides. Society would be protected if pesticides could only be used by licensed specialists who would know what uses were legal, adhere to maximum dosage schedules, and treat the chemical agents with proper respect.

"Too many physicians demand that medical schools devote themselves to the production of practicing physicians in greater numbers while ignoring the importance of biomedical research. Somehow, the physicians forget that every useful procedure available to modern medicine is the product of basic research. They demand that research be more directly addressed to the problems of disease rather than exploration of the biochemical basis of life. Worse still, they demand diversion of the already scarce federal resources from biochemical research to direct improvement of the delivery of health services. They could not be more wrong. When research provides a scientific basis for truly definitive prevention or therapy, invariably the resultant control of a disease is far simpler and cheaper than palliative halfway technologies. Reflect, if you will, upon only a partial list of such diseases, each of which was, at one time, a major drain upon the then extant health care system but is now of little consequence in this sense. Among them are such diseases as infantile diarrhea, epidemic meningitis, typhoid fever, tuberculosis, typhus, trachoma, scarlet fever, cholera, yellow fever, poliomyelitis, bacterial endocarditis, syphilis, gonorrhea, lobar pneumonia, measles, whooping cough, smallpox, tetanus, diphtheria and puerperal sepsis. Included also are such nutritional disorders as pellagra, rickets, sprue, scurvy, and iron deficiency anemia, as well as pernicious anemia, Addison's disease, goiter, juvenile diabetes, glaucoma, hyperthyroidism and, most recently, Parkinsonism. It is not these diseases, now under control, that pose the great problems of logistics, manpower, and costs for the health care system. Rather it is those diseases which we understand

only partially, for which we lack definitive measures, and which can be mitigated only by major efforts. It is these diseases which demand the complex technologies available in a modern hospital, particularly the heroic efforts in surgery, anesthesiology and intensive patient care which, nevertheless, offer only palliative, corrective measures. These disorders occasion large human and financial costs and frustrate the health care system because of a lack of basic research. This is true, for example, for most forms of cancer, stroke, coronary thrombosis, myocardial infarction, hepatic cirrhosis, glomerulonephritis, pyelonephritis, rheumatoid arthritis, acute rheumatic fever, disseminated lupus, bronchial asthma, multiple sclerosis, the senile psychoses, schizophrenia, emphysema, muscular dystrophy, cystic fibrosis, most genetic disorders of metabolism, and virtually all the virus disorders which are not preventable by early immunization. Because of the rapidly developing understanding of human tissue and how it functions in molecular terms, we can now ask penetrating questions into the etiology and pathogenesis of these diseases which would invariably lead to solutions if we had the national will to undertake the necessary research. Only the government can underwrite the huge effort required. There is no escape from a federal commitment to biomedical science. We must urgently require better fundamental understanding of disease. When research has provided a basis for truly definitive clinical procedures, the resulting control of a disease will be effective and far less expensive than palliative care.

"The time is indeed at hand for the Congress clearly to declare itself with respect to the role of science in our civilization and to the manner in which the government should relate to science in the future. A national plan is needed that includes all the necessary elements of a federal science policy, especially a rational formula by which to establish how much science should be supported, and a rational schedule for providing the appropriated funds to avoid abrupt changes in any one fiscal year. Most scientific ventures require lead time for planning, and subsequent decisions to terminate them arbitrarily and abruptly, for whatever reason, are highly wasteful. We recognize the annual nature of the federal appropriation cycle, but there is no relation between the useful life of a laboratory or scientific project and the time required for earth to complete one orbit about the sun.

"Nothing could be more frustrating or perplexing to the scientific community than to find science itself under attack and public support falling away at this moment in time. Scientists now stand on the brink of understanding the nature of the cosmos, the history of planet Earth, the atomic nucleus, and the living cell. They have learned enough of basic biological mechanisms to address themselves with confidence to the question of what life is, to an understanding of the human brain, to how the ecological system works, and to the forces which generate our climate. What myopia. Repeatedly, political considerations divert funds from scientific efforts that are truly important for the long-term interests of society.

"Admittedly, it is not easy to establish how much fundamental research the government should undertake. A reasonable approach would be to ascertain how many good scientists the nation has, and the cost of providing each of them a research grant that would allow them to use their talents. The plan would assure a vigorous effort on each major frontier of science. Were such an estimate available it would constitute a fully satisfactory level of funding for fundamental research, a goal to be attained. That statement is not simply a manifestation of the arrogance of scientists. There can be no better investment by this society. We estimate that the total expenditure on fundamental

research since the time of Archimedes has been about $30 billion. Our country presently enjoys a gross national product that is about fifty times that. Since the returns on the investment in science would be so great, I can only advocate support of all the competent research of which we are capable. The intellectual structure of science is among the most magnificent accomplishments of our civilization. It is no arrogance to suggest that the conduct of research is now among the very purposes of our society, analogous albeit not quantitatively comparable to the attainment of such national goals as racial harmony, a stable, beneficent peace, provision of health care, full employment, stabilization of the size of our population, disappearance of the drug culture, a salubrious environment, or an adequate educational system, attainment of all of which will yet require a substantial effort in fundamental and applied natural and social science. Unfortunately, at the present time, there is no national commitment to science or any other cultural endeavor.

"Our principal instrument for scientific research is the university, but the present conditions at our universities are chaotic. If we are to continue the coupling of research to the educational process — as we certainly should — then the government must assure the financial welfare not only of science but also that of the universities themselves. This proposition demands both explicit acceptance by the Congress of federal responsibility for the welfare of our universities, and an appropriate knowledgeable and competent agency to make and oversee the Federal investment in research and graduate education. An essential component of that investment must be a large-scale program of formula grants to colleges and universities, or their major subunits, to permit them to remain solvent, meet their payrolls, assure that their basic operations go forward and, thereby, also put an end to the bootlegging of support for the academic endeavor through the back door of individual research grants and contracts. If science is truly to thrive, this program must be certain to support those institutions already in the forefront of the research endeavor, with established traditions of excellence.

"There has been an unprecedented burgeoning of understanding of living systems and the physical universe in the last three decades. These developments altered the societal role of scientific communities in all countries. Pari passu, as your president, we consider ourself highly responsible for the ways in which the fruits of the labors of scientists are used by society.

"The Academy must support our brother scientists in all countries, and make known to them our intention to help foster development of science and justice in all nations. In these matters we have no desire to interfere in politics or to take part in the management of temporal affairs, but rather to focus on scientific and ethical considerations in our opposition to the persecution of scientists everywhere. We feel that this duty is all the more urgent the longer that discord and dissensions last. Therefore the Academy will take constant care to direct our attention to questions of this kind. We are committed to defend the human rights of scientists, not only because humanity may be denied the fruits of their science, but also because abrogation of their rights is injurious to all mankind. We perceive no essential distinctions between pursuit of truth about the nature of man or of the physical universe and the pursuit of truth about the condition of scientists in the societies in which they live. We will speak out for those in other countries whose rights have been denied, because the cost of silence is the abandonment of human rights and that is a price we will not pay.

"The concerns that brought many of us to this Great Hall continue to abide within us and energize us for the task ahead. Let us express clearly our fervent belief, greatest interest, and primary objective is science and the welfare of the individual scientist. Only by concentrating our attention on the intellectual and spiritual freedoms and the conditions of work of each scientist, our most precious natural resource, can science survive in the years ahead. Since science is surely the most powerful instrument available to mitigate the condition of man, the survival of science is absolutely critical to the survival of human societies. The scientific enterprise can be a bridge of understanding among people at a time when the penalty for ignorance about the material world is too great to endure. Construction and maintenance of that bridge will be expensive and will demand intense effort as well as a willingness to forego hyperbole, forbearance, and good will. Our objective is to help bring about improvement of the environment and simultaneously make the fruits of technology accessible to all citizens. Our goal is to ensure that history will not find wanting the achievements of the Academy during our presidency."

Handler had the ability to give speeches that sounded to laymen like they thought a scientist should sound, and he parlayed that ability into political power. His religious-like dedication to biochemistry, however, made him an existential danger to development of the kind of knowledge in biology and medicine that laymen actually wanted — what causes cancer so that they can avoid it. Nevertheless the times were well matched to his personality and he rose to the pinnacle of American science policy. Physicists had discovered fission and fusion, engineers had invented technology and space travel, and biochemists had discovered how nutrition and genes worked. Handler was among the first to recognize physics as yesterday and technology as tomorrow, and that he could advance his religion by portraying it as the bridge to tomorrow.

On the day of his coronation as the pope of science, Handler was balding, chronically sick, and prone to periods of depression. His private life provided him little satisfaction, but he was energized by his habit of working fifteen hours a day to advance his ideology and conquer those who opposed it; what happiness he enjoyed he derived from this habit. His career in science had summed to an attempt to establish that genes and biochemistry completely explained life processes, and he articulately raged against scientists who believed additional evidenced-based concepts were needed. The black beast that always stalked him was the notion that something — God or some new law of science — was needed to explain life. When scientists argued that new understandings of the laws of physics were needed to explain life, Handler accused them of making a veiled claim that the idea of God was needed to explain life. Nevertheless, the impact of his work could not be gainsaid. Handlerian reductionism and the preposterous prediction it entailed — that one day biochemists would mix chemicals from bottles on a shelf and create life in a test-tube — continued to be the foundation of essentially all biomedical research funded by the National Institutes of Health and, following its lead, all other federal agencies that supported biomedical research.