THE WHITE HOUSE

WASHINGTON

October 12, 1984

MEMORANDUM FOR DR. CARLTON TURNER

FROM: JUDI BUCKALEW

SUBJECT: MEETING, OCTOBER 16, 1984

The meeting with the members of the American Society of Pharmacology and Experimental Therapeutics (ASPET) is scheduled for October 16, 1984 at 10:00 a.m. in Room 476, OEOB.

The following is a list of the people attending the meeting:

Marjorie G. Horning, Ph.D.
President of ASPET and Professor
Department of Biochemistry and Institute for Lipid Research
Baylor College of Medicine
Texas Medical Center

Allan H. Conney, PH.D.
Past President ASPET
Director of The Department of Experimental Carcinogenesis and Metabolism
Hoffman-La Roche, Inc.

William L. West, Ph.D
Professor and Chairman
Department of Pharmacology
Howard University College of Medicine

H. George Mandel, Ph.D.
Professor and Chairman
Department of Pharmacology
George Washington University School of Medicine and Dentistry

Frank G. Standaert, M.D.
Professor and Chairman
Department of Pharmacology
Georgetown University School of Medicine and Dentistry

J. Richard Crout, M.D.
Vice President, Medical and Scientific Affairs
Boehringer Mannheim Corporation
Pharmaceuticals Division
(Formerly, Director, Office of Medical Applications for Research, NIH)

William J. Waddell
Professor, Chairman
Department of Pharmacology
Louisville University, School of Medicine

Mrs. Kay S. Croker
Executive Officer for ASPET

Mary Helen Cobb
(Staff)
Perito, Duerk, Pinco

Frederick H. Graefe
Perito, Duerk, Pinco

In addition to meeting with you on October 16, I am hoping to have the group also meet with Dr. D. McDonald, Administrator, Alcohol, Drug Abuse and Mental Health Administration following their time with you.

If you have any questions, please do not hesitate to call me at ext. 6573.

Thank you.

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THE WHITE HOUSE

WASHINGTON

October 23, 1984

Dear Bill:

Thank you for taking the time to come by the office and visit with us. As stated to you in our meeting, I will help wherever possible.

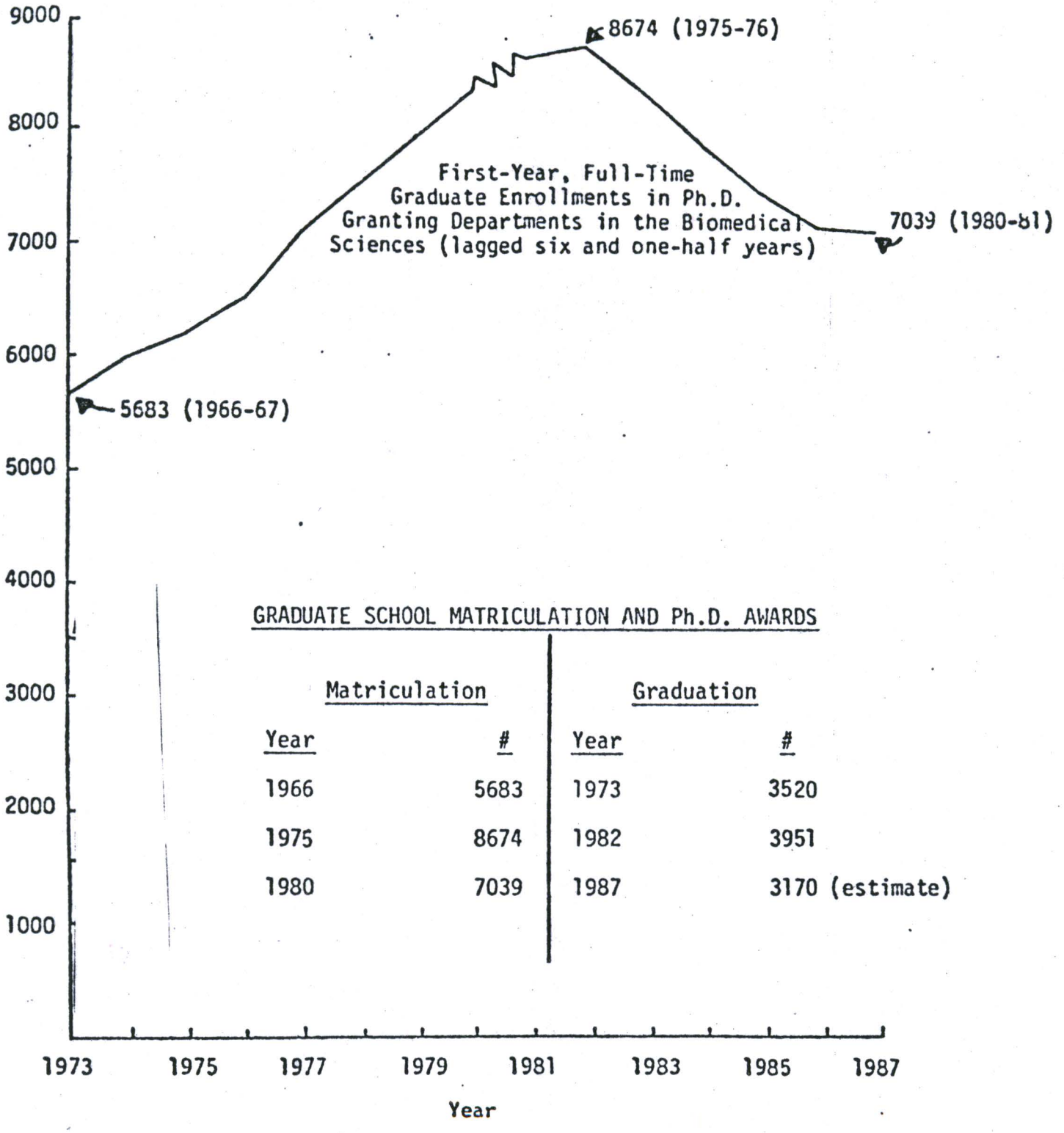
The contact person at the "Weekly Reader" is Mr. Terry Borton. His address is attached. The best contact for Lions' International is Mr. John Hall whose address is also attached. John is an expert on communications and on how best to sell ideas.

Please do not hesitate to contact me if I can be of further assistance. Best regards to the group.

Sincerely,

Carlton E. Turner, Ph.D.
Special Assistant to the President
for Drug Abuse Policy

Dr. William J. Waddell
University of Louisville
School of Medicine
Louisville, Kentucky 40292



GRADUATE SCHOOL MATRICULATION AND Ph.D. AWARDS

Matriculation		Graduation	
Year	#	Year	#
1966	5683	1973	3520
1975	8674	1982	3951
1980	7039	1987	3170 (estimate)

FIGURE 3.4 First-Year Graduate Enrollments in the Biomedical Sciences and Projected Ph.D. Awards and New Entrants to Academic Postdoctorals.

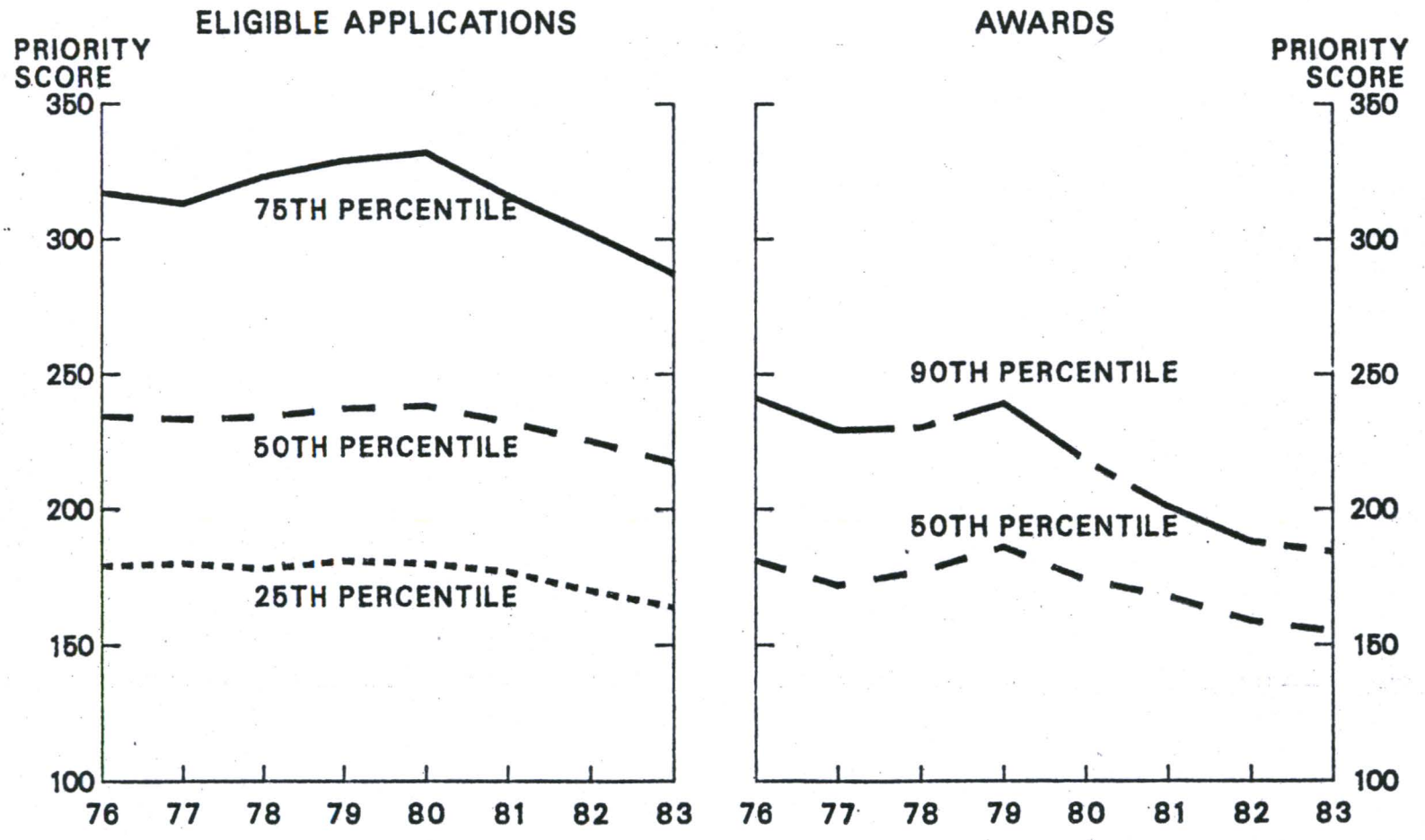
Personnel Needs and Training for Biomedical and Behavioral Research

THE 1983 REPORT
of the

Committee on National Needs for
Biomedical and Behavioral Research Personnel

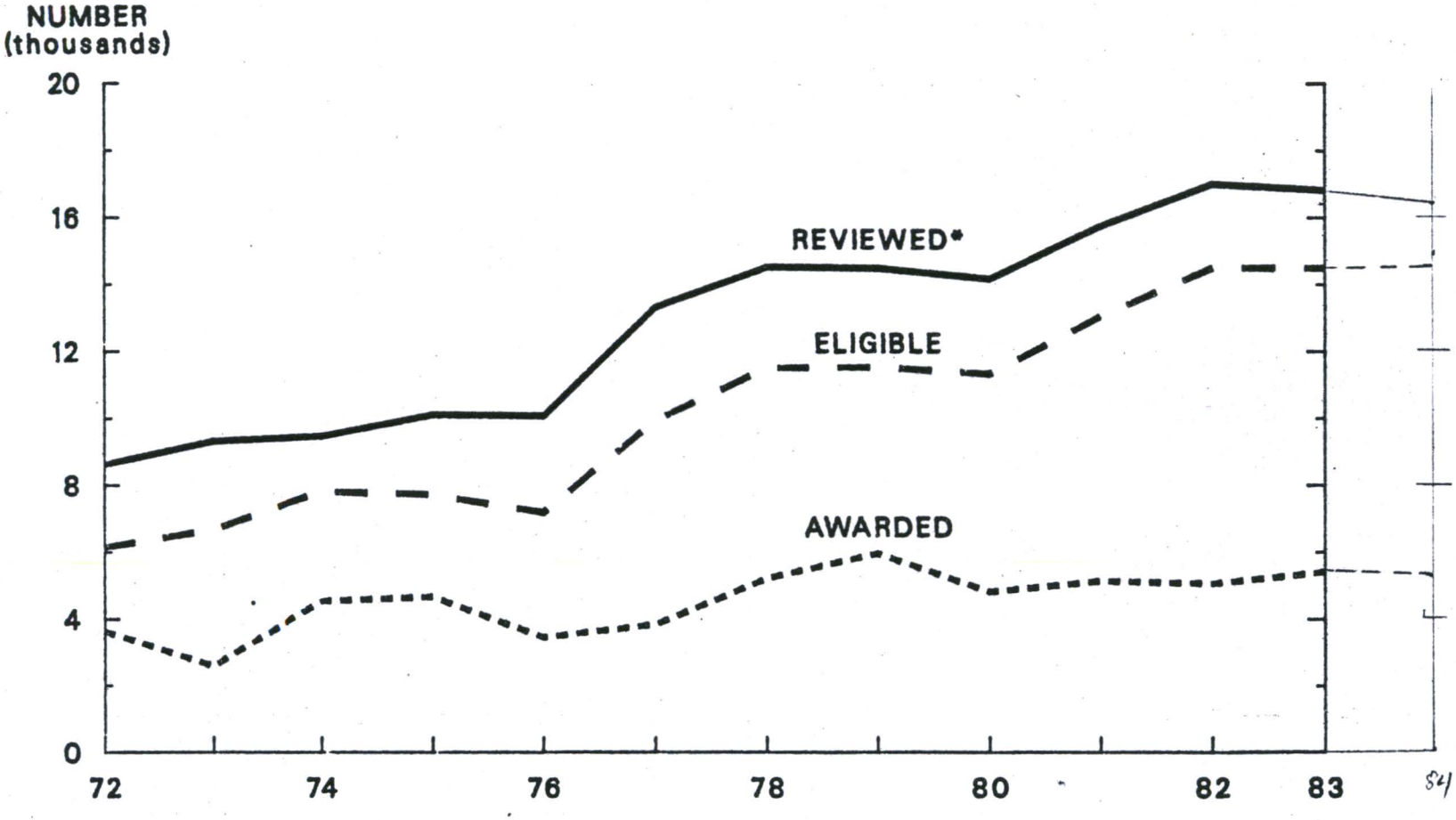
Institute of Medicine
National Academy of Sciences

PRIORITY SCORES FOR NIH COMPETING RESEARCH PROJECTS* AT VARIOUS PERCENTILES, FISCAL YEARS 1976-1983



NOTE: SEE TECHNICAL NOTE ON PAGE III FOR ACTIVITY COVERAGE. *BASED ON NUMBERS.
SOURCE: NIH, DRG, STATISTICS AND ANALYSIS BRANCH

NUMBER OF NIH COMPETING RESEARCH PROJECT APPLICATIONS REVIEWED, ELIGIBLE AND AWARDED, FISCAL YEARS 1972-1983



NOTE: EXCLUDES TQ. SEE TECHNICAL NOTE ON PAGE iii FOR ACTIVITY COVERAGE AND PROCEDURES.
*REPORTING YEAR.
SOURCE: NIH, DRG, STATISTICS AND ANALYSIS BRANCH

FACT SHEET ON NIH RESEARCH PROJECT GRANTS

(R-01 and P-01)

	FY1984	FY1985	ASPET'S Recommendation FY1986
NIH			
# Noncompeting	11,930	12,094	--***
# Competing			
Approved (est. 3/84)*	15,853	16,818	--
Funded	5,272	6,550	7,500
Approved but unfunded	10,581	10,268	9,318
% Funded of approved	33.3	38.1**	44.6
$, in millions	723	940	1,120

*According to the most recent data from NIH (October 12, 1984), the actual number of approved grants may be somewhat lower, indicating that the nation's pool of biomedical research investigators is already diminishing.

**In FY1979, 5,944, or 51.6%, of approved grants were funded.

***Additional funds will be required to honor commitments made for new starts in FY 1985.

H. George Mandel, October 10, 1984

RECENT ACCOMPLISHMENTS
RESULTING FROM RESEARCH IN PHARMACOLOGY AND THERAPEUTICS

1. Mortality rates from coronary disease and stroke decreased by 29% and 44%, respectively, between 1972 and 1982.

2. Lowering blood cholesterol levels with drugs diminishes the risk of heart attack and mortality.

3. Survival of childhood cancer patients increased from 5% in 1962 to 57% in 1982.

4. Survival from testicular cancer has reached 70% in advanced and 95% in localized malignancies.

5. Survival from advanced Hodgkin's disease, previously almost nil, has reached 70%.

6. Discovery of effective medications for controlling hypertension.

7. Discovery of effective medications for controlling Parkinson's disease.

8. Discovery of effective medications for controlling epilepsy.

9. Discovery of effective medications for controlling sleep disorders.

10. Discovery of effective medications for controlling peptic ulcer disease.

11. Discovery of effective medications for combating viruses.

12. Development of slow releasing drug implants for patients with chronic inflammatory bowel disorders, various heart conditions, and diabetes.

13. Discovery of new drugs that combat infection and the determination of mechanisms by which bacteria become resistant to penicillin, leading to the identification of more effective antibiotics.

14. Development of effective treatment for the prevention of respiratory distress syndrome, a formerly fatal disease in premature infants.

15. Elucidation of the probable mechanisms by which environmental pollutants cause toxicity, including cancer.

16. Discovery of immunosuppressant drugs that make effective organ transplants possible.

17. Discovery of drugs which inhibit inflammatory responses in arthritis and related disorders.

18. Discovery of brain hormones which control numerous physiological processes including pain.

19. Development of a better understanding of how drugs should be administered for optimal therapy.

20. Development of drugs which control psychiatric disorders. This has decreased the number of patients in hospitals and has decreased costs.

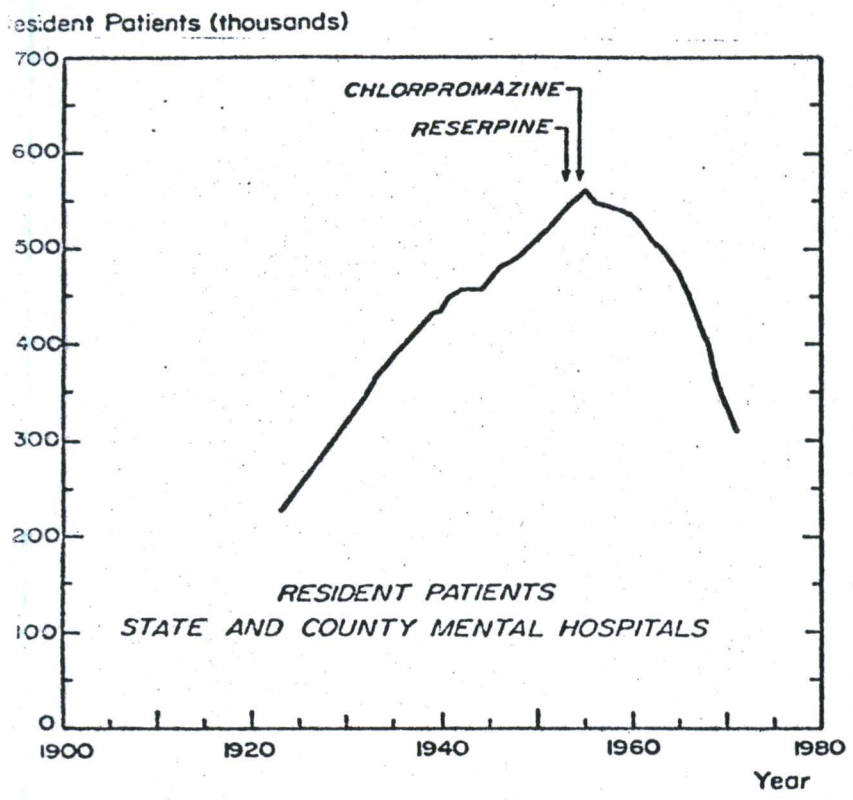


FIGURE 8. Resident Patients, State and County Mental Hospitals—Impact of Reserpine and Chlorpromazine
SOURCE: U.S. Department of Health, Education, and Welfare, National Institute of Mental Health, Biometry Branch.

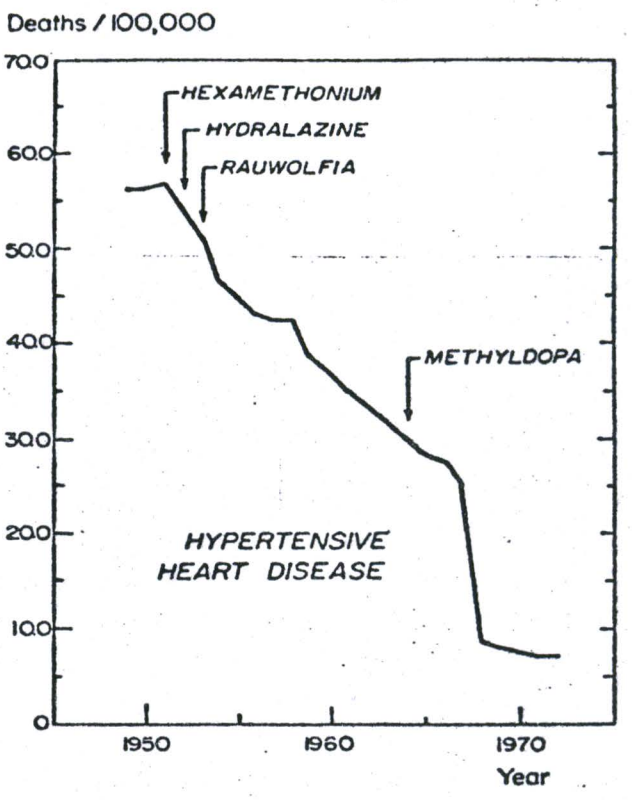


FIGURE 5. Hypertensive Heart Disease: Deaths per 100,000 Population—Impact of Hexamethonium, Hydralazine, Rauwolfia, and Methyldopa

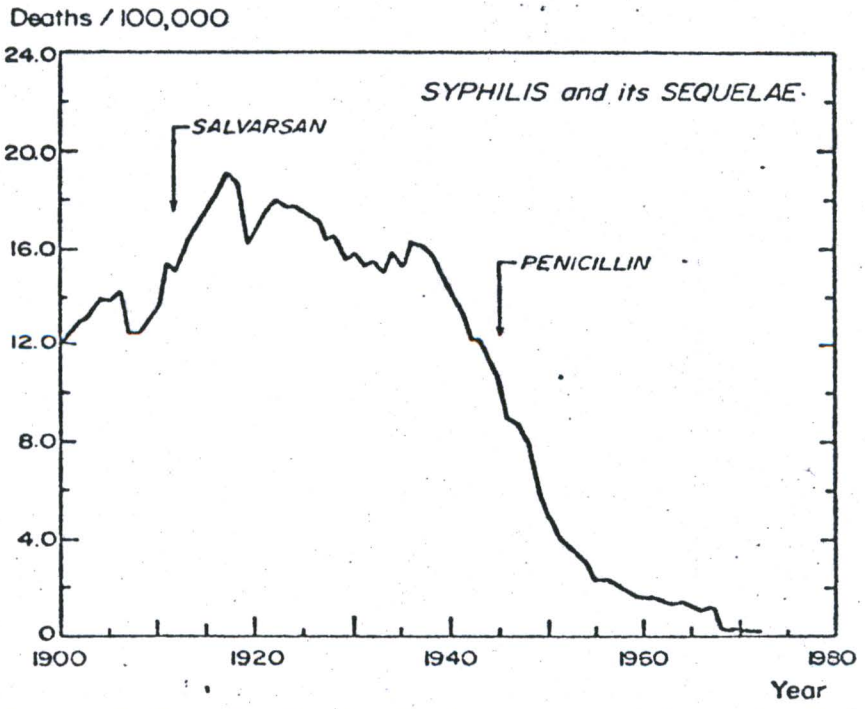


FIGURE 4. Syphilis and Its Sequelae: Deaths per 100,000 Population—Impact of Salvarsan and Penicillin

Nuturing the Scientific Enterprise

James B. Wyngaarden

Summary. The National Institutes of Health has given its highest priority to funding investigator-initiated projects and to minimizing year-to-year fluctuations in the number of new and competing awards. Adequate funding for centers, research contracts, intramural research, and training is also necessary for creation of the science base essential to sustaining the powerful momentum of recent progress. The important question for the future is whether the present system is sufficiently flexible and imaginative to keep pace with the contemporary revolution in science.

In the foreword of a soon-to-be published volume, whose chapters were written by 40 leading scientists about their years in the intramural NIH laboratories, Dr. Lewis Thomas has written (*1*): "We seem to be living through a period (transient, I hope) of public disillusion and discouragement over government and all its works. At all levels, bureaucracy in general is mistrusted, here and abroad. The word is out that government doesn't really work, can't get things right, wastes public money, fumbles along, stalls, gets in the way.

"At such a time, it lifts the heart to look closely at one institution created by the United States government which has been achieving, since its outset, one spectacular, stunning success after another. The National Institutes of Health is not only the largest institution for biomedical science on earth; it is one of this nation's great treasures. As social inventions for human betterment go, this one is a standing proof that, at least once in a while, government possesses the capacity to do something unique, imaginative, useful, and altogether right."

From the perspective of decades, the development of the NIH represents a remarkable accommodation of the public's understandable demands for results from the expenditure of public funds and science's inherent need for independence and elbowroom. The succession of laws that established and molded the NIH were wise, visionary, and enormously beneficial. But as farsighted and wise as the enabling statutes have generally proved to be, the development and maturity of the NIH resulted from sure-handed and enlightened administration of the congressional mandates, accompanied by a tolerant confidence on the part of Congress that its intention would be honored.

It was fortunate that during the period of its explosive growth from 1955 to the late 1960's, the NIH was directed by an unusually able and strong leader—James A. Shannon. Jim Shannon insisted that the congressional mandate to conduct research in cancer, heart disease, and arthritis, for example, be interpreted broadly. He realized that the scientific base was not sufficient to permit a frontal assault on the diseases themselves. He set about to build the research capability of this country through the intramural program at Bethesda and through a substantial expansion of the mechanisms of grants-in-aid to institutions.

The Shannon era was a time when year-to-year budget increases for the NIH averaged around 25 percent. What was entirely foreseeable has happened. Although our annual appropriation is now well over $4 billion—ten times what it was in 1960—the increases for the past decade have barely kept pace with inflation. Our thoughts have turned to preservation; that is, the preservation of the momentum of the burgeoning biomedical research enterprise.

By 1975, the NIH appropriation had just reached $2 billion, but the positive slope of the growth curve was flattening noticeably. In its report on the 1976 NIH budget, the Senate Appropriations Committee warned that "annual increases should not be routinely expected and it would therefore be prudent to develop a policy for the most effective management of the research grant programs on the basis of relatively constant funding from year to year" (*2*).

As early as 1974, the NIH had begun accommodating to a relatively constant budget by funding an increasing number of excellent research proposals through shifting funds from among various other program mechanisms. There was a clear need for articulation of policy for guidance through the uncharted funding plateau. In 1978, under the leadership of Donald Fredrickson and Secretary Joseph Califano, a national conference on health research principles was held in Bethesda. Its purpose was to draw out ideas from the department's health agencies and the research community for a research plan to help guide in the allocation of limited resources. More than 100 nonfederal scientists, many of them representing major segments of the scientific community, participated actively in the conference discussions. All parties to the conference agreed on the essentiality of the federal commitment to ensure a strong "science base" for health. They repeatedly stressed the need for long-term stability in the funding of health research and warned that present research capabilities must be sustained and enhanced to assure future health gains.

These considerations stimulated the development of the so-called "stabilization strategy" that was conceived to benefit biomedical research. As applied to research project grants, the most important component of the science base, a major goal was to minimize the year-to-year fluctuations in the numbers of new and competing renewal awards and thereby to reduce the likelihood that investigators would forsake research careers because of the appearance of unpredictability of funding opportunities.

Amid the hectic give-and-take of the iterative budget process, the first step toward effecting the stabilization concept was to apply it to research project grants. The goal of funding at least 5000 new and competing renewal research grants, atop a base of moral commitments comprising approximately 11,000 noncompeting continuation grants, became an end in itself—an end to be met, if necessary, by repeated downward negotiations in direct costs from the levels recommended by peer reviewers, by payment of less than full indirect costs, and by reduction in other important program activities.

The author is director of the National Institutes of Health, Bethesda, Maryland 20205. This article is the text of his address at the Annual Meeting of the Association of American Medical Colleges, 7 November 1983.

The present and continued adherence to the abridged stabilization strategy has become a problem in that it does not reflect a broad view of the needs throughout biomedicine, even though it does much to protect the most important mechanism for the generation of new knowledge—the investigator-initiated research grant. Serious concerns in this regard have been advanced by NIH institute directors, by the NIH director's advisory committee, by national advisory councils, and by other groups representative of the research community or the public at large. However, a superior alternative has yet to be articulated, much less become adopted as broadly and fervently as has the current strategy.

While it is true that NIH has supported at least 5000 new and competing renewal research project grants each year since 1980—and in 1983 the total was over 5300—it would be incorrect to contend that maintenance of this number per se has produced stability for the biomedical research enterprise overall. The fact that we have found it necessary to fund research project grants at levels well below those recommended by peer reviewers is a chronic source of concern to all involved. Moreover, repeated and unpredictable reductions in the fraction of total NIH dollars available for all other funding mechanisms, including training and research career awards, research centers, and contracts, has led to less than desirable levels of effort in complementary areas.

One component of the long-range stabilization effort—5000 new and competing grants—is easy to describe and, as things have turned out, is achievable. It is not surprising that this partial expression of a broader objective has become its surrogate and the focus of attention from all concerned. Numerous proposals have been made recently to "stretch" the research dollar by limiting or reducing the amounts paid on individual grants in order to free funds to support additional awards. These proposals have been considered by the NIH and have been found to be lacking in many respects, not the least of which is the implication that research awards represent a full employment program for scientists. The proposal brings to mind a statement in testimony by Philip Handler: "In science the best is vastly more important than the next best," or John Gardner's query—"Can we be equal and excellent, too?"

However, in fiscal year 1982, the NIH instituted a formal policy of awarding grants at amounts less than those recommended by the peer review groups as a way of maximizing the number of grants that could be supported within a given budget level. Although, as demonstrated by the 1982 and 1983 experience, this policy has provided short-term relief from budget stringencies, it holds little promise of contributing to long-term solutions. Just as there are limits to the amounts of resources that can be shifted from other program mechanisms to support the funding of research project grants, so are there limits to the reductions that can be made in funds awarded to support of an individual research project grant without defeating the purposes for which those funds were awarded.

Despite the untoward side effects of the recent partial implementation of a stabilization policy, the NIH has no desire to abandon the concept—and we recognize the positive effect of even an incomplete application of this long-range plan during a time of fiscal stringency. It is our conviction that the important needs addressed by the original stabilization strategy remain and that the essential components of the strategy continue to be vital as means for addressing those needs.

Stated in the simplest possible terms, we need to assure adequate levels of support for the entire research enterprise if we are to preserve the momentum of discovery. We believe that the optimal level for progress is to be able to award 45 to 50 percent of approved applications for research support. In the context of the federal budget, the sums needed are not large. Last December I expressed to the director's advisory committee my belief that to achieve such a goal, we would need an additional $300 million to $400 million per year for 3 years, with steady funding for new awards thereafter. It is encouraging that the increase for 1984 approaches that projection.

The Association of American Medical Colleges (AAMC) and the Coalition for Health Funding have been untiring in their efforts to improve public awareness of the value and promise of biomedical research as well as its funding needs. That better public understanding was translated again this year into action by the Congress as it made its decisions on the NIH budget. But a projection based on a 50 percent award rate, essentially full funding of grants, and maintenance of balance among the essential mechanisms for research support would require much larger sums, perhaps a doubling of the NIH budget by 1990 even if a modest rate of inflation is assumed.

In speaking of the essential mechanisms for research support, I would include at the minimum adequate funding for centers, for contracts, for intramural research and for training, as well as for research grants. For obvious reasons, we consider first-time grantees a highly important category of investigators who must be adequately supported by NIH awards. In 1982, about 8 percent of our awardees were "first-timers"—this, by the way, is the lowest that ratio has been in a decade. In FY 83, when we funded 39 percent of study section approved awards, this figure rose some but precise figures are not yet available.

At the other end of the grantee spectrum is the outstanding established investigator for whom a mechanism is needed for providing longer term, more flexible support. Another matter requiring attention is the need to replace or purchase the increasingly sophisticated instruments required for today's research. It is estimated that $20 million a year for 5 years is needed for the acquisition of large-scale shared instrumentation resources with additional funds for the purchase through research grants of smaller instruments. The NIH has recently joined an ongoing study by the National Science Foundation for the purpose of securing a valid current assessment of national need.

Finally, extramural laboratories and facilities are slowly deteriorating. With the exception of funds supplied by the cancer program and more recently by the National Eye Institute, NIH stopped supporting facilities after 1969, and currently lacks legal authority to do so. As a consequence, many of the facilities benefiting from the major NIH construction effort—the health research facilities program—are more than 20 years old, or rapidly approaching that mark. Rather than calling for any new major expansion, the realistic aim of any new federal construction program should probably be less ambitious. It should, however, include new construction to replace outmoded facilities, to relieve overcrowding, and to accommodate changing research requirements, including facilities for dealing with toxic wastes, for laboratory animals, and for major renovation and repair of inferior facilities. There is a dearth of good information on construction needs, and a current study similar to that being conducted on instrumentation deficits is seriously needed.

It is clear that for a construction program to make any difference in addressing the needs, the monies appropriated would have to be substantial. Past approaches which have limited the total

federal construction contribution to up to some fixed percentage of total costs may be a reasonable condition to impose on any new authority developed. It is encouraging to note that the Congress has recognized that universities and other institutions of higher learning are reaching a point where they will not be able to participate fully in our cooperative research endeavor without assistance.

As important as buildings and adequate instrumentation may be, there is another consideration of even greater moment. This subject is necessarily at the heart of any discussion about preserving the momentum of discovery or of preserving the biomedical research enterprise itself. That subject is research training. In our view, the training and research programs are so closely interwoven as to be practically indivisible. The intense competition for research support has increasingly taken its toll of the amateur or undertrained investigator. The professionalization of research activity has progressively selected against the M.D. scientist who 15 years ago had a much better prospect of success in research applications than the Ph.D. applicant.

Concurrently, there has been a decrease in the number of physicians who are seeking research training. The application of scientific advances to maintain good health and to prevent and treat disease is ultimately the responsibility of the physician. The trained clinical investigator is the critical link between the laboratory and the health care provider. In the face of the explosive growth of basic knowledge in the biomedical sciences which has opened up vast opportunities for clinical research, the shortfall in training of clinical investigators assumes additional significance.

Despite these negative factors and partly to counter them, the NIH has developed several programs in addition to its regular research training grants that are designed to acquaint the physician in training with the excitement and possibilities of biomedical research. At present, the stipends available for support of National Research Service Award trainees are paltry, well below those available in other federal research training programs. Predoctoral stipends should be raised to the $8100 that is offered by the National Science Foundation. An estimated supplement of some $34 million would be required to achieve parity under the NRSA program. Our new training programs for exceptional postdoctoral fellows would require more than $10 million to bring their stipend levels in line with other individuals of equivalent training and experience.

Additional training slots should be made available for the NRSA program to bring it to the level recommended by the National Academy of Sciences. Over a 2-year period, training positions should be increased to about 10,500. Increases are also needed in the career development program at a rate of 200 added awards a year for 3 years. The latter increases, plus the increase in numbers of NRSA trainees, would require an addition of some $40 million per year over the President's request. Thus, total needs to bring the support to competitive level amount to about $84 million.

Earlier I spoke of some of the exterior changes that have occurred affecting the long-standing federal-academic partnership. Recently we have seen the beginnings of development of a three-way partnership involving industry as a participant. There have been suggestions that the NIH take some kind of active part in the institution of these new relationships. We have not done so. We believe it preferable that the new forms of joint endeavor continue to evolve as they have been with government playing a facilitative role. Notwithstanding the fact that the areas of collaboration between the universities and industry have broadened significantly and promise to continue in that expansion, I believe it safe to predict that the government will continue as the principal source of funding for basic research.

At the same time, and within the biomedical scientific enterprise itself, there has been a gradual change having profound implications. Nobel Laureate Arthur Kornberg recently called attention to the "confluence of the many discrete and previously unrelated medical subjects into a single unified discipline." He observed that "anatomy, physiology, biochemistry, microbiology, immunology and genetics have now been merged and are expressed in a common language of chemistry" (*3*).

It is ironic that in the presence of this confluence of the scientific disciplines, there are increasing pressures on the NIH for fragmentation through the creation of new organizational entities each having a relatively narrow focus on a particular set of health problems. Such movements gain much of their strength from, and indeed are an expression of, the public confidence in the power of research. The movements are also an understandable reaction by segments of the biomedical community to the funding crunch and represent an effort to establish altered research priorities through congressional action.

The NIH and the Department of Health and Human Services have opposed legislation for the creation of new institutes and for the establishment in statute of favored status for specific research programs. Our opposition to these proposals is based not only on their adverse effects on administrative costs and flexibility, but also because the compartmentalization they establish is counter to the direction in which science is moving. At a time when we *can* confidently predict unusually rapid movement in science, but *cannot* predict just where that progress will occur, we need the maximum flexibility for marshaling finite resources for support of science. Organizational structures have a direct influence on funding priorities. Even though such detailed legislative prescriptions may be proposed with the intent of preserving the scientific enterprise, their effect can tend toward another kind of preservation—freezing the enterprise in status quo. That is also a reason we continue to oppose H.R. 2350, the so-called Waxman bill, and to insist that simple reauthorization of expiring authorities and preservation of section 301 of the Public Health Service Act are all that are needed.

In saying this, however, I am aware that adamant refusal on the part of the scientific and academic community to consider change is shortsighted. Such a posture would ignore the history of the development of the NIH—institute by institute and most of them disease-oriented. It was from such specificity that public interest and vigorous support was drawn.

Last June, we asked the Institute of Medicine of the National Academy of Sciences to make an objective study of the organizational structure of the NIH and, considering scientific developments and economic conditions, to recommend the establishment of standards for determining the need for any substantial change in the organizational structure of the agency. We expect the study to be completed and to have a report from the IOM in November 1984.

In that connection, permit me to lay to rest one bit of false speculation that has circulated in some quarters of the scientific community; namely, that NIH's hidden agenda in sponsoring the IOM study is to do away with categorical institutes. I can categorically say that we did not and do not have such an intention.

In summary, the scientific enterprise

is alive and reasonably healthy—but it could be much more so. To flourish vigorously, to utilize to the full our vast human resources for greater progress in health research, additional sums are needed for many purposes, but equally we need a renewal of the long-range commitment to excellence and accelerated progress, and to preservation of managerial flexibility within the enterprise itself.

The AAMC has consistently and effectively supported this position. In that connection, I urge you to read carefully the analysis and exposition of principles for the support of biomedical research just issued by the AAMC executive council. This little blue book, titled *Preserving America's Preeminence in Medical Research*, is an exceptionally clear, balanced, and persuasive statement deserving of widespread attention.

Most of you will remember another influential report issued by the AAMC in 1965. It was written by Lowell T. Coggeshall and titled *Planning for Progress Through Medical Education*. In the report was an observation that fits exactly the context of my remarks and, in a sentence, captures the ideas I have endeavored to present. In Dr. Coggeshall's words—as valid now as when they were written—"The important question for the future is whether the present system is sufficiently flexible and imaginative to keep pace with the contemporary revolution in medical sciences and the changing expectations of the American people" (*4*).

References and Notes

1. L. Thomas, from the foreword of *Laboratories and Clinics: An Account of Research at the National Institutes of Health* (Academic Press, New York, in press).
2. Report on 1976 Appropriations for Departments of Labor, Health, Education, and Welfare and Related Agencies. U.S. Senate 1975.
3. A. Kornberg, from "Biology and technology," unpublished manuscript, 1982.
4. L. T. Coggeshall, "Planning for medical progress through education," a report submitted to the Executive Council of the Association of American Medical Colleges (Association of American Medical Colleges, Washington, D.C., 1965).

RESEARCH ARTICLE

Major *pol* Gene Progenitors in the Evolution of Oncoviruses

Ing-Ming Chiu, Robert Callahan, Steven R. Tronick
Jeffrey Schlom, Stuart A. Aaronson

Abstract. *The genetic relationships among molecularly cloned prototype viruses representing all of the major oncovirus genera were investigated by molecular hybridization and nucleotide sequence analysis. One of the major progenitors of the* pol *genes of such viruses gives rise to mammalian type C viruses and another gives rise to type A, B, D, and avian type C oncoviruses. Evidence of unusual patterns of homology among the* env *genes of mammalian type C and D oncoviruses illustrates that genetic interactions between their progenitors contributed to the evolution of oncoviruses.*

Oncoviruses, a subfamily of Retroviridae (*1*), are the causative agents of naturally occurring tumors in diverse vertebrate species. Unlike most viruses, which are spread only as infectious agents, oncoviruses can also be transmitted within the germ line of the host. Under such conditions, these viruses are passed from one generation to the next and often in an unexpressed form. The widespread distribution of oncoviruses among vertebrates implies that this intimate association has persisted through a considerable period of evolution.

The oncovirus genera have been classified by morphologic criteria (*2*). Defective intracisternal type A viral particles were initially observed in early embryos of mice and in certain murine tumors (*3*). Later studies revealed the existence of infectious retroviruses containing extensive homology to the A particle genome as well (*4*). Type B viruses have been found only in murine species. Such viruses have been established as etiologically responsible for mammary tumors of the mouse (*5*). Type C viruses, which are widely distributed among birds and mammals, cause leukemia and other tumors [see (*6*) for reviews]. The most recently described type D oncoviruses are so far limited to primate species, and their oncogenicity remains to be established (*7*).

In recent years, efforts have been made to ascertain the evolutionary relationships among different oncovirus genera. One of the most useful approaches has been the demonstration of shared antigenic determinants in their translational products. Interspecies cross-reactivity was initially observed for several early isolates of type C viruses (*8*). The advent of radioimmunological techniques made it possible to demonstrate the presence of interspecies determinants common to the respective *gag*, *pol*, and *env* gene products of all known mammalian type C viruses (*9*). Such studies have led to the conclusion that mammalian type C viruses arose from a common progenitor. The detection of immunological relatedness between the major structural proteins of type B and D viruses, as well as between mammalian type C and D viruses, has suggested that evolutionary links may also exist among these three major oncovirus genera (*10*).

Efforts to analyze the structural and evolutionary relationships between different oncoviruses have been facilitated by the ability to isolate and amplify these viral genomes by molecular cloning techniques. In the present studies, we used molecular hybridization and nucleotide sequence analysis to detect and localize related genes of viruses representing different oncovirus genera. We have now established the existence of major *pol* gene families in the evolution of oncoviruses, as well as other previously undetected evolutionary linkages.

Oncoviruses have been classified on the basis of their morphological properties (*2*). Even though four different genera have been recognized (Table 1), vi-

I.-M. Chiu, S. R. Tronick, and S. A. Aaronson are in the Laboratory of Cellular and Molecular Biology and R. Callahan and J. Schlom are in the Laboratory of Tumor Immunology and Biology, National Cancer Institute, Bethesda, Maryland 20205.

Republican Party Platform Differs Markedly from Democratic

Though both strongly support research, the two platforms diverge on science education, government regulations, and environmental issues

The Republican Party platform that emerged from the recent Dallas convention is, as could only be expected, a reaffirmation of many of the Administration's present policies. It offers striking contrasts to the Democratic platform (C&EN, Aug. 6, page 13), but there is at least one area of agreement—both contain kind words about research and development.

In a section labeled science and technology, the Republican platform says, "We pledge to continue the Reagan Administration's science and technology policies, which have enhanced economic recovery and our nation's research capability. We have refocused federal research and development programs on basic research and it has increased more than 50%. We propose to extend the incremental research and development tax credit to stimulate greater activity in the private sector. To allow U.S. firms to compete on an equal footing with foreign companies, we will permit U.S. firms to cooperate in joint research and development efforts."

As can be seen, the section specifically labeled science and technology is rather short, but there are other favorable references to research scattered throughout the platform. In setting forth the party's position on agriculture, for example, the platform notes that farmers and ranchers "have benefited immensely from agricultural research, extension, and teaching, unequaled in the world.

Reagan: will continue science policies

... We support these programs, with special attention to marketing, efficiencies, reduced production costs, and new uses for farm and ranch commodities."

The Republicans are also high on health research—an apple-pie issue if there ever was one. Thus, says the platform, "We will maintain our commitment to health excellence by sponsoring research into yet-unconquered diseases. There is no better investment we as a nation can make than in programs that hold promise of sounder health and longer life. For every dollar we spend on health research, we save many more in health care costs. ... The federal government has been the major source of support for biomedical research since 1945. ... We commit to its continuance."

The two parties' platforms begin to diverge on the issue of science education. The Democratic platform spoke at length about the need for aid to local school districts to improve math and science education and. enhanced support for undergraduate and graduate training in science and engineering. The Republican platform says only, "We urge the states to establish partnerships with the scientific and business world to increase the numbers of teachers in these critical areas of learning. We also recognize a vast reservoir of talent and experience among retirees and other Americans competent to teach in these areas and ready to be tapped."

The divergence widens when the subject of government regulation is addressed. The Republican platform notes, "We are committed to the termination of the Department of Energy. President Reagan has succeeded in abolishing that part that was telling Americans what to buy, where to buy it, and at what price—the regulatory part of DOE. Then he reduced the number of bureaucrats by 25%. Now is the time to complete the job." It also calls for decontrolling natural gas prices as rapidly as possible, repeal of the "confiscatory" windfall profits tax on oil, and elimination of unnecessary regulatory procedures so that nuclear plants can be brought online quickly, efficiently, and safely.

In addition, the platform notes, "We moderated the Environmental Protection Agency and the Food & Drug Administration's excessive adherence to 'zero risk' standards concerning the use of pesticides, antibiotics, food additives, and preservatives. Republicans favor modernizing our food safety laws, providing guidelines for risk-benefit assessment, peer review, and regulatory flexibility consistent with other health and safety policies."

When it comes to environmental issues, the platform states, "The environment is not just a scientific or