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PRESIDENTIAL ADDRESS

## Biomedical Research and National Policy

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The President of our scientific Society is called upon to conclude his brief tenure of office by delivering an address. This rather strange custom is not embedded in the By-Laws of the American Society for Clinical Investigation. Furthermore, casual perusal of the past fails to reveal any firm mandate transmitted from a grateful membership for this form of gratuitous pontification. Nevertheless, like some aging Beefeater at the Tower of London, each president bows to history and clings to these atavistic trappings. He can describe, decry, fret, predict, or praise—and all of these have been done with considerable spirit and effectiveness in the past. More immediately, he is expected to examine some of the issues and problems which face that part of medicine and science in which we hold a common interest, as reflected in our presence here today. More bluntly, it might be considered a “State of the Boardwalk Address.” In that context this year, marking the beginning of a new decade, does not lend itself to graceful benedictions. Academic medicine is in trouble and we all know it. It is my privilege to dig into this problem briefly during this, my last day of active membership in the ASCI.

Almost 8 centuries ago, Alexander Neckam, Abbott of Cirencester, wrote an encyclopedia of current science entitled “The Nature of Things.” He stated, “Science is acquired at great expense, by frequent vigils, by great expenditure of time, by sedulous diligence of labor, by vehement application of mind.” This précis from a 13th century monastery is clearly applicable to the individual; it is equally applicable to a society. For approximately 20 yr, the American people have seen fit to furnish that “great expense” on an expanding base as an investment in biomedical science. As you know, this has occurred without any clear statement of national policy. It has grown and diversified steadily, nevertheless, under the leadership of some remarkable men in government. We

can single out for particular note James Shannon, Lister Hill, and the late John Fogarty, although many others have made major contributions. This new and largely unenunciated federal policy has furnished the single most important force in the revolution which has occurred in modern biology and scientific medicine during this period, both in this country and indirectly throughout the world. The mechanisms of support which have evolved have allowed for the recruitment and training of many of the nation’s best scientific minds in the life sciences and a reasonable, peer-monitored program for broad distribution of research funds on considerations of merit. The impact of this biological revolution on medical education has been profound and largely salutary. Its influence on medical care has been impressive, although most of the major diseases remain to be fully elucidated. Into this confident and expansive scientific society, of which we here today are a part, the budgetary restrictions of the past 3 yr have injected an alarming seismic tremor. A number of important questions arise, which can be considered only briefly at this time. Why have the cutbacks occurred? What does this mean for the future? What can we do to reverse this trend?

A thorough analysis of the pathogenesis of our problems would be lengthy, tedious, and largely unconvincing. It will not be attempted here. In biology and medicine we are not alone in our partial public repudiation for there has been a more general national retreat in science and technology. The reductions in support of biomedical science have in fact come relatively late and have been less severe than those in other branches of science, although this is a point without any particular potential for comfort. There is a prevailing feeling of malaise in American society with a conviction that things are bad, are likely to get worse, and that our technology, highly touted in the past, has been of

approximately the same household help as the sorcerer's apprentice. This unfocused, free-floating disenchantment with our technological society finds its adverse expression in national science policy in a way which is difficult to measure and also difficult to combat.

The biomedical science budget has also become vulnerable because of its gradual visibility based on size. The budget of the National Institutes of Health, approximately \$1.5 billion, has emerged as a significant item above background fiscal noise in the budgetary process, worthy of serious attention and matched against other national priorities. Of course it is our purpose to make the biomedical science budget more visible based on continued growth. Its size is one of our major concerns, together with the guidelines for distribution. When Samuel Gompers, founder of the American Federation of Labor, was asked what he wanted for his union, he replied, "More." However admirable in its acquisitiveness, this simple statement will no longer suffice as a bill of particulars for federal support. Yet it is surprising to realize how difficult it is to develop a reasoned defense, buttressed by fact, for a particular rate of growth of research expenditures. Attempts have been made to relate the research budget to gross national product (GNP), to the size of the health care industry (currently about \$60 billion per year), or even to the cost of disease in terms of disability and premature death. It is perhaps even relevant that life insurance sales, based largely on fear of the economic consequences of premature death, rose by \$7.2 billion in 1969 to a record \$157.9 billion, although the support from all sources of research to delay death fell to less than 3% of that figure. As a footnote I find it even more bizarre that with our continuing national fixation on what might be considered Earth Day ceremonies more money is spent on funerals than on medical research in the United States. Despite these exercises in comparative statistics the absolute size of the biomedical science budget will continue to stand as a tempting target for the unpersuaded.

In any consideration of pathogenesis we must also note that other pressing problems contend for support from finite federal resources. Although some of the more martial aspects of our foreign policy may be yielding minimal national gratifications and the supersonic transport may seem both boom and bust, there are other priorities which few would deny. These include poverty, the inner cities, education, the environment, population control, health care itself, and other variables which affect what now is called "the quality of life." The biomedical science budget is therefore competitive in good company as well as in bad and sometimes suffers in the ensuing tradeoffs for limited funds.

If it can be agreed that we now find ourselves at a critical point in the support of biomedical research in this country—as a matter of fact, participating in the first scientific recession of the post-World War II period—what courses of action are open to us as physicians and scientists and as citizens? Although many of these points are self-evident, I would like to venture a few personal opinions.

First, we should not panic. Being obsessed with the importance of what we are doing gives a firm platform for advocacy, but it may not lead to a balanced response. A natural tendency is to react with something resembling fibrillation of the fourth ventricle; that is a sense of rage that those in authority cannot see the consequences of their decisions. This may be followed by a growing conviction that the actions of the decision makers are so desperate as to call for application of the McNaughton rule, a guide for accountability in criminal jurisprudence. Such a response, not without its espousal in the scientific community, reflects abysmal ignorance of the political process. Public policy in a democratic government is arrived at by turbulence and is characterized by inconstancy. It would indeed be surprising if, in the federal herd, only our ox escaped ungored. As a profession we have enjoyed the good fortune of an expanding economy for 2 decades now with prodigious lassitude. By this I do not mean to imply lassitude in the laboratory but lassitude in the public arena. An unlimited growing season appeared to be part of the natural order of things. That is no longer true. During this period of pause, rather than wring our hands it would seem more sensible to find out whose hands to wring.

Second, we should continue to pursue our academic careers according to the patterns which have proved their worth during the middle third of this century. It is fashionable to think that the blending of biology and medicine which is the leitmotif of academic medicine and of this Society, emerged somehow spontaneously from the dissonances of World War II. On the contrary, the tradition which we have received and hope to enlarge upon in our time is a long and valuable one. This is reflected, incidentally, in the history of this Society which is spelled out in former programs and in its membership roster for more than 60 yr. This tradition and the mechanisms by which we adapt it now to the immediate problems at hand have not been repudiated or discredited. The commodity is sound; it is only that its marketability has softened.

Third, despite well founded confidence in academic medicine, it would be wise, in my opinion, to consider more seriously some of the criticisms which are being directed toward us. Some of them are trivial and irresponsible; some are based on misunderstanding of facts;

some have a certain validity which must be recognized by a careful response. A few of these criticisms, which come both from within and without the profession, will be touched upon briefly. No one who is in medical education has escaped wholly the wave of anti-intellectualism which has appeared in our colleges and universities and now laps in an attenuated form into our medical schools. Although many of us might consider medicine to be effective to the degree that it is based firmly in a scientific foundation, this is not universally acclaimed by students today. Much of their concern for the immediate problems of society is highly commendable and will be increasingly reflected in our profession over the years ahead to the benefit of the nation. Unfortunately, this concern too often leads the medical neonate into an easy assumption of antipathy to the scientific basis of medical care. There emerges a Rousseau-like dream world of natural bonhomie, unencumbered by the rigors of molecular interactions, where everything is warm, moist, and relevant. This amniotic state of mind, although the byproduct of national trends, must give us concern for it is apparent in those who are our professional progeny. In my opinion, this rejection of science is a serious fallacy which calls for an answer throughout our educational system. A distinction can be made between maturation and growth. Superficial training in "relevant" clinical medicine without scientific insight may lead to early maturation as a physician but not to the capability for further growth. It is like giving thyroxine to a tadpole. One gets an instant frog, but unfortunately a rather small one. Stated obversely, science is necessary for the physician if his intellectual epiphyses are to remain open.

A second and more serious criticism with which we are confronted relates more directly to the outflow pathway from medical science to its final application in health care. Here two constrictions are envisioned, one of them between basic science and its investment in specific mission-oriented research on major health problems. The second is an alleged lack of concern about the distribution system of health care. In essence the thrust of this criticism is that the biomedical scientist pursues his research as an intellectual game, hermetically sealed off from the real problems of society, indifferent to the ultimate utility, or even lack thereof, of his discoveries. The spin-offs may be there but they come grudgingly from a process with a rather low angular velocity. This criticism, although not presented in sophisticated terms, must be taken seriously for it has been expressed directly or implied from positions of authority. It is also subject to action, and this has already been reflected in national policy in very tangible budgetary terms. In my opinion, the first part of this criticism is based on a lack of understanding concerning

the mechanisms of scientific progress; the second part has a certain validity. We should differentiate between the two. Basic biologic and medical research has prospered in this country in recent years, judged by any standard of measurement. The ability for the average citizen to obtain prompt, effective medical care at a price he can afford has not kept pace, to state the problem as a euphemism. Our scientists flock to Stockholm each winter with admirable regularity; our infant mortality rate (now as widely publicized as the GNP) slips to 14th in international competition. Life expectancy for males in the USA ranks 18th, and for females 11th, among countries which record vital statistics. In the mind of the public, this disparity is linked, simplistically and fuzzily but nevertheless dangerously, and it would be folly to ignore the implications.

The support of medical research, divorced from basic science, is a scenario for decline. The record is clear in the case histories of all major medical advances of the last generation. There are few in this audience who would dispute this particular generalization. Unfortunately, this interrelation of basic biology and medical progress is not so easily grasped by a utilitarian public, jaded by technical achievements and space spectacles. The public may be ready to invest in the specific solutions to medical problems "of clear and present danger" (to use Justice Holmes' phrase), but the support of the broad base of biology as a legitimate national goal requires a level of sophistication which is hard to obtain and to sustain. This difficulty is reflected in many ways. We are asked to define what the proper mix should be in the support of basic vs. mission-oriented research as if these were alien and contending disciplines within impervious capsules, rather than a continuum of activity by the individual scientist and by science as a whole. Targets are being selected now, sometimes on dubious grounds, with diversion of resources during a period of declining over-all support. The defense of untargeted research is now and will continue to be one of our main problems. It will be difficult, but at least the profession can base its case on a positive record of accomplishment.

The second point of constriction between biomedical science and patient care finds us on shakier ground, that is, the crisis which is occurring in our health care system. Not only is the crisis growing, but its dimensions are becoming increasingly apparent to the public and even to the profession. In a sense most health care is ultimately derived from the academic medical centers. In its educational role, the academic center creates the profession; in its research role, it creates and perfects the tools of the profession. It might be considered to manufacture the basic commodity of its industry, that of scientific information and professional skill. The

relationship of academic medicine to the health care industry has always been an ambiguous one. It functions both within the industry and within the university in a way which finds no direct analogy in other professional schools. Although an integral part of the health care system, academic medicine has traditionally exhibited little concern for the functioning of that system beyond the bounds of its immediate coterie of hospitals and clinics. The academic centers have extruded trained professionals into the community, have sent new skills and information after them, and have hoped that somehow something workable would coalesce from this. In the past this seemed to suffice; at the present time it clearly does not. The failure now at hand finds us with little experience to offer and remarkably little data on hand to guide the major decisions which will be made within the next few years, decisions which will have far-reaching consequences for our profession, our patients, and the conditions under which they interact. It would be clearly inappropriate and probably disastrous to place managerial responsibility for our health care system in our academic medical centers. On the other hand, our sterile timidity in the past in investigating the political, sociological, and economic problems in health care delivery stands in sharp contrast to the march of scientific progress in biology and biologically based medical research. As a result, in the time of decision now, we have relatively little to offer.

This has been only a brief recitation of some of the problems which face us at this particular time of dwindling confidence in biomedical research and the erosion in financial and political support which has followed. What can we do in response to this challenge? There are no easy answers. We have a very broad audience in this country. The basic problem is to convert this audience to a supporting constituency. It will require clarification of our goals, education of the American

public, and intimate knowledge of the mechanisms by which decisions are made in the federal government. Some of this can be accomplished individually through education of our friends, patients, colleagues, and our representatives in government. The latter is of particular importance and preferably carried out locally, for the receptivity of the individual congressman increases in a linear fashion as he returns to his constituency. Arguments which appear to be special pleading in Washington gain credence when encountered with specific details in a familiar setting. In addition, there are things which we must do collectively as members of a scientific community. In order to act in concert, it is necessary to form a more effective national organization to serve as a broad forum for the biomedical scientific community. The need for such a structure was presented before this Society last year by Dr. Arnold S. Relman in his eloquent Presidential Address and will not be elaborated upon now. The past 12 months have perhaps brought us closer to that goal, but the final pattern has yet to emerge. Whether this will come eventually as a National Academy of Medicine or in some marsupial arrangement with the American Association of Medical Colleges has not yet been established. Your officers have participated in these activities and will continue to do so over the months ahead.

In summary, the beginning of this new decade finds our science and our profession troubled by challenges from within and from without, and facing a period of retrenchment coming unexpectedly after an era of unparalleled success. Our response to that challenge may in large measure determine the future of biological science and scientific medicine in this country. It is a time which calls for Abbott Neckam's "sedulous diligence of labor" and "vehement application of mind" by each of us individually and from all of us collectively.