

American Chemical Society's Public Policy Statements

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THE AMERICAN CHEMICAL SOCIETY'S
OFFICIAL PUBLIC POLICY STATEMENTS AND COMMUNICATIONS
1975

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December 8, 1975	Letter of President William J. Bailey on behalf of the American Chemical Society to the Senate Committee on the Judiciary on S.2255, a bill for the general revision of the Patent Laws.	ACS 75-011

STATEMENT
of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY
COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES
on the
NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT, 1976
regarding
SCIENCE INFORMATION SYSTEMS
Wednesday, February 26, 1975

The American Chemical Society appreciates being given this opportunity to comment on the National Science Foundation Authorization Act, 1976, regarding science information systems. It is appropriate that we give this statement since our National Charter imposes obligations on the Society to provide assistance to the government in matters of national concern related to the Society's areas of competence and also to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers,

reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

The American Chemical Society, primarily through its Committee on Chemical Abstracts Service of the Board of Directors, has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views presented by the American Chemical Society represent a consensus of the nation's science community.

We wish to offer for the consideration of the Subcommittee the following specific recommendations:

1. On behalf of the United States chemical science community, we ask that the FY 1976 Budget for the NSF Office of Science Information Service (OSIS) be specifically identified in the National Science Foundation Authorization Act, 1976, at the \$8.5 million level -- a level consistent with its FY 1974 obligations -- and that NSF be instructed to reinstate the long established OSIS program for support of the development of discipline-based information-accessing systems for science and technology which was dropped from the FY 1975 Budget by direction of the Office of Management and Budget.
2. Four or five years more will be required to develop the discipline-oriented processing systems to the point of operational viability, and much additional effort will be required to bring users to the point where they use and rely on automated information services in their regular work. This can only be accomplished with continuity of OSIS encouragement and support. On the basis of funds assigned by federal mission-oriented agencies to similar information system development, the American Chemical Society recommends that the OSIS annual budget grow to 3-5% of NSF funds over the next several years.

The urgency and magnitude of current world problems, such as the need for increased productivity, environmental management, and prudent husbandry

of the limited reserves of critical natural resources, make it mandatory that we utilize effectively the available scientific and technical knowledge in obtaining practical solutions to these problems. Today's tools for locating pertinent data are not sufficiently powerful to assure that we avoid costly repetition of much recorded work. Neither do these tools permit us to assemble rapidly the information that decision makers need to have as a reliable basis for choice among developmental alternatives. To meet the challenge of current problems, there must be vast improvement within the United States in the utilization of accumulated scientific and technical information arising from public and private research and development; from industrial, business, and commercial enterprise; and from educational and governmental activities. This improvement is essential if U.S. technology is to maintain its global preeminence, if the markets for U.S. products are to be sustained, and if the growing stream of societal problems are to be solved without continual crises.

Science and technology grow by building forward from the present state of knowledge -- science being converted to technology, and technology stimulating additional science. Learned societies have long played the leading role in maintaining a reliable primary record of scientific and technical information and of providing many of the secondary services -- abstracting and indexing tools. Despite some inadequacies, present information-accessing services constitute the only avenues for entry into the cumulative archives of information. This stewardship should be preserved in the public interest.

Effective use of available scientific and technical information is not just a U.S. problem. Already the national governments of the German

Federal Republic, Japan, and the Soviet Union have initiated major programs of support directed both at rapidly increasing the efficiency of industrial utilization of published information and at underwriting much, if not all, of the routine production expense for the necessary data bases. All aspects of U.S. life are and will continue to be heavily influenced by the timeliness and the effectiveness of access within the United States to such information, from wherever the information may derive. And, since nearly three-quarters of the literature published in most scientific disciplines originates outside the United States, competition in the development of information systems is truly international.

The scientific societies have the know-how, but do not have the resources to develop systems to meet our national informational needs. Therefore, unless the federal government provides encouragement and financial support, there can be no continuity of planning, development, and implementation of information-handling systems capable of meeting the needs of efficient government, of vigorous industry, and of an effective educational system. For the purpose of illustration, we would like to focus on the dependence of the federal agencies and of industry on these information-accessing services.

Much of the work of the federal government is dependent upon routine acquisition of large amounts of information. In addition to the vast volume of data generated in compliance with legislation and governmental regulation at all levels, success in most federal missions depends upon reliable access to related information which is widely dispersed among the world's accumulated publications. It is not easy to assure awareness of new information pertinent to the accomplishment of federal missions, because most missions cross many disciplinary boundaries, such as chemistry, physics,

mathematics, biology, etc. Not surprisingly, this has led to the common practice by federal agencies of developing special information services, each designed to supply the specified combination of information required to accomplish that agency's mission. Also, not surprisingly, the haste in which these special-purpose services are usually established seldom allows any interlinking of files with related information previously accumulated in the long-established discipline-based information services.

The missions of the federal agencies, and therefore the information they deal with, frequently overlap. These overlaps are becoming increasingly common as new agencies are established to meet new problems, such as environmental protection, energy conservation, transportation development, natural resource management, and population growth. Unfortunately, the mission-oriented information tools specially developed by these agencies are usually based on published information which is already being covered by the combined contents of the long-existing discipline-oriented information services -- most of which are operated outside of the government.

Few, if any, federal agencies can depend solely on mission-oriented services which they create; they must also utilize the discipline-oriented information services operated by the scientific community to fulfill their assigned responsibilities successfully. It has often been acknowledged that agencies such as the U.S. Patent and Trademark Office, the National Bureau of Standards, the National Institutes of Health, the Food and Drug Administration, the Environmental Protection Agency, the Agricultural Research Service, the Bureau of Mines, the Center for Disease Control of HEW, and the fisheries and wildlife bureaus of the Interior Department are heavily dependent upon these discipline-oriented information services.

Missions, as used here, are special-purpose combinations of parts of disciplines. Missions reflect current practical needs for certain kinds of applications of science and technology. Examples of mission-oriented projects which have developed their own information systems are space, energy, medicine, and the environment. Disciplines reflect the intellectual organization of science as it has evolved over hundreds of years, that is, chemistry, physics, geology, etc. Discipline-based information services are essential to assure access to the archive of information which predates the existence of any given mission and, therefore, of any mission-based information service. In the same way, the discipline-based services also provide continuity with related information which may not be linked closely to the needs of a given mission and, therefore, is not covered by the corresponding mission-oriented information service.

Obviously, missions tend to adjust with time (possibly ceasing to exist) with corresponding changes in their informational requirements and the coverage of their supporting services. The variability of content of mission-oriented information services is further complicated by differences in the objectives defined for apparently similar missions, but established in different nations. In contrast to the mission-based information services, whose content can vary both with time and with national boundaries, discipline-oriented services can have long-term international consistency and are capable of maintaining stable coverage policies. Thus, the public must depend upon discipline-based information services to supply reliable access to pertinent subject matter which pre- or post-dates a given mission-oriented service and to compensate for variations in the coverage of ongoing mission-based services.

While continuity of OSIS support for the development of information systems by scientific and technical societies has been banned by OMB, continuity of support for development of mission-oriented services operated by federal agencies is not similarly restricted. Outstanding advancements have been and will continue to be made by development of these government services, and it is in the public interest that such development efforts be continued. However, unless a way is found to assure that the development of the privately operated services is continued, these services will fall far behind in their ability to serve modern needs of both governmental and non-governmental agencies. To date, the only sustained federal support for improving the processing systems of these discipline-based services has come through OSIS.

Further, there has been no federal support -- except that provided through OSIS -- directed at effective use of combinations of two or more of these existing discipline-oriented services. This too has been discontinued according to OMB edict.

Industry also depends heavily upon the discipline-oriented information accessing services for locating information needed to solve day-to-day problems and to plan and support research and development. Each company requires its own special information, and to protect its marketing position, a company must often exercise confidentiality in acquiring information and rarely considers "pooling" information with a competitor. Unlike many federal agencies which establish their own mission services, most companies cannot afford to generate and maintain individualized accessing tools starting from the primary literature. Instead each company meets its requirements by use of varying combinations of discipline-wide and specialty services.

Small companies depend mainly, often entirely, on libraries and information centers which provide service to the public. In recent years, small manufacturers and businesses have decreased their use of existing information services because these services have dramatically increased in size and price and because dependence solely upon printed abstracting and indexing services cannot provide sufficiently prompt and complete search results. The volume of published literature has become too large for effective manual handling.

On the other hand, many large companies maintain extensive libraries of primary scientific and technical publications, although no organization -- industrial, educational or governmental -- directly acquires all of the primary information directly applicable to its interest. For access to the specific content of their individual library collections and to other primary documents which they do not acquire directly, these company libraries depend upon combinations of the discipline-oriented information-accessing services. Here again, however, printed services alone cannot provide information access that would be adequate to meet national and international demands. New technology must be developed to augment traditional techniques.

If there is no sustained support for the development of privately-operated, discipline-based information services, these services cannot develop processing capabilities comparable to those being developed within the federal mission-based agencies, and the market for discipline-oriented information services will continue to decrease. The loss of income already being felt by the discipline-oriented services is resulting in tremendous pressure to change coverage policies. In the absence of well-conceived modernization, these pressures can be met only by reduced coverage which, in turn, can only lead to permanent loss in long-term continuity of information access for the

community as a whole. Careful study has shown that once continuity of coverage is broken, it is nearly impossible to re-establish.

Despite the limited long-term usefulness of mission-oriented information tools, there has been no good alternative -- the technology has not existed until now to permit the broadly-based discipline-oriented services to jointly support agency missions. Such support would logically comprise re-use of selected portions of many discipline-oriented services via automated extraction, combination, and packaging of the needed information. Under firm OSIS encouragement, the feasibility of the needed technology has begun to be demonstrated. Despite the problems which are encountered in trying to achieve concerted action by the many organizations with investments and long, proud histories of individual accomplishment, acceptance of the need for concerted effort is starting to grow. However, coalescence can occur through the investment of public funds for the step-wise adoption of processing techniques which have been demonstrated to be effective. Without such an investment, there can be no development of needed technology, no demonstration of practicality for the needed techniques, and no possibilities for solving these information supply problems.

Acquiring national competence in automated information processing is largely a developmental problem. To achieve such competence requires the availability of suitable hardware and the adaptation of existing software techniques to information-handling problems. The required development demands an organized engineering approach. Some research is required, and some basic research from other fields is applicable, but assured progress depends upon continuity in demonstrating the practicality of changing present information processing and use mechanisms.

Sophisticated hardware and software techniques already available are far beyond the capacity of the scientific and technical community, and the public at large, to apply reliably to information-handling problems. Successful automation of information resources demands deep-seated re-organization in the approach to the recording, storing, managing, and use of information. Such automation is becoming increasingly mandatory in the face of the steadily increasing volume of worldwide scientific output. Also, hardware and software techniques show great promise for use by information processors and such use should keep pace with services developed in conjunction with business and governmental activities.

Indeed, there will continue to be rapid change in computer systems over the next several years, and information activities will have to adapt to hardware and software capabilities made available mainly for other purposes. This implies that the useful life of automated information-handling capability developed during this period will depend on the rate of improvement in the hardware and software utilized in the overall community. In other words, the development of the necessary information-handling systems is neither a short-term nor a one-time effort. Success demands steady, long-term buildup in information-handling capability and the continuing regular investment in improvement of such systems. On the other hand, since the buildup in capability does not depend on specially designed and developed hardware, nor on extensive basic research, sustaining the necessary OSIS program should require a very modest portion of the total NSF Budget.

Recognizing the need for continued public support, the following questions should logically be asked: "Why not obtain the funds for developing the necessary capabilities for the discipline-oriented information services from those who directly benefit from such increased capabilities?"

Why should OSIS be the source of support?" The rationale is as follows:

- NSF is a discipline-oriented agency with the established program for meeting developmental needs which cross other agency boundaries, and it is therefore the most appropriate agency to support development of discipline-oriented information services.
- None of the discipline-based services which has received OSIS support for system development has enough financial reserves to accomplish the objective without this support.
- Each of the services for which OSIS has provided funding for system development has supported a significant portion of its development from funds obtained through sales of its services. Actual production expense for these services -- which constitutes by far the largest part of all operational expense -- has received no continuing OSIS funding. Attempts to increase the portion of development expense recovered from sales of services have resulted in cancellations of subscriptions, which besides endangering the financial viability of these services, decreases the availability of these services for those with need for the information.
- It has been suggested that industry should simply contribute the needed developmental funds on behalf of its own interests. Such support is most difficult for most information-accessing services to acquire. The utilization of highly mechanized access systems is essential for easing the economic burdens of future R&D, but it is also expensive. Prototypes need to be developed to appraise the value of such systems and to put them to a practical test --

currently, no agency but the federal government is capable of making the substantial outlay for such prototypes. Only one such prototype system exists today -- in chemistry and chemical engineering -- and in the past decade, this has cost about \$30 million, shared between NSF and private sources, and it is far from complete. It is nearly impossible to obtain the requisite underwriting of services within the industrial community because of the concern of individual companies for subsidy of potential competitors.

- Just as small colleges are essential to the U.S. educational system, small companies generate an important part of "U.S. products." Small academic and industrial organizations desperately need improved access to information and would benefit greatly from improved information-accessing capability, but as "non-subscribers" which utilize services purchased by others, these organizations contribute little, if anything, to that part of the development expense recovered from "subscription revenue."
- Assured improvement in information access through the discipline-oriented services requires careful planning and continuity of support for system development. The wide variations in demands placed on discipline-oriented services by the individual federal agencies make it difficult for these agencies to coordinate and sustain support for the necessary overall system development. And, fortunately within NSF, the only discipline-oriented agency, OSIS already exists to provide coordinated support of system development among individual discipline-based systems.

- ° Coordination of the development of mission-oriented and discipline-oriented information-accessing services so as to assure the economical, complementary utilization of varying combinations of these services also requires careful attention. Only a "non-operating" federal agency such as NSF can hope to work effectively to promote such coordination.
- ° OSIS has had a good record in stimulating important innovations in the processing and the use of scientific and technical information. OSIS support has led to the establishment of:
 - the Science Citation Index;
 - implementation of computer-readable services in biology, chemistry, engineering, geology, mathematics, and physics (over four million documents have been covered by these services during the last decade);
 - processing capabilities which permit combination of selected information files developed for use in biology and chemistry-based services with toxicology files produced by the National Library of Medicine's TOXLINE service;
 - information centers to provide for utilization of automated information services by those who do not have the necessary computing capability;
 - software techniques utilized in processing special files of scientific and technical information by many organizations inside and outside of government, in the United States and abroad.

Ongoing programs dependent on continued OSIS support which offer greatly improved production economics and important increases in utility are now starting into development. These include joint efforts to combine

English and German language services in chemistry into a single English-based service, thereby eliminating much wasteful duplication of effort and reducing significantly the cost to users. Development of a new cooperative system between basic information services in biology and chemistry also offers significant opportunities to reduce duplication and increase the utility of both services. All of these programs have required patient, firm encouragement and continuity of purpose by OSIS, demonstrating its ability to mount and sustain complex programs. This is the kind of management which must continue to be exercised if the United States is to build up the information resources necessary to meet overall national and international goals. If the United States does not exercise leadership in this area, there is every evidence that the U.S.S.R. will invest large sums of money in the development of competitive information systems.

In conclusion, we offer these suggestions to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

STATEMENT
of the
AMERICAN CHEMICAL SOCIETY
to the
SPECIAL SUBCOMMITTEE ON THE
NATIONAL SCIENCE FOUNDATION
COMMITTEE ON LABOR AND PUBLIC WELFARE
UNITED STATES SENATE
on the
NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT, 1976
regarding
SCIENCE INFORMATION SYSTEMS
Tuesday, April 8, 1975

The American Chemical Society appreciates being given this opportunity to comment on the National Science Foundation Authorization Act, 1976, regarding science information systems. It is appropriate that we submit this statement since our National Charter imposes obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

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a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

The American Chemical Society, primarily through its Committee on Chemical Abstracts Service of the Board of Directors, has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views presented by the American Chemical Society represent a consensus of the nation's science community.

The American Chemical Society would like to bring to the attention of the Subcommittee a critical national problem concerning scientific and technical information that has arisen out of restrictions placed by the Office of Management and Budget on the National Science Foundation. These restrictions, which were first set forth in the President's FY 1975 Budget, result in:

1. Reduced funding for the NSF Office of Science Information Service (OSIS). The funding proposed by the President has decreased from \$8.1 million in FY 1974 to \$5.0 million in FY 1975 and has been raised slightly to \$6.0 million in FY 1976. The National Science Foundation Authorization Act, 1976, as reported to the House (H.R.4723), has raised this to \$6.2 million.
2. Elimination of OSIS support for systematic development of nongovernment information services. NSF has eliminated all

OSIS FY 1975 commitments for systematic improvement of nonprofit services which provide basic information support for U.S. education, industrial, and governmental activities.

The FY 1975 and FY 1976 reductions bring the OSIS Budget down from a high of \$14.4 million in FY 1968. Since OSIS has been the only source of support for systematic development of the discipline information services, the OMB requirements leave these services without means of keeping pace with the improved technology of the federally-operated information services. This disparity already has had serious impact on the viability of the discipline information services which are operated largely by scientific and engineering membership organizations without any Government subsidy of the production of these services.

ACS Recommendations

The American Chemical Society recommends that the FY 1976 Budget for the NSF Office of Science Information Service be set at \$8.5 million and that science information activities be specifically identified in the National Science Foundation Authorization Act, 1976.

The Society further recommends that NSF be instructed to reinstate the OSIS program for systematic development of information systems and that, for this purpose, the OSIS Budget grow to 4% - 5% of NSF funds over the next several years.

With such support, services can develop to the point of operational viability, and users can effectively rely on automated information services in their regular work. We believe that these services are essential to the health and well-being of the citizens of the United States and that these ends will not be accomplished without continued OSIS encouragement and support.

Unique Role of OSIS

NSF is the only federal agency which is organized along lines of scientific disciplines, and it was also clearly directed in the Act establishing the Foundation to "foster the interchange of information." NSF is not an operating agency, and unlike mission-directed agencies, it produces no information services that compete with similar services produced outside the Government. Thus, NSF is in a solid position for coordinating the systematic development among services to provide access to scientific and technical information.

OSIS has been highly successful in stimulating important innovations in the processing and use of information. OSIS support has led to:

- establishment of the Science Citation Index;
- implementation of computer-based services in biology, chemistry, engineering, geology, mathematics, and physics (over four million documents have been covered by these services during the last decade);
- compatibilities that permit information files developed for biology and chemistry to be combined with toxicology files produced by the National Library of Medicine's TOXLINE service;
- creation of information centers which provide automated services to small organizations, such as liberal arts colleges, small industrial firms, and individuals;
- a decision by West Germany to utilize the English language information services produced by the American Chemical Society in place of German language services produced in West Germany. This decision stemmed from establishment of the Chemical Registry and from closely related West German developments.

The Chemical Registry is a computer-based system whose development was jointly funded by OSIS and the American Chemical Society. This shift by West Germany to the use of the English-language services will eliminate much of the duplication of producing two parallel services -- one in English and one in German -- and will substantially reduce future costs of these information services for both United States and West German users.

Another joint program which was initiated with OSIS support, but which has been set aside because of lack of funding, is the coordinated interlinking of U.S.-based information services produced by the American Chemical Society and those produced by BioSciences Information Service of Biological Abstracts (BIOSIS). BIOSIS, which is located in Philadelphia, provides the only English-language access to the worldwide literature of experimental biology. Effective interlinking of ACS and BIOSIS services would reduce duplicate effort and greatly increase the usefulness of services from both organizations for the whole scientific and engineering community.

All of these programs have required patient, firm encouragement and continuity of purpose by OSIS. This kind of management must continue to be exercised if the United States is to build up the information resources necessary to meet overall national and international goals.

Need for Information Services in Assessing National Priorities

Congress, in founding the Office of Technology Assessment (OTA), has recognized how essential it is for legislators to have ready access to reliable information. However, as OTA will confirm, the existence of this Office does not in itself assure Congressional access to existing public information. Timely handling of the problems currently facing the nation

depends upon compilation, evaluation, and analysis of information with the aid of all the existing access services, many of which come from outside the Government.

With the growing complexities of legislative demands and the constant pressures for rapid identification of legislative alternatives, these information services must be provided in a computer-readable form that permits automatic correlations among details selected from two or more different information services. Thus, OTA success in supporting Congress depends upon effective coordination of existing computer-based information, since there is no one system capable of providing all the information that is needed.

Over long periods of time, the discipline information services provide consistent subject coverage that is not affected by changing societal problems. Because it is not possible to predict the directions in which knowledge will grow, nor to forecast the effects of intended actions, it is often necessary to search the accumulated record to locate background information and to correlate previous observations. The consistency provided by discipline services allows such access and is essential to the development of viable policy alternatives.

The OMB requirements that OSIS eliminate all FY 1975 system and development commitments to the private information services could lead to the undermining of the long-existing stewardship of these services by scientific and engineering societies. Without new production technology, the existing services cannot continue to provide necessary access to information. Without discipline services, solutions to societal problems in areas such as food, health, environment, and energy cannot be effectively formulated. Inability of these services to keep pace with the demands for access to information would also seriously impair the quality of education in the United States and

the ability of U.S. industries to meet foreign competition.

Restrictions on development of information-accessing services in the United States come at a time when information services in foreign nations are being supported on a larger scale. West Germany, Japan, and the USSR are actively supporting programs to improve scientific and technical information systems and to underwrite costs of information supply to their various national communities. A long-term concern is that, if the United States does not exercise leadership in this area, the USSR, by its substantial commitment to becoming competitive in this field, will replace the United States as the main supplier of such services in many parts of the world. Such a reduction in foreign use of these U.S.-based services would result in increased charges to users within the United States.

Required Continuity of Development

Although there are problems in the current OSIS program, it does identify many investigations worthy of support. However, because of the severe limitations on OSIS funds and because of the great range of activities which are worthy of OSIS support, the present OSIS program consists only of limited investigations of user problems and requirements, of approaches for testing, and of evaluations of operational feasibility. Such limited investigations, even if successfully completed, offer little significant possibility of improving access to the information needed to solve pressing national problems unless these preliminary results are followed by a systematic effort to develop the tools to provide this access.

Although the present OSIS program offers an avenue for identifying developmental alternatives for improving access to information, no funds are available for the necessary follow-up, and OMB restrictions on OSIS objectives prohibit any continuity in development. To gain significant impact, there

must be uninterrupted support for the systematic buildup in information resources in the United States. In our view, such a program should start with a suitable research and development effort, such as that offered by the current OSIS program, and it should continue without interruption to build up the ability within the United States to produce information resources for the benefit of the general public, and thereby supplement many existing services which are available to specific groups of users.

Dollar Benefit of OSIS Activities

One of the apparent OMB concerns is the lack of a clear-cut dollar return from federal investment in nongovernment information services. While this may be true, it is also true that clear-cut dollar return is not easily measured from federal investments in research and development, from federal acquisitions of high-technology hardware, and from other federal functions such as regulatory activities. Each of these activities depends heavily on reliable information derived from resources produced and maintained outside of the Government. Thus, although other components of these governmental functions are not justified on the basis of cost, there is an inconsistency in the OMB requirement that federal investment in the systematic development of U.S. information resources must demonstrate measurable return.

Furthermore, the cost of creating effective information-accessing tools would not require huge amounts of Government support. In fact, cost of developing suitable national access to available information -- including the OSIS support we are now recommending -- would be small in comparison to the investment in programs that depend upon effective information input.

Another aspect clouding the justification on the basis of cost of improved information access is this: the development of information-processing technology over the past five years has been so rapid that users

have not yet been able to keep pace with the advances. But to slow the pace of this development, or upgrading, will multiply uncertainties and make it less likely that we will be able to deal responsibly with national crises. Eventually, the scientific, and engineering community will catch up with the improving technology. The Government should, therefore, move to restore and maintain balance in the development of information services so as to assure that overall welfare of the citizens is not impaired by a lack of necessary information-accessing capabilities.

In conclusion, we offer these suggestions to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

STATEMENT
of
DR. WILLIAM J. BAILEY
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON ENVIRONMENT
COMMITTEE ON COMMERCE
UNITED STATES SENATE
on the
TOXIC SUBSTANCES CONTROL ACT, S.776
Tuesday, April 15, 1975

Mr. Chairman and members of the Subcommittee:

My name is William J. Bailey. I am President of the American Chemical Society for 1975, and I appear before you today with the authorization of the Society's Board of Directors to present this statement. Accompanying me today is Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the American Chemical Society.

We appreciate being given this opportunity to comment before this Subcommittee on the features of the Toxic Substances Control Act, S.776. It is appropriate that we give this statement since our National Charter imposes obligations on the Society to provide assistance to the government in matters of national concern related to the Society's areas of competence and also to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our

country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

The American Chemical Society, primarily through its Joint Committees on Environmental Improvement and on Chemistry and Public Affairs of the Board of Directors and the Council, has fostered an ongoing debate on the issues addressed by this legislation. The Society recognizes these issues to be fundamental and vital to the formulation of sound national health and environmental policies, and, thus, the Society views regulation of toxic substances as an important factor in the maintenance of the future health and welfare of the citizens of the United States. We believe the views presented here by the American Chemical Society represent a consensus of the chemical science community.

The American Chemical Society gives strong support to the basic concept of toxic substances control. The Society believes that with proper safeguards new substances can be introduced and used without the threat of significant hazard to human health or to the environment. This can be accomplished only by exercising careful control, based on scientific judgment, over the use of such substances. The Society fully supports the concept of pre-use clearance of all materials that are likely to pose a significant

hazard, either to man or to the environment.

The Society also recognizes that the progress achieved during the 93rd Congress by the Senate-House Conference Committee on S.426 is reflected in S.776, and the Society wishes to take this opportunity to commend the efforts of those who served on the Conference Committee. However, it is not our purpose at this time to present a detailed discussion of the legislation proposed in S.776, nor to suggest any specific language to be incorporated in the bill. Rather, the Society wishes to emphasize some basic considerations that it believes should be incorporated into the measure which is eventually passed into law.

The basic consideration in regulating toxic chemical substances is the hazard to man and the environment, not the inherent toxicity of specific chemicals. The regulation of new substances or new uses of substances must be based on the best available scientific evidence in judging any hazard posed. In addition, hazard is a function not only of toxicity, but also of the degree of exposure. Thus, the hazard of a substance must be evaluated in terms of the amount of material to be introduced into the environment, the manner of introduction, and the time-duration of exposure to the material.

The Society recognizes that a material which may be essentially innocuous in one form can be hazardous in other forms and under other conditions. Implicit in this principle is the concept that each new form in which a product is introduced should be examined for possible changes in hazard related to the change in form. The authority vested in the Administrator of the Environmental Protection Agency should be flexible enough to allow the Administrator to determine a rational approach in selecting the appropriate degree of regulation.

Though the Society fully supports the pre-use clearance of all

materials likely to pose significant hazards, exhaustive testing for possible impact on man and the environment is not necessary for every new chemical or new form of a chemical proposed to be introduced into commerce. In our opinion, testing requirements should be reasonable and should be determined for each specific case, giving due consideration to existing data on closely related compounds and to the uses for which the substance is intended. The high potential benefit to society of a particular substance would justify increased testing costs in order to permit widespread usage. Adequate testing can best be accomplished by developing hazard-testing schemes which provide a high degree of confidence that the substance, as used, presents negligible hazards and that take into account the information already available on related compounds.

The American Chemical Society believes that research and development of new chemical substances should be encouraged, as should the compilation of information relevant to any significant hazards associated with new substances. In order to do so, materials which are synthesized and used solely for research and testing purposes, in our view, should be given special consideration for exemption from clearance prior to experimental use.

With the amount of work to be done, it would be unwise to utilize scientific resources and manpower to conducting extensive tests that scientific judgment indicates would have little chance of providing significant data. Obviously, the development of the best procedures for hazard screening will require a variety of scientific skills. And, in establishing such screening procedures, the Environmental Protection Agency and other federal agencies concerned with this problem should seek to achieve a rational

balance between considerations of:

- safety to human health and the environment;
- maintenance of the discovery and development of useful new chemicals;
- and the optimum use of limited facilities and trained manpower which are now available for testing them.

The Society supports the principle that a manufacturer should be required to pre-test new materials for hazards to man and the environment before their introduction into the marketplace, if such standards for test protocols utilize scientific resources effectively. However, despite the best application of limited resources, the time and expense involved in testing will still be considerable, and unless adequate provision is made to protect the "pioneer," there will be little or no testing of anything except patentable compounds or products. A number of potentially useful products have never been made available to commerce because of their lack of patent protection. The Society believes that protection of the "pioneer" is essential. To ensure that compounds other than only patentable compounds are tested, the Society recommends that exclusive usage certificates valid for a definite period of time be issued to the original applicant, or alternatively, that subsequent applicants be required to share the costs of testing.

To deal with inevitable differences of opinion between applicants and the Government, the American Chemical Society recommends provision be made in the law for the participation of panels of qualified scientific experts, independent of the parties involved, in the appeal process. The Society would hope that participation of this type could provide a basis for sound scientific judgment, uninfluenced by either public or political pressure. Eventual appeal to the courts should also be provided.

The American Chemical Society believes that the quality of scientific and technical information that would be available to the Administrator of the Environmental Protection Agency is another important consideration. Access to data on the toxicological, carcinogenic, mutagenic, and teratogenic properties of such substances is crucial to the evaluation of the hazards posed by these substances. In addition, information which might provide insight into other properties of these materials -- such as decomposition patterns, by-products, possible reaction with other compounds prevalent in the environment, etc. -- will necessarily be part of the evaluation of hazards posed. As a major publisher of primary literature and of secondary services -- indexing and abstracting -- in the discipline of chemistry, the Society is willing to cooperate with any of the federal agencies concerned with information-handling to ensure reliable, efficient, and expeditious access to chemical information.

In summary, the American Chemical Society strongly supports the need for controlling toxic substances in our environment. In compliance with its National Charter responsibilities, the Society would be pleased to identify experts or otherwise cooperate in the implementation of legislation to regulate toxic substances which embodies the concepts and principles outlined in this statement.

American Chemical Society

OFFICE OF THE
PRESIDENT

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William J. Bailey, *President*

April 18, 1975

The Honorable John V. Tunney
Chairman
Special Subcommittee on Science,
Technology and Commerce
Committee on Commerce
United States Senate
Washington, D.C. 20510

Dear Senator Tunney:

The American Chemical Society, primarily through its Joint Board-Council Committee on Chemistry and Public Affairs, has had an opportunity to review carefully the "Products and Materials Shortages Research and Development Act," S.4051, from the 93rd Congress, and I have been authorized by the Board of Directors of the Society to respond to your request for comments. The Society is pleased that the subject of alleviating shortages of critical materials is being addressed in legislation, and in offering suggestions for improving several provisions in the bill, the Society hopes that you may find them helpful in drafting a similar measure to be introduced in the 94th Congress.

The Committee on Chemistry and Public Affairs is very much involved in the problems of material resources. Its Subcommittee on Material Resources has organized a task force for a study that the Society has recently initiated on material resources from the chemical viewpoint. The study is expected to cover the chemical science and technology of recycling of materials, of substituting less energy-intensive materials for those with high energy requirements, and of developing alternatives to critical raw materials.

The American Chemical Society supports a federal program aimed at anticipating shortages of critical materials and at replacing energy-intensive materials which mandates research and development to determine acceptable substitutes for them. Indeed, most product-oriented companies in the world have already begun research and development in the area of substitute materials. However, the program that would be established by the bill, though laudable for its intent, has several aspects which could be improved.

The Society recognizes that a program of research and development on this subject needs to be coupled with detailed analyses of the availability of raw materials and minerals. A program on materials shortages, in our view, should be

separated from any program dealing with shortages of products, inefficient methods of production, and inadequate utilization of potential performance levels of products. The nature of research and development related to materials shortages is sufficiently different from research and development related to production methods and product performance to suggest that the product aspects of this bill should be excised and covered in a separate bill.

The present program should therefore focus on scarce, critical minerals that are refined into the raw materials of commerce and on the properties of resources developed into raw materials and various products, and it should exclude or minimize investigations of finished retail products. Studies could then be undertaken to identify (a) existing and potential shortages of these resources and (b) feasible and economical substitutes for them by assessing the properties of other more available materials.

From the chemical viewpoint, it is important not only to investigate materials problems which might be generated as a result of dependence on foreign suppliers, but to seek to replace nonrenewable resources with renewable ones. Another crucial area for investigation is to seek improvements in the technology of recovering waste materials and recycling them. We are pleased to note the inclusion of these needs in S.4051.

Although it is clear that the National Bureau of Standards is the agency which should have major responsibility for administering a research and development program designed to alleviate critical materials shortages, the Bureau of Mines should also be directly involved in the administration of such a program. Ongoing programs within the National Bureau of Standards and the Bureau of Mines could provide a valuable information base for a materials research and development program. The Federal Energy Administration, the Energy Research and Development Administration, or other agencies might be involved as well.

Any program undertaken by the federal government to alleviate materials and minerals problems should involve private industry and universities and other non-profit organizations. Thus, the American Chemical Society is concerned that several sections of the bill seem to discourage participation by the private sector. The patent provisions, for example, would be more attractive to the private sector if greater recognition were accorded to the proprietary character of background information and if additional flexibility were provided in the negotiation of the terms covering the use of such background information. The Society is giving particular attention to this complex issue because we believe proper disposition of patent rights is important to the development of technology for public benefit in these critical areas.

Another section of the bill which would diminish the incentive for participation by the private sector is the section which requires that grants and contracts be made only if other means of financing or refinancing, including loan guarantees, are not available to the applicant. This section would require that loans rather than grants or contracts be made to those with collateral and would lead, in our view, to greater involvement by Government and universities to the exclusion of most private industrial firms.

April 18, 1975

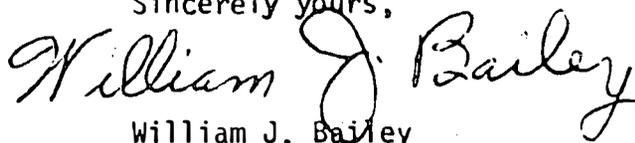
The American Chemical Society would also like to point out a special advantage accruing from the involvement of universities both in direct laboratory work and in conducting studies under such a program. Programs of this type provide an excellent opportunity for instilling an awareness of materials problems in students of all fields.

So that you may place the recommendations of the American Chemical Society in perspective, I should mention that it is an individual member organization. Chemical or other companies are not eligible for membership. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. About 60 percent of our members are employed by industry, about 25 percent by academic institutions, and 15 percent by government and nonprofit institutions.

The American Chemical Society was founded in 1876 and chartered as a nonprofit, scientific and educational organization by an act of Congress signed into law on August 25, 1937. Under its National Charter, the Society is charged with the responsibility to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering the public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people." Also, the Charter imposes an obligation on the Society to provide assistance to the Government in matters of national concern related to its areas of competence.

The American Chemical Society offers these suggestions in the spirit of cooperation in helping to develop the best possible strategies for resolving current and potential shortages of critical raw materials in the United States. The Society would welcome the opportunity to comment on any similar bills which might be introduced in the 94th Congress, or to develop testimony for presentation at any hearings on the subject of materials research and development.

Sincerely yours,



William J. Bailey

STATEMENT

OF

DR. ROBERT W. CAIRNS

EXECUTIVE DIRECTOR, AMERICAN CHEMICAL SOCIETY

On Behalf Of The

AMERICAN CHEMICAL SOCIETY

To The

SUBCOMMITTEE ON COURTS, CIVIL LIBERTIES, AND THE

ADMINISTRATION OF JUSTICE

HOUSE COMMITTEE ON THE JUDICIARY

UNITED STATES HOUSE OF REPRESENTATIVES

On A Bill For The

General Revision of the Copyright Law, H.R.2223

May 14, 1975

Mr. Chairman and members of the Subcommittee:

My name is Robert W. Cairns. I am the Executive Director of the American Chemical Society and, with the authorization of its Board of Directors, I appear before you today to present the Society's statement. I have spent 37 years in industry and retired as Vice President of Hercules Incorporated on July 1, 1971, to accept the position of Deputy Assistant Secretary of Commerce For Science and Technology. I resigned from that position on December 1, 1972, on acceptance of my present appointment. Accompanying me today are Dr. Richard L. Kenyon, Director of the Public, Professional and International Communication Division, Dr. Stephan T. Quigley, Director of the Department of Chemistry and Public Affairs, and Mr. William B. Butler, representing Mr. Arthur B. Hanson, General Counsel of the Society.

We appreciate being given this opportunity to comment on the certain features of the Copyright Revision Bill, H.R. 2223. The issues addressed by this legislation are both fundamental to the formulation of national science policy, and of vital significance with respect to the ability of our Society to resolve many of the problems which confront it. These issues have been under discussion for some time now by the Committee on Copyrights of the Board of Directors and Council of the American Chemical Society, as well as by other similar scientific societies, and a general consensus on them has been under development. This consensus has been developed in the context that the protection of copyrighted material will "promote the Progress of Science and Useful Arts", as specified in Article I, Section 8, Clause 8 of the Constitution of the United States. The viewpoint which we attempt to express is that of the chemical, scientific and technological community, as represented by the American Chemical Society.

The American Chemical Society is incorporated by the Federal Congress as a non-profit, membership, scientific, educational society composed of chemists and chemical engineers, and is exempt from the payment of Federal income taxes under Section 501 (c) (3) of the Internal Revenue Code of 1954, as amended.

The American Chemical Society consists of more than 107,000 such above described members. Its Federal Charter was granted by an Act of the Congress in Public Law No. 358, 75th Congress, Chapter 762, 1st

Session, H.R. 7709, signed into law by President Franklin D. Roosevelt on August 25, 1937, to become effective from the first day of January, 1938.

Section 2 of the Act is as follows:

"Sec. 2. That the objects of the incorporation shall be to encourage in the broadest and most liberal manner the advancement of chemistry in all its branches; the promotion of research in chemical science and industry; the improvement of the qualifications and usefulness of chemists through high standards of professional ethics, education, and attainments; the increase and diffusion of chemical knowledge; and by its meetings, professional contacts, reports, papers, discussions, and publications, to promote scientific interests and inquiry, thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Its Federal Incorporation replaced a New York State Charter, which had been effective since November 9, 1877.

One of the principal objects of the Society, as set forth in its Charter, is the dissemination of chemical knowledge through its publications program. The budget for the Society for the year 1975 exceeds \$39,000,000 of which more than \$30,000,000 is devoted to its publications program.

The Society's publication program now includes three magazines and seventeen journals, largely scholarly journals that contain reports of original research from such fields as medicinal chemistry, biochemistry, and agricultural and food chemistry, as well as a weekly newsmagazine designed to keep chemists and chemical engineers abreast of the latest developments affecting their science and related industries. In addition, the Society is the publisher of CHEMICAL ABSTRACTS, one of the world's most comprehensive abstracting and indexing services. The funds to support these publications are derived chiefly from subscriptions.

The journals and other published writings of the Society serve a very important function, namely: they accomplish the increase and diffusion of chemical knowledge from basic science to applied technology. In so doing, they must generate revenue, without which the Society could not support and continue its publications program in furtherance of its Congressional Charter to serve the science and technology of chemistry. The protection of copyright has proved an essential factor in the growth and development of the scientific-publishing program of the Society.

The twenty periodical publications of the Society produce more than 40,000 pages a year and subscriptions in 1974 totalled 323,000. CHEMICAL ABSTRACTS annually produces more than 140,000 pages which go to 5,500 subscribers. Its abstracts number in excess of

361,000 yearly and its documents indexed in excess of 425,000. The single greatest source of income for all ACS publications is subscription revenue.

As is indicated by the objectives of the American Chemical Society, we believe that the effective dissemination of scientific and technical information is critical to the development, not only of the society and economy of the U.S.A., but also of modern society worldwide.

These journals provide the knowledge base for technical development of answers to urgent problems facing the United States and the rest of the world, such as the energy crisis, the world food problem, the delivery of adequate health services, and pollution abatement. It is critically important that this system for organizing, evaluating, and providing scientific information remain healthy.

Scholarly journals are the major instruments for dissemination and recording of scientific and technical information. These journals are expensive to produce. If the costs are not supported financially by those who make use of them they cannot continue. There is no adequate substitute in sight.

The scholarly scientific or technical journal is more than merely a repository of information. The scientific paper is the block with which is built our understanding of the workings of the world around us. In his papers, each scientist records his important findings for the permanent record. His successors then have that knowledge precisely recorded and readily available as a base from

which they may start. So the process continues in a step-by-step fashion from scientific generation to scientific generation, each worker having available to him or her the totality of the knowledge developed up to that time. Each scientist stands upon the shoulders of his predecessors.

But this analogy of simple physical structure is inadequate, for at least of equal importance is the continuous refinement that takes place. Before new knowledge is added to the record, it is reviewed, criticized and edited by authoritative scholars; then, once published, it is available in the record for continued use, criticism, and refinement. New findings make possible the revelation of weaknesses in the earlier arguments and conclusions, so that as the structure of scientific knowledge is built higher it is also made stronger by the elimination of flaws. While it has been said that mankind is doomed to repeat its mistakes, the system of scientific recording in journals is designed to prevent the repetition of such mistakes and to avoid building upon erroneous conclusions. The scholarly journal record is the instrument for insuring this refining process.

In addition, journal papers form an important part of the basis upon which a scientist's standing among his peers is judged. For this reason, scientific scholars are willing to give their time and effort to help produce these evaluated records and are also willing to leave the management of the copyright on their papers in the hands of the

scientific societies. These scholars are rarely concerned with private income from their published papers, but they are vitally concerned with the preservation of the intrinsic value of the scientific publishing system.

Publishing costs have risen and are rising continuously, making the continuation of the scientific-journal system increasingly difficult. This has been recognized by the U.S. Government in acknowledging the philosophy that scientific-research work is not complete until its results are published, and in establishing a policy which makes it proper that money may be used from federal support of research projects to help to pay the cost of journal publication. It is this policy which provides most of the funds for paying page charges, charges originally designed to pay the cost of bringing the research journal through the editing, composition, and other production steps, up to the point of being ready to print. However, publishing costs are now so high that these page charges no longer pay even for these initial parts of the publishing process. American Chemical Society records in 1974 show that page charges supported one-third or more of those costs for fewer than 30% of ACS journals.

Publishing costs must be shared by the users. If these users are allowed, without payment to the journal, to make or to receive from others copies of the journal papers they may wish to read, it is not likely they will be willing to pay for subscriptions to these journals. If and as free photocopying of journals proceeds, the number of subscribers will shrink, and subscription prices will have to rise. The

reduction of subscription income may continue to the point of financial destruction of these journals.

The problems of the commercial publishers of many good scientific journals are even more severe, because these publishers do not have the moderate assistance of page charges.

The doctrine of fair use, developed judicially but not legislatively, has long been useful to the scholar, for it has allowed him to make excerpts to a limited extent for purposes of the files used in his research. However, the modern technology of reprography has offered such mechanical efficiency and capacity for copying that it is presently endangering the protection given the foundations of the scholarly journal by copyright. "Excerpts," instead of being notes, sentences, or paragraphs, are being interpreted to mean full scientific papers, the aforementioned building blocks.

As the copyrighted journal system developed, it was agreed long ago that the scholar should be allowed to hand-copy excerpts for use as background information. As a further step, authors became accustomed to ordering the reprints of their papers to send to their colleagues as a means of assuring a good record of the progress of work in the field concerned. This was followed, 20-30 years ago, by some minor use of the old "Photostat" machine. While that process strained a little the proprieties of copyright, it was fairly generally agreed that the mechanics of the practice were such as to help the research scientist while difficult and costly enough not to undermine the basic structure of the journal system.

We hold no objection to a scholar himself occasionally making a single copy in a non-systematic fashion for use in his own research. However, in the past decade the techniques of reprography have advanced to such an extent that third parties, human and mechanical, are beginning to be involved in a substantial way. It now is practical to build what amounts to a private library through rapid copying of virtually anything the scholar thinks he might like to have at hand. While this process has obvious personal advantages, it is now being done extensively and increasingly, without any contribution from these scholars -- or the libraries which copy for them -- to the cost of developing and maintaining the basic information system that makes it possible. Even conservative projections of the development of reprographic techniques within the next decade make it clear that the economic self-destruction of the system within the next decade is a real possibility. Overly permissive legislation could make this destruction a certainty.

Use of a journal by an individual for extracting from it with his own hands, by hand-copying the material specifically needed and directly applicable to his research, is one thing. A practice in which an agent, human or mechanical, acts as copier for an individual or group of individuals wishing to have readily available, without cost, copies of extensive material more or less directly related to his or their studies and research, is quite a different matter. The latter is certainly beyond justification on the mere grounds that technology has made it convenient, or that the purposes are socially beneficial.

Documented evidence of the increase in photocopying is found in "A Study of the Characteristics, Costs, and Magnitude of Inter Library

Loans in Academic Libraries," published in 1972 by the Association of Research Libraries. There we find that in 1969-70 the material from periodicals sent out in response to requests for "interlibrary loans" filled by the academic libraries surveyed was 83.2 percent in photocopy form as compared with 15.2 percent in original form and 1.4 percent in microform.

In that same report the volume of interlibrary loan activities from academic libraries is traced. It grew from 859,000 requests received by academic lending libraries in 1965-66 to 1,754,000 in 1969-70, and is projected to reach 2,646,000 in 1974-75.

Much thinking and study are being devoted to systems for improving access to periodicals resources through networks. These networks would make the scientific information available widely and rapidly from a relatively small number of original journal copies. In "Access to Periodical Resources: A National Plan", by Vernon E. Palmour, Marcia C. Bellassai, and Lucy M. Gray, a report prepared at the request of the Association of Research Libraries, it is stated that a number of advantages accrue to the provision of photocopies instead of originals. "Supply of photocopies," the report states, "is more essentially a 'mail order' or merchandising rather than a lending operation." It is also noted that "A single copy, or in some cases a few copies, at a center can meet, without undue delay, the needs of a large number of users."

In viewing the possible growth of service by a National

Periodical Resources Center, the authors estimated that from a collection of ten thousand titles, the demand would grow starting in the range of 58,000 to 75,000 in the first year to a range of 2,281,000 to 5,462,000 in the tenth year, with 90 percent of the request being filled by photocopies.

Such estimates as these show expectations of a great growth in use of photocopied material. Obviously the direct uses of the printed journal would be very small.

These data give some indication of the trends in use made of the published literature without contribution of any share of the very considerable cost of evaluating, organizing, and publishing it.

In another report, "Methods of Financing Interlibrary Loan Services," by Vernon E. Palmour, Edwin E. Olson, and Nancy K. Roderer, a fee system is suggested as a practical possibility with the fee initially set at \$3.50, about half the full cost recovery, and gradually increasing toward providing the full cost. No consideration is given in this suggestion to payment of a fee to the publishers from whose periodicals the copies are made. An adequate additional fee, paid into a clearinghouse and distributed to the appropriate publishers, could spread the full cost of support of a journals system equitably over the users.

It is desirable that use be made of modern technology in developing optimum dissemination. This technology includes the use of modern reprography, but as technology inherently includes

economics the means of financial support of the system must be a part of its design. Therefore, photocopying systems must include an adequate means of control and payment to compensate publishers for their basic editorial and composition costs. Otherwise, "fair use" or library-photocopying loopholes, or any other exemptions from the copyright control for either profit or non-profit use, will ultimately destroy the viability of scientific and technical publications or other elements of information dissemination systems.

The copyright law is directed to the interest of the public welfare. It is not in the interest of the public welfare to modify the copyright law so as to allow the economic destruction of the scientific and technical information system.

The American Chemical Society is properly concerned with the clarity and vitality of the copyright laws of the United States and of the world. These laws have provided a sound basis for the continuity of scientific communication programs, including at present the primary and secondary journals, microforms, and computerized information systems.

The Society recognizes that its members and others concerned with its publications are both "authors" and "users" of information, and that it is the Society's objective to serve their needs as fully as possible. It recognizes the functions and problems of such vital information channels as libraries, information centers, and information systems and networks. It further recognizes the challenges offered by technological advances in communication techniques

However, scientific communication programs cannot continue without proper funding, and in the immediate future this funding must continue to come from "authors" and "users." "Page charges" are an acceptance of the philosophy that "authors" (or their employers) must share in the funding of the communication process, and that publication of findings is the final step in the completion of a significant study. "Users" have traditionally paid their share through personal and employer (library) subscriptions to printed publications, but "technology" and "networks" are changing the need for multiple or even local copies, making it all the more vital that revenue be obtained in relation to direct use, wherever and however provided.

Because law is the basis for order among individuals, organizations, and nations, the Society believes that the laws which affect communication--information transfer--must be equitable and clear, and that they must be periodically reviewed to maintain these qualities. The copyright law of the United States has not been seriously updated since 1909, and it is badly in need of revision. Its antiquity is the direct cause for present ethical and judicial arguments over what is "fair" or "free" as regards communication--arguments which obscure the basic rights of authorship; the "value added" factors in reviewing, editing, publishing, and information-base creation; and the fact that the real problem is inadequate funding at most stages of the communication process (including libraries).

The Society has repeatedly and clearly stated its need for copyright protection against continuation and growth of "uncontrolled dissemination of scientific information"--the unauthorized regular or systematic or concerted single-copy republishing of Society papers by libraries or networks of libraries. The Society is opposed to copyright-law revisions relating to "copying" that would destroy the copyright protection for its publication programs.

Until communication issues can be further clarified, the Society would prefer that "fair use" remain a judicial rather than a legislative concept. The Society is specifically opposed to any definition of "fair use" that could be further interpreted as permitting unauthorized, concerted "single copying" (photocopying, electronic copying, etc.).

The Society recognizes the need to develop total systems for information transfer; therefore, it specifically opposes any broadening or interpretation of the definition of or the right to prepare a "derivative work" that would reserve to "authors" (primary publications) the right to control the writing of original informative abstracts that are not complete "abridgments" or "condensations." However, the latter are accepted as being fully protected derivative works; they are of significance to the Society's future primary publication of "short papers."

The Society advocates immediate copyright-law revisions that will more completely and explicitly define and continue to protect

such technological developments as computerized information bases, computerized data bases, computer programs, and microforms, i.e., that will define and specify these as "Exclusive Rights in Copyrighted Works." Because the scope and importance of these technological developments are already extensive, the Society no longer advocates deferring related copyright-law revisions until after the studies and recommendations of the National Commission on New Technological Uses of Copyrighted Works. In particular, the Society firmly advocates revisions which clarify and continue the protection of copyrighted computer bases at time of input, on the basis that copyright control at output only might be limited severely by broad interpretations of "fair use."

The Society opposes most of the specific additional limitations on the exclusive rights of authors and their publishers to provide copies of copyrighted publications that are contained in recent legislative bills. As proposed, these limitations do not really meet the needs of "users" and libraries for uncomplicated copying.

The Society recognizes that these and other suggested limitations on exclusive rights to provide copies are based on the very real desire of "users," and libraries in their behalf, to avail themselves of such "new technology" as photocopying to prepare or obtain copies of copyrighted documents quickly and easily. The Society has repeatedly declared its readiness to cooperate in the development of a clearing-house that can grant such permissions in an equitable and simple

manner and is presently working actively toward this goal through the Conference on the Resolution of Copyright Issues under the chairmanship of Barbara Ringer, Register of Copyrights, and Fred Burkhardt, Chairman of the National Commission on Libraries and Information Science. The Society also advocates the development of "document-access networks" that will quickly supply actual copies in an equitable manner. The Society therefore advocates copyright-law provisions that will equitably authorize and regulate such important services to "users".

Despite reservations on some segments of this bill, the American Chemical Society recommends passage of the sections of H.R. 2223 related to library photocopying. This recommendation is made with the belief, based on work with the Conference on the Resolution of Copyright Issues, that a practicable system for licensing and fee collection for photocopies of copyrighted works can be developed which will render fair and equitable charges for systematic photocopying in the interest of an improved and economically viable system for the dissemination of scientific information. Plans now are being developed for testing such a mechanism.

STATEMENT
of
DR. MARY L. GOOD
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON HUD-INDEPENDENT AGENCIES
COMMITTEE ON APPROPRIATIONS
UNITED STATES HOUSE OF REPRESENTATIVES
on the
HUD-INDEPENDENT AGENCIES APPROPRIATIONS ACT, 1976
regarding
SCIENCE INFORMATION SYSTEMS
May 15, 1975

Mr. Chairman and members of the Subcommittee:

My name is Mary L. Good. I am a Boyd Professor of Chemistry at the University of New Orleans and also a member of the Executive Committee of the Board of Directors of the American Chemical Society. I appear before you with the authorization of the Board of Directors to present this statement. Accompanying me today are Dr. Robert W. Cairns, Executive Director of the Society, Mr. Dale B. Baker, Director of the Society's Chemical Abstracts Division, and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the Society.

We appreciate being given this opportunity to comment on the HUD-Independent Agencies Appropriations Act, 1976, regarding science information systems. It is appropriate that we give this testimony since our National Charter imposes

obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

The American Chemical Society, primarily through its Committee on Chemical Abstracts Service of the Board of Directors, has monitored the amounts previously allocated in the National Science Foundation budget for science information activities. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views presented by the American Chemical Society represent a consensus of the nation's science community.

The Society is concerned about an impending national crisis in the supply and use of scientific and technical information. This crisis results from budget reductions imposed on the National Science Foundation's Office of Science Information Service (OSIS) by the Office of Management and Budget. These pressures have resulted in steadily decreasing OSIS obligations from a

peak of \$14.4 million in FY 1968 to \$5.0 million in FY 1975. The Administration's FY 1976 request is up slightly to \$6.0 million. The American Chemical Society recommends that science information activities be identified in the HUD-Independent Agencies Act, 1976, at the maximum authorized level for FY 1976. The Society has recommended an authorization of \$8.5 million for development of scientific and technical information systems and an increase in funding over the next several years to 4% to 5% of the National Science Foundation budget.

The Society's concern is for the individual discipline information services (those for chemistry, physics, biology, etc.) which are operated on a non-profit basis by scientific and engineering societies trained in the various disciplines. These services provide access not only to the information associated with a single discipline, but to all other scientific and technical information as well. Each individual or organization has interdisciplinary information requirements which are as personal and unique as an individual's fingerprints. The services, therefore, collectively constitute an essential national and international resource for satisfying informational requirements of public and private groups.

Science and technology have traditionally grown by the building of new developments upon previous ones. The record of science has grown so large, however, that the accumulated record cannot be managed and utilized effectively with traditional tools, especially since it is spread across the world's publications and is too complex in detail to permit reliable, timely access to the existing store of information. This problem can be illustrated by considering the output in 1974 of the Chemical Abstracts Service of the American Chemical Society. This abstracting and indexing service published about 26,300 pages of abstracts and 27,800 pages of indexes in 1974 -- corresponding to more than 3,000,000 pages of original documents. This is, of course, the annual increment for only one scientific discipline.

The problem of effective use of scientific and technical literature through automated services is so overwhelming that it cannot be solved by the seeding operations such as those presently constituting OSIS programs. Neither can it be solved simply by increasing the amount of funding for these seeding operations, but will be solved only through systematic development of automated tools specifically designed and coordinated to provide prompt and reliable access to stored information.

This information problem is not confined to a few fields of learning, or to specific types of business and industry, or even to selected branches of Government. The problem is general, touching every individual and organization in the United States and around the world. Nations meet their information needs by being able to select from a wide range of subjects and from the publications of a large number of countries. The value of information comes not from its source, but from the context of its application. Indeed, our national welfare depends heavily on information generated outside of the United States as well as at home, and we share with other countries the use of major information accessing tools generated throughout the world. No nation can be self-sufficient in meeting its information needs.

The serious information problem facing the United States is related to today's major national and international problems, which are dominated by societal concerns. We are learning that problems of population control, urban crises, transportation revitalization, energy conservation, natural resources management, environmental protection, ecologic impact, and food shortages are interrelated, and therefore, their solutions are interdependent. Timely solutions to these problems are hampered by the inability to gather the necessary information quickly, which although it already exists, often cannot be located in time to be used in evaluating or solving the problems. Current tools do not provide adequate or timely access to scientific and technical information that is necessary to deal responsibly with societal problems.

Improved access to the scientific and technical literature requires the creation of computer-based information-distribution systems that will allow a high degree of individualized access. Such systems are technically feasible, and the United States is capable of developing them if the resources are made available. The approach required is an organized, sustained, systems-engineering approach. Some applied research is needed, and some basic research from other fields can be used, but assured progress requires, first, a demonstration that it is practical to change present information processing and information exploitation mechanisms, and then, careful coordination of the implementation in the discipline systems.

The OSIS programs launched in the middle and late 1960's led to the introduction of computer-readable files which parallel the existing printed abstracting and indexing publications. Automated search of these files helps to overcome some of the cumbersome handling problems of printed publications. It is fair to say that the largest and most widely used of the current computer-readable services devoted to scientific and technical information originated through OSIS programs. However, these services are still far from satisfactory. They are first, or possibly early second, generation information systems which are operating on fourth, soon to be fifth, generation computers.

Thus, the sophistication of current hardware and software techniques, made available mainly for other purposes, are beyond the capability of the scientific and technical community to adapt immediately and reliably to information processing. Successful automation of scientific and technical information resources demands deep-seated reorganization in the approach to the recording, storing, managing, and using of information. Further, the potential of computer technology has not started to approach anything like a plateau. The technology in use by information processors will need to keep pace with that developed by those engaged in business and governmental activities.

The alternatives offered by developing computer technology are so numerous and are expanding so rapidly that there will continue to be rapid change in information systems over the next several years, and these systems will have to continue to adapt to new hardware and software capabilities. In other words, the development of the necessary information-handling systems is neither a short-term nor a one-time effort. Success demands steady, long-term build-up in information handling capability and the associated continuing regular investment in improvement of such systems.

Unfortunately, OMB pressures on OSIS over FY 1969-1974 culminating in FY 1975 have effectively eliminated continuing OSIS support for improvement in the production and automated search of discipline information services. However, there is no alternative source of federal support for this development, and the nonprofit scientific and engineering societies do not have the resources to finance this development. Without federal aid, the viability of these services is in serious jeopardy. The problem is intensified greatly by the substantial investments in systematic development of the information services operated by federal agencies which often are in direct competition with these private services.

The information services developed by federal agencies to suit a given mission, such as space, energy, medicine, and the environment, reflect current practical needs for certain kinds of applications of science and technology and depend on information derived from combinations of disciplines. In support of the mission services, the discipline information services are essential to assure access to information which predates the existence of any given mission and to provide continuity with related information which is not linked closely to the needs of a given mission.

It should be noted that there have been no cutbacks in the continuity of

support for agency-operated or mission services, nor should there be -- outstanding advancements have been made in developing these services, and it is in the public interest to continue such development. However, unless a way is found to assure continued development of the privately operated services, those services will fall far behind in their ability to meet the needs of both the Government and the public.

Computer-readable information services are already important tools, but we need to greatly simplify and extend their use. They should become as easily used as today's telephone, radio, and television communications system. This will require education of the user, and it will also require engineering to tie the user into the system in such a way that use of the system can be almost as uncomplicated as long-distance telephone calls.

The American Chemical Society recognizes that even with wide dependence on computer-readable tools, printed books, journals, and reports will continue to be the principal means of recording and disseminating information. Books are of durable value and can be read directly by an individual. Nevertheless, as we have indicated, printed tools alone are not sufficiently versatile to be responsive to many of the critical demands for information.

Since it will be necessary to have automated systems for locating information quickly and thoroughly and printed publications for familiar and long-term use, the same processing system must produce both forms of output without expensive duplication of effort. Also, computer-based systems will have to become almost as easy for scientists and engineers to use as books are now. This is not the case with a computer storehouse of information at present.

The processes equivalent to thumbing and reading require the user to communicate with the computer through a complex language. Most individuals, including those well versed in the content of a given computer bank, cannot get at the

information without a great deal of personal assistance. The situation is somewhat like an individual in 1925 in Rice Lake, Wisconsin wanting to speak directly to a friend living in Mannheim, Germany.

Unlike the crude communication system of 1925 which had no underlying reserve technology, the basic computing knowhow is already available for automating an information supply system with phone-like access to information banks. Development of the necessary supply system depends upon adaption of techniques and components selected from computer applications such as accounting, communication support, manufacturing control, system modeling, and mathematical computation. The alternative to such development is a very substantial rise in the cost of providing the printed indexing and abstracting version of the information services. The consequent reduction in subscriptions would limit the availability of scientific and technical information, particularly to small colleges and business firms, and would leave the largest part of our most productive citizens without direct access to important intellectual and creative ingredients in their work.

In considering the need for federal support of the development of information services, it should be remembered that OSIS like the rest of the National Science Foundation represents a coalescence of basic activities gathered together in the public interest to assure that reserves in our national store of knowledge are complete, with no segment overlooked. The Society has recently noted in a statement to the Subcommittee on Science, Research and Technology of the House Committee on Science and Technology that OSIS has already demonstrated its ability to generate and direct an effective program aimed at systematic development of scientific and technical information resources in the United States. We urge that OSIS be returned to this role, that OMB restrictions on the OSIS program be removed, and that OSIS be funded at the maximum authorized level.

The FY 1975 budget for OSIS programs limited its activities to a diverse set of investigations with objectives such as "determining feasibility," "evaluating alternatives," and "testing approaches." Under the budget constraints within which OSIS now operates, these programs are probably the best compromise, for they would be a highly useful basic part of a balanced research and development effort aimed at improving information supply systems in the United States. However, the funds available for OSIS, and other OMB restrictions on OSIS, do not permit support of development work aimed at systematic improvement in existing information services based in the United States. For the same reasons, useful results coming from the current OSIS projects cannot be brought to maturity. This is inconsistent with the NSF purpose of assuring essential competence in science and technology -- including information handling technology -- and assuring strong and complete reserves in our national store of knowledge. In this framework, the investment in OSIS programs, even at the level recommended by the Society for the future of 4% to 5% of the Foundation budget, is low.

In conclusion, we offer these suggestions to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

STATEMENT
of
DR. BRYCE L. CRAWFORD, JR.
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON HUD-INDEPENDENT AGENCIES
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE
on the
HUD-INDEPENDENT AGENCIES APPROPRIATIONS ACT, 1976
regarding
SCIENCE INFORMATION SYSTEMS
Monday, May 19, 1975

Mr. Chairman and members of the Subcommittee:

My name is Bryce L. Crawford, Jr. I am a Professor of Chemistry at the University of Minnesota and also a member of the Executive Committee of the Board of Directors of the American Chemical Society. I appear before you with the authorization of the Board of Directors to present this statement. Accompanying me today are Dr. Robert W. Cairns, Executive Director of the Society, Mr. Dale B. Baker, Director of the Society's Chemical Abstracts Division, and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the Society.

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The FY 1975 budget for OSIS programs limited its activities to a diverse set of investigations with objectives such as "determining feasibility," "evaluating alternatives," and "testing approaches." Under the budget constraints within which OSIS now operates, these programs are probably the best compromise, for they would be a highly useful basic part of a balanced research and development effort aimed at improving information supply systems in the United States. However, the funds available for OSIS, and other OMB restrictions on OSIS, do not permit support of development work aimed at systematic improvement in existing information services based in the United States. For the same reasons, useful results coming from the current OSIS projects cannot be brought to maturity. This is inconsistent with the NSF purpose of assuring essential competence in science and technology -- including information handling technology -- and assuring strong and complete reserves in our national store of knowledge. In this framework, the investment in OSIS programs, even at the level recommended by the Society for the future of 4% to 5% of the Foundation budget, is low.

In conclusion, we offer these suggestions to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.



American Chemical Society

OFFICE OF THE
PRESIDENT

William J. Balley, *President*

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June 2, 1975

The Honorable John L. McClellan
Chairman
Subcommittee on Patents, Trademarks
and Copyrights
Committee on the Judiciary
United States Senate
Washington, D.C. 20510

Dear Senator McClellan:

I have been authorized by the Board of Directors of the American Chemical Society to bring to your attention the views of the Society on the legislative proposals for comprehensive patent reform that are now being considered by the Subcommittee on Patents, Trademarks and Copyrights. The American Chemical Society, as you may know, is an individual member organization. Chemical or other companies are not eligible for membership. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits. About 60 percent of our members are employed by industry, about 25 percent by academic institutions, and about 15 percent by government and nonprofit institutions. A high proportion of the members are inventors, and the strength of the U.S. patent system, therefore, is of vital significance to the Society.

The American Chemical Society was founded in 1876 and chartered as a non-profit, scientific and educational organization by an act of Congress signed into law on August 25, 1937. Under its National Charter, the Society is charged with the responsibility to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people." Also, the Charter imposes an obligation on the Society to provide assistance to the Government in matters of national concern related to its areas of competence.

In the nine years that your Subcommittee has devoted to the important and needed matter of patent reform, the American Chemical Society, primarily through its Committee on Patent Matters and Related Legislation, has carefully followed the evolution of thinking by the Congress, the Administration, and members of the patent community on what is needed to strengthen and modernize the patent system of the United States. As stated in the Society's letter of July 23, 1974, we have been encouraged by the substantial progress toward a consensus on the major provisions

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that should be incorporated in legislation reforming Title 35 of the U.S. Code. The many similarities of the four bills now pending before the Subcommittee — S.23, S.214, S.473, and S.1308 — strengthen the hope that your years of study and effort may culminate in a bill that can be passed during this session of the 94th Congress.

In the Society's last communication to you dated December 17, 1974, the newly reached conviction was expressed that passage of an omnibus reform bill would be difficult because complete agreement on such a many-faceted proposal is almost impossible to achieve. The Society proposed, as others have since, that it might be more fruitful to approach patent reform a step at a time. The Society suggested as a first step, amending the present law to assure the most thorough possible consideration of the prior art by the Patent and Trademark Office before patentees have full use of their exclusive right. Although the Society continues to believe that this approach is sound, we recognize the desire of your Subcommittee to proceed with consideration of an omnibus bill — an approach which is, of course, entirely appropriate if it can be successfully carried to completion — and we would like to offer the following comments on certain important changes from the present law that are embodied in the bills pending before your Subcommittee.

1. On the question of opposition or reexamination procedures, which is of first importance in our judgment, the American Chemical Society strongly favors an inter partes proceeding, basically as provided in S.23. The Society is convinced that the opportunity for participation in the process by the opposing third party is essential to restore the integrity of issued patents and strengthen the presumption of validity that has been so severely weakened as a result of present ex parte examination procedure.

The Society believes that the opposition process should follow the issuance of the patent, as provided in S.23, rather than take place in some limited time before grant. This gives the patent owner a vital early right of enforcement of his property, thereby avoiding the troublesome question of interim damages associated with preissuance opposition, and eliminates the costs of multiple publication of the specification. Such a post-issuance process would also reduce the danger of opposition proceedings becoming unnecessarily protracted and being used as a delaying tactic. No doubt the great majority of patents will never be opposed, and it would clearly be wasteful to burden the Patent and Trademark Office with unnecessary publication of examined applications.

On the question of what period should be available for opposition, the American Chemical Society sees merit in the provision of S.214 that opposition can be entered at any time during the life of the patent. The Society recognizes the desirability of encouraging opposing parties to come in as early as possible, but we question the desirability of doing so by foreclosing those who, for whatever reason, are not in a position to meet a specified time limit. There is no reason why a patent holder should have an exclusive right if he does not deserve it, and it surely is in the public interest to enlist the aid of third parties in exposing specious patents, no matter when invalidating prior art or use is discovered. Furthermore, it is more economical for the Patent and Trademark Office to make this determination than to leave it to litigation in the courts.

Finally, and as has been emphasized before, the American Chemical Society believes the subject of opposition procedures should be examined on its own, separately from omnibus legislation, even if there is no likelihood of further delay in agreement on a patent reform bill.

2. On the matter of fees, the American Chemical Society is concerned by the provision contained in each of the bills pending before the Subcommittee except S.214 to the effect that fees are to be set to recover a fixed portion of costs of the Patent and Trademark Office. We consider it extremely important to the progress of the useful arts in this country that individual inventors, who include some of our most creative persons, should not be priced out of participation in the patent system. Fees should be fixed at a modest level by the Congress and increased only as the Patent and Trademark Office can demonstrate the need. To the extent that the fees that are set go beyond the level of moderation — and we hope this will not happen — provision should be made for alleviating the fee burden upon a showing of hardship.

The Society has previously expressed agreement with the principle of maintenance fees, and we believe maintenance fees should be low enough so as not to be a burden to those of modest means. We are pleased to note that a consensus on a reasonable procedure and level of fees exists in the bills before the Subcommittee.

3. The American Chemical Society has expressed concern in our letter to you of July 23, 1974 over the extensive subpoena powers proposed for a large body of examiners-in-chief and suggested that present provisions for using the subpoena powers of the federal court system are adequate. This view has not changed, and the Society urges that this matter be the subject of careful consideration, preferably in separate legislation rather than as part of an omnibus reform measure. The Society recognizes the need for and the importance of adequate subpoena powers, but believes that they should be carefully contained, with all the protections of due process.

4. Although the American Chemical Society has earlier endorsed the principle of deferred examination, the need for such a provision is not now urgent because the U.S. Patent and Trademark Office is doing a fine job of staying current with its patent examinations, and there would be significant extra costs incurred if unexamined applications had to be published. The Society would, therefore, be content to see deferred examination made available as a standby option if needed by the Patent and Trademark Office, or better, considered in separate legislation at a later date when the subject can be more intensively explored than is presently possible and when the benefit of added experience in those countries now using such a system will be available.

5. The Society's letter of July 23, 1974 expressed concern over certain proposals that very extensive disclosure and multiple supplementary oath requirements be written into the patent law. As stated then, there is no real gain in protection against fraud by such sweeping demands, and unnecessary costs and complexity are added to the patent process if such provisions are included. In our view, S.214

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has the most acceptable requirements of the pending proposals if the Subcommittee concludes that anything beyond a simply expressed duty of disclosure is necessary.

6. The Society has previously stated that in modern team research, which is the source of many patents, it is not practical to require that each of two or more joint inventors shall have contributed to every claim of a patent. The Society is pleased that S.23, S.214, and S.473 have all adopted this view, and we recommend that the Subcommittee approve a provision incorporating it.

7. The Society is also pleased that there is agreement among the bills before the Subcommittee on a patent term of 20 years from date of filing. There is no need or justification, in our view, for extending this term as the result of delay due to priority proceedings or any cause other than that resulting from a secrecy order in the national interest. If the patent law of the United States is to fulfill its primary purpose of moving new technology into the public domain as soon as possible consonant with a reasonable reward to inventors, it should be designed to prevent undue delay in procedures such as priority proceedings. It should avoid delay as is so often the case with present interference procedures coupled with the 17 year term from grant of a patent. As to opposition proceedings, if they were post-issuance as recommended above, no need for extension from that cause would exist.

In conclusion, the Society would like to reiterate the hope that patent law revision can proceed apace and that the long period of delay in enacting these reforms can come to an end. Many of these reforms are desirable and long overdue. The patent system has played a vital role in this nation over the years. Contributions from the patent system would be augmented and the prestige of a U.S. patent improved as a result of the proposed changes in the patent law. The American Chemical Society would like to see the importance of patents issued in the United States maintained at a high level, and the Society believes that a careful, selective revision looking toward incorporation of some of the proposed changes that are referred to here, as well as others contained in the pending bills, will go far in achieving these objectives.

Sincerely yours,

William J. Bailey

William J. Bailey
President

cc: Members, Subcommittee on Patents,
Trademarks and Copyrights



American Chemical Society

OFFICE OF THE
PRESIDENT

William J. Balley, *President*

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June 19, 1975

The Honorable Olin E. Teague
United States House of Representatives
Washington, D.C. 20515

Dear Congressman Teague:

I have been authorized by the Board of Directors of the American Chemical Society to bring to the attention of the House-Senate Conference Committee on H.R.4723, the "National Science Foundation Authorization Act, 1976," the concern of the Society regarding the so-called "Bauman Amendment." The Society believes the new procedure suggested by this provision in the House version of H.R.4723 would raise serious questions of duplication, expense, and objectivity.

The American Chemical Society, as you may know, is an individual member organization. Chemical or other companies are not eligible for membership. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits. About 60 percent of our members are employed by industry, about 25 percent by academic institutions, and 15 percent by government and nonprofit institutions. Over half of the members hold advanced professional degrees, and a high proportion of the members are research scientists.

The American Chemical Society was founded in 1876 and chartered as a nonprofit, scientific and educational organization by an act of Congress signed into law on August 25, 1937. Under its National Charter, the Society is charged with the responsibility to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people." Also, the Charter imposes an obligation on the Society to provide assistance to the Government in matters of national concern related to its areas of competence.

The American Chemical Society has followed the status of the Bauman Amendment with deep concern. Since its establishment in 1950, the National Science Foundation has played an essential role in maintaining the vitality of science in the United States. Any diminution of that role, we believe, would have serious consequences for the maintenance of the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent. The Society views the Congressional review of proposed research grants that would be required by the Bauman Amendment as unnecessary, duplicative, and potentially harmful to the advancement of science.

June 19, 1975

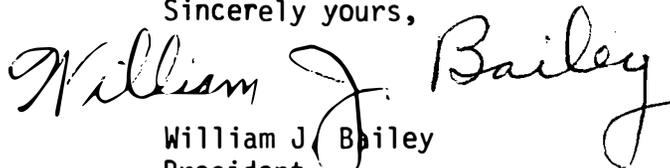
Since the Congress bears the fiscal responsibility for federal agencies, it can naturally be expected to exercise general policy review of these agencies and to hold them accountable for decisions made under approved policies. However, the Bauman Amendment would involve the Congress in the detailed substantive review of proposed grants -- a task clearly unsuited for a legislative body.

While recognizing that the peer review system used by the National Science Foundation and other granting agencies is not perfect, the American Chemical Society has great confidence in the system. It has been developed carefully over the years and has led to the pre-eminence of science in many fields in the United States. On the whole, the system is objective, thorough, and workable. Peer review provides a good mechanism for assuring quality and integrity in research programs funded by the federal government. This system is used extensively by private funding organizations as well.

The Society appreciates the legitimate concerns of the Congress for appropriate funding policies. However, some of the recent criticisms of research projects, which have been widely publicized in the press, fail to recognize important uses and implications that are not readily apparent in the titles or brief summaries of the projects, except to those familiar with the fields involved. Perhaps scientists should exert more effort to make the full significance of their projects apparent to non-scientists, but a requirement to do so would inevitably lead to the selection of projects comprehensible to non-experts. In addition, even a superficial review of the 14,000 proposed grants each year by qualified reviewers would involve considerable time and expense at a time when present economic conditions make it necessary to monitor all spending very closely, including, of course, research spending. We would hope, however, that the laudable aims of saving the taxpayer's money and monitoring funding policies would not lead the Congress to approve a provision that is certain in the long run to be considered unnecessary, expensive, and possibly destructive of the quality of research in the United States.

In the past, the Congress and the National Science Foundation have cooperated harmoniously to promote the advancement of science and technology in the United States through broadly based programs of research and development. The Society hopes that this relationship can continue in a rational and mutually beneficial way. The Society strongly recommends that the Bauman Amendment be dropped from the version of H.R.4723 reported by the Conference Committee.

Sincerely yours,



William J. Bailey
President

Identical letters were sent to the other members of the House-Senate Conference Committee on H.R.4723:

Rep. James W. Symington
Rep. Don Fuqua
Rep. Walter Flowers
Rep. Mike McCormack
Rep. Charles A. Mosher
Rep. Marvin L. Esch

Sen. Edward M. Kennedy
Sen. Claiborne Pell
Sen. Thomas F. Eagleton
Sen. Alan Cranston
Sen. Walter F. Mondale
Sen. Paul Laxalt

Sen. Robert T. Stafford
Sen. Richard S. Schweiker

STATEMENT
of
DR. HERMAN S. BLOCH
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON CONSUMER PROTECTION AND FINANCE
of the
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES
on the
TOXIC SUBSTANCES CONTROL ACT, H.R.7229
Wednesday, July 9, 1975

Mr. Chairman and members of the Subcommittee:

My name is Herman S. Bloch. I am Chairman of the Board of Directors of the American Chemical Society and Director, Catalysis Research, at Universal Oil Products Co., and I appear before you today with the authorization of the Society's Board of Directors to present this statement. Accompanying me today are Dr. Thurston E. Larson, Chairman of the Society's Committee on Environmental Improvement and Assistant Chief and Head of the Chemistry Section of the Illinois State Water Survey; Dr. Donald G. Crosby, a member of the Committee on Environmental Improvement and Professor of Environmental Toxicology at the University of California at Davis and Toxicologist at the California Experiment Station; and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the American Chemical Society.

Consideration of the Issues

We appreciate being given this opportunity to comment before this Subcommittee on the Toxic Substances Control Act, H.R.7229. It is appropriate that we give this testimony since our National Charter imposes obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a nonprofit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and nonprofit institutions.

The American Chemical Society, primarily through its Joint Committees on Environmental Improvement and on Chemistry and Public Affairs of the Board of Directors and the Council, has fostered an ongoing consideration of the issues addressed by this legislation. The Society recognizes these issues to be fundamental and vital to the formulation of sound national health and environmental policies, and thus, the Society views regulation of toxic substances as an important factor in the maintenance of the future health and welfare of the citizens of the United States. We believe the views presented here by the American Chemical Society represent a reasonable consensus of the chemical science community.

The American Chemical Society recognizes that the progress achieved during the 93rd Congress by the House-Senate Conference Committee on S.426 is reflected in H.R.7229, and the Society wishes to take this opportunity to commend the efforts of those who served on the Conference Committee. Indeed, the Society is pleased to note the similarities between the House and Senate versions of the Toxic Substances Control Act and hopes the legislation will be enacted by this Congress. The Society believes that the approach to control of toxic substances in H.R.7229 is a sound one, particularly in that it defines to a great extent the context in which the Administrator of the Environmental Protection Agency is required to take action. Thus, in outlining some general considerations and specific recommendations, the Society hopes to bring to your attention improvements to a generally sound piece of legislation.

Relation of Toxicity to Hazard

The American Chemical Society gives strong support to the basic concept of toxic substances control. The Society believes that with proper safeguards new substances can be introduced and used without the threat of significant hazard to human health or to the environment. This can be accomplished only by exercising careful control, based on scientific judgment, over the use of such substances. The Society also supports the concept of pre-use clearance of all materials that are likely to pose a significant hazard, either to man or the environment, based on the properties of the material or the use for which it is intended.

The basic consideration in regulating toxic chemical substances is the hazard to man and the environment, not the inherent toxicity of specific chemicals. As chemists, we recognize that toxicity cannot be treated in a

simplistic fashion. Many substances that are required for good nutrition in small amounts become lethal in larger doses. In addition, hazard is a function not only of toxicity, but also of the degree of exposure. Thus, the hazard of a substance must be evaluated in terms of the amount of material that may be introduced into the environment (rather than the total production), the manner of introduction, and the time-duration and level of exposure to the material.

The Society, therefore, recommends that H.R.7229 include more explicit recognition that both human health and environmental effects of chemical substances can be totally different at different exposure levels. This might be accomplished by an insertion in Section 2(b)(1) at line 4 to read "...and the environment as a function of their respective concentrations and that such testing...." Similarly, Section 3(5) might contain an insertion at line 5 to read "...environmental effects of a chemical substance as a function of its concentration, (B)...." It should be recognized that all chemical substances, both those occurring naturally and those prepared synthetically and even those beneficial in normal amounts, are harmful at some level.

While the beneficial intent of H.R.7229 seems clear -- namely, to regulate substances which pose significant hazards to man and the environment -- it might be useful to reflect this intent in the title and body of the bill. The Society's concern is that attention be focused on truly hazardous materials rather than on potentially toxic materials where exposure is minimal, and therefore, hazard is minimal.

Hazards Related to Changes in Form

Since a material which is essentially innocuous in one form may be hazardous in other forms and under other conditions, each new form in which

a product is introduced should be examined for possible changes in hazard related to the change in form. Many substances undergo transformations upon introduction into the environment to form products which may either be more or less toxic than the original substances. Also, the toxicity of a substance may be due to impurities or byproducts associated with a given process or method of manufacture. Therefore, it is important that, within the limits of detection, the true levels of exposure as well as the nature, products, and rates of reaction be ascertained under the expected exposure conditions rather than relying exclusively upon tests performed under artificial or unrealistic conditions.

The authority vested in the Administrator of the Environmental Protection Agency should be flexible enough to allow the Administrator to determine a rational approach in selecting the appropriate degree of regulation, and we believe that the flexibility provided to the Administrator in H.R.7229 accomplishes this to a reasonable degree.

Definition of Human Health

The Society notes the absence of a definition of human health which might profitably be added to Section 3, since it would affect the scope of substances covered by the Act. Were one to be included, the Society recommends the following: "Health is a state of relatively high physical, mental, and social well-being and not merely the absence of identifiable disease or infirmity."

Testing Requirements and Costs

Though the Society fully supports the pre-use clearance of all materials likely to pose significant hazards, exhaustive testing for possible impact on man and the environment is not necessary for every new substance or new form

of a substance proposed to be introduced into commerce. The testing requirements for these substances must be based on the best available scientific evidence in judging any hazard posed. There is a very large body of data available on different classes of compounds, and experts can predict in many cases those chemical substances most likely to pose hazards.

Some testing will require long periods of time before effects may become evident, and in certain cases, there is no general agreement among experts on reliable test protocols for major industrial chemicals. Thus, testing requirements should be reasonable in terms of cost/benefit and should be determined for each specific case, giving due consideration to existing data on closely related compounds and to the uses for which the substance is intended. The high potential benefit to society of a particular substance would justify increased testing costs in order to permit widespread usage. Adequate testing can best be accomplished by developing hazard-testing schemes which provide a high degree of confidence that the substance, as used, presents negligible hazards and which take into account the information already available on related compounds.

With the amount of work to be done, it would be unwise to utilize scientific resources and manpower to conduct extensive tests which scientific judgment indicates would have little chance of providing significant data. Obviously, the development of the best procedures for hazard screening will require a variety of scientific skills. And, in establishing such screening procedures, the Environmental Protection Agency and other federal agencies concerned with this problem should seek to achieve a rational balance between considerations of:

- safety to human health and the environment;
- maintenance of the opportunities for discovery and development of useful new substances;

- and the optimum use of limited facilities and trained manpower which are now available for testing new substances.

Lists of Chemical Substances

The Society has carefully considered the provisions of H.R.7229 requiring (1) the listing of 300 high priority candidates for data development -- Section 4(b); (2) the listing of substances that the Administrator estimates will pose, or are likely to pose, an unreasonable risk to human health or the environment -- Section 5(a); and (3) the inventory of substances manufactured, processed, or imported into the United States -- Section 8(b). With regard to the first listing, the Society sees no scientific basis for specifying that the list contain three hundred chemical substances. While there is no doubt that there are that many substances with unknown health and environmental effects, it might be preferable to allow the Administrator to determine what materials can be given adequate thought and consideration, especially during the first year after enactment. It is obvious that relatively few substances can be tested at any one time due to lack of facilities and therefore, those materials which appear to pose the greatest hazards must be tested first.

The Society supports the provision that, in selecting the materials for testing, the Administrator establish a priority list based on the best available information on the hazards posed to both human health and the environment. If one of a series of closely related substances does not present a hazard to human health or the environment, the Administrator may determine that pre-market testing requirements for others in the series are minimal. If a member of a class of substances is determined to be hazardous, or likely to be hazardous, to human health or the environment,

the Administrator may then require extensive testing of all related materials prior to their introduction into commerce.

The Society is concerned that the third list, the inventory, might become simply a listing of all known chemical substances and, therefore, become nearly impossible to compile and maintain or use. There are nearly a third of a million new compounds synthesized in laboratories each year, but only a few of them are ever important enough to be introduced into commerce. Since this third list is the basis for characterizing new substances, its utility in this regard would be diminished if it were to become a list of all known substances. Thus, substances which have been known for years, but which later become commercially significant, might not be identified as new substances or significant new uses. In any event, the Society hopes that the specific requirements for these lists will not prove to be a significant barrier to agreement with the Senate.

Exemption for Research Samples

The American Chemical Society believes that research and development of new chemical substances should be encouraged, as should the compilation of information relevant to any significant hazards associated with new substances. In order to do so, materials which are synthesized and used solely for research and testing purposes, in our view, should be exempt from clearance prior to experimental use. The Society recognizes the exemption in Section 5(k) given to chemical substances for test marketing purposes, upon a showing of no unreasonable risk, or otherwise as the Administrator considers appropriate. However, we would only emphasize the importance to innovation that research samples distributed for testing and development purposes be exempt. We suggest the following addition to Section 3(12), "...in commercial amounts for commercial purposes." Since temporary or experimental use permits issued during data collection in the case of pesticides have been important because of the lengthy

development time necessary to satisfy those criteria, consideration might be given to doing so here.

Sharing the Costs of Testing

The Society supports the principle that a manufacturer should be required to pre-test new materials for hazards to man and the environment before their introduction into the marketplace, if the requirements for testing utilize scientific resources effectively. However, despite the best application of limited resources, the time and expense involved in testing will still be considerable, and unless adequate provision is made to protect the "pioneer," there will be little or no testing of anything except patentable compounds or products. The Society believes that protection of the "pioneer" is essential. A number of potentially useful products have never been made available to commerce because of their lack of patent protection.

To ensure that compounds other than only patentable ones are tested, the Society has recommended previously that exclusive use certificates valid for a definite period of time be issued to the original applicant, or alternatively, that subsequent applicants be required to share the costs of testing. We are pleased to note that Section 4(c) provides for the sharing of testing costs. However, we believe the provision is not clear with regard to new competitors entering the market after a cost-sharing arrangement has been made.

Independent Panels of Qualified Experts

To deal with inevitable differences of opinion between applicants and the Government, the American Chemical Society recommends provision be made in the law for the participation of panels of qualified scientific experts, independent of parties involved, in the appeal process. There should also be provision for eventual appeal to the courts. Independent experts could also be extremely useful in establishing scientific procedures for hazard evaluation.

The Society would hope that participation of this type could provide a basis for sound scientific judgment, uninfluenced by either public or political pressure.

Availability of Chemical Information

The American Chemical Society believes that the quality of scientific and technical information that would be available to the Administrator of the Environmental Protection Agency is another important consideration. Access to data on the toxicological, carcinogenic, mutagenic, and teratogenic properties of such substances is crucial to the evaluation of the hazards posed by these substances. In addition, information which might provide insight into other properties of these materials -- such as decomposition patterns, byproducts, possible reaction with other compounds prevalent in the environment, etc. -- will necessarily be part of the evaluation of hazards posed. As a major publisher of primary literature and of secondary services -- indexing and abstracting -- in the discipline of chemistry, the Society is willing to cooperate with the Environmental Protection Agency and any other federal agencies concerned with information-handling to ensure the comprehensive compilation, storage, and expeditious access to chemical information.

Confidentiality of Information

The Society believes that an essential safeguard to proprietary rights is the confidentiality of information supplied to the Administrator. Although Section 14 covers this necessity to some degree, additional requirements to ensure confidentiality might be added, particularly if qualified panels of experts are involved in administering the Act.

Relationship to Federal, State, and Local Laws

The Society believes that the principal focus of this Act, in its relationship to other federal laws, should be to provide authority in those areas where other laws provide it only partially or not at all. The specific aspects of Section 9, concerning other federal laws, appear reasonable and balanced.

However, with due regard for the advantages of uniformity, the Society views with some concern the pre-emptive nature of Section 19, despite the possible exemption of local jurisdictions under Section 19(b). The United States is not environmentally homogeneous, and substances tolerable in one part of the country may be damaging in other parts. It might be preferable to provide explicitly for the delegation of enforcement to states and other local jurisdictions that demonstrate, to the satisfaction of the Administrator, that their own laws and regulations will accomplish the purposes of the Act, thereby avoiding the need for such a large federal inspectorate.

Authorization of Appropriations

Section 26 authorizes the appropriation of \$11,100,000 for the implementation of the Act, a reasonable budget for the early stages of such a new program. However, the Society is aware of the recent history of the Environmental Protection Agency where a number of new programs have been initiated within that Agency without authorization to increase the number of personnel. The result has been a continuous reshuffling of staff with the inevitable deterioration of morale and fragmentation of work. Programs of this sort have been necessarily contracted out, which is not wrong in itself, but there has frequently been insufficient manpower even to monitor those contracts effectively.

If the work required by this Act is to be carried out in the manner

prescribed, there will apparently need to be an explicit authorization for enough additional employees to do the work. The Society believes that this increased staff should be highly trained technically, and the Administrator should be able to designate the appropriate number of new employees required.

Summary

In summary, the American Chemical Society strongly supports the need for controlling toxic substances in our environment. The authority vested in the Administrator is substantial. We believe that careful exercise of these powers, based on the best scientific judgment, will allow substances to be introduced into commerce without the threat of significant hazard to human health or the environment and without undue interference to innovation. In compliance with its National Charter responsibilities, the Society would be pleased to identify experts or otherwise cooperate in the implementation of legislation to regulate toxic substances.



American Chemical Society

OFFICE OF THE
PRESIDENT

William J. Bailey, *President*

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December 8, 1975

The Honorable James O. Eastland
Chairman
Committee on the Judiciary
United States Senate
Washington, D. C. 20510

Dear Senator Eastland:

I have been authorized by the Board of Directors of the American Chemical Society to bring to your attention the views of the Society on S.2255, a bill for the general revision of the Patent Laws, title 35 of the United States Code, that is now being considered by the Committee on the Judiciary. The American Chemical Society, as you may know, is an individual member organization. Chemical or other companies are not eligible for membership. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum of academic, governmental and industrial professional pursuits. About 60 percent of our members are employed by industry, about 25 percent by academic institutions, and about 15 percent by government and nonprofit institutions. Since a high proportion of the members are inventors, the strength and effectiveness of the U.S. patent system is of vital significance to the Society.

The American Chemical Society was founded in 1876 and chartered as a non-profit, scientific and educational organization by an act of Congress signed into law on August 25, 1937. Under its National Charter, the Society is charged with the responsibility to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people." Also, the Charter imposes an obligation on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence.

You have before you S.2255 as voted by your Subcommittee on Patents, Trademarks and Copyrights. The American Chemical Society has followed closely the efforts by the Subcommittee over the past nine years to arrive at constructive changes in the patent law, because the patent system has been a vital force serving to advance the practice of chemistry in this country for the benefit of the public. While the present patent law has, in general, served its purpose well,



changes in both the national and international economy have made it increasingly clear that such changes are needed to bolster the confidence of the public and the trust of the courts in our patent procedures.

The Society, through its Committee on Patent Matters and Related Legislation, believes it has taken a constructive and forward-looking view of patent reform legislation as expressed in a number of written communications and in testimony before hearings of the Subcommittee on Patents, Trademarks and Copyrights. It has been gratifying to see the trend toward agreement by participants in the patent system on the important changes that should be made in U.S. patent law. However, while there are some constructive features in S.2255, the Society is convinced that substantial problems still remain in certain aspects of this bill and feels strongly that some of the features of S.2255 are in urgent need of modification before the bill goes to the full Senate.

To be specific:

1. The American Chemical Society believes that the provision of S.2255 that fees charged by the Patent and Trademark Office be set by the Office to recover a fixed percentage of costs is unfortunate and potentially damaging. The constitutional mandate underlying our patent system is "to promote the progress of science and useful arts," for the ultimate benefit of the public. The primary thrust of the patent system is to encourage disclosure of inventive discoveries so they can ultimately be used by all, and to stimulate further efforts by others. Fees should be fixed at modest levels from time to time by the Congress with this purpose in mind.

The Society applauds the bill's apparent intent to espouse the cause of the individual inventor and the small business enterprise. However, the granting of reduced fees to such patent applicants is an idle gesture in the face of the considerably increased legal fees which can be expected to result from the increased complications imposed on all applicants by the proposed new procedures for obtaining patents. Government fees are normally a comparatively trivial proportion of the cost of obtaining a patent. It may, moreover, well be asked whether subsidization of the patent fees of individual inventors and small businesses should not be derived from general funds instead of being taxed against other patent applicants as proposed in S.2255.

In the view of the Society, it is not in the public interest for Congress to abdicate the responsibility for setting the amounts of examination fees and maintenance fees and the relation between them by leaving this function to the chance distribution between big and small applicants and to administrative whim.

It should be further noted that there is no distinction in Sec. 41 of S.2255 between U.S. and foreign individual inventors, a factor which may have greater economic impact under the Patent Cooperation Treaty. Moreover, the definition of "small-business concern" which is incorporated from 15 U.S.C. 632 is uncertain since the latter section of the Code places the detailed definition in the hands of the Administrator of the Small Business Administration and permits him to establish different definitions for different purposes.

The Society agrees with the principle of maintenance fees, as embodied in S.2255, on the basis that an invention which is put to significant use can surely support relatively modest fees. Maintenance fees also serve the purpose of accelerating the process of moving inventive discoveries of less than great value into the public domain. Such fees could also do much to offset costs of the Patent and Trademark Office not met by examination fees set by the Congress. However, as embodied in S.2255, the maintenance fees, while modest in this bill, are not fixed by statute but are subject to possible unlimited upward adjustment for irrelevant causes and by arbitrary administrative decision.

2. The American Chemical Society is concerned with the complexities and the costs to participants in the patent system that would almost certainly result from the extensive subpoena powers given by S.2255 to as many as 60 examiners-in-chief. The Society recognizes the need for adequate discovery and subpoena powers in certain aspects of the patenting process but believes that this need can be met in most circumstances by using the powers of the existing federal court system, where experience shows that such powers can be carefully contained, with all the protection of due process. A specific proposal for an alternative procedure involving the question of the breadth and scope of investigations involving subpoena powers, a procedure which the Society believes would be effective and equitable, is included in the appendix to this communication. In this proposal the more inclusive subjects of reexamination and opposition proceedings are also addressed.

3. Although the American Chemical Society favors the principle of deferred examination, the need for such a provision is not urgent because the Patent and Trademark Office is now nearly current in its patent examining function. There would also be very significant extra costs incurred if unexamined applications had to be published as provided in S.2255. The Society would prefer to see deferred examination considered in separate legislation at a later date so that the need for such provisions can be more intensively explored when the long-range benefit of added experience in those countries now using such a system will have become available. Failing passage of suitable legislation, deferred examination procedures might be made available as a standby option, if needed by the Patent and Trademark Office.

4. The American Chemical Society is especially concerned with the inordinately complex and detailed provisions of S.2255 in respect to, inter alia, the contents of the patent specification, claiming practice, disclosure of prior art known to the applicant, and multiple supplemental oaths by those involved in prosecution of a patent application. The Society agrees fully that the patent law should make it clear that the applicant must be entirely candid in his dealings with the Patent and Trademark Office; that he must meet his obligation to disclose the best mode of practicing his invention known to him; and that the applicant has a duty to make known to the examiner all relevant prior art in his possession. The patent statutes should set forth these principles - preferably in language as close as possible to that now contained in the statute - and leave the details of their implementation and execution to administrative decision and rules of practice.

While the above mentioned problems with S.2255 are of concern to the American Chemical Society, the Society is especially aware of and sensitive to two other flaws - the provisions for the term of a patent and the method provided for protesting the grant of a patent. The Society, in concert with essentially the entire community of participants in the patent system, agrees that the term of United States patents should run from the filing date rather than from the date of issue as at present. The reason is that present practice encourages dilatory tactics in the prosecution of an application, thus delaying the time when new technology enters the public domain and defeating the primary purpose of the patent system. While S.2255, paragraph 154, provides that the term shall be 20 years from date of filing, the effect of this desirable provision is unduly diluted at paragraph 136(h), where it is provided that this term shall be extended by a period equal to any delay in grant due to priority (interference) proceedings. Experience with interferences under present practice has shown that delays of many years can result, with pre-emption of important technologies by the winner of such a contest long past any justifiable time. This provision should be stricken from S.2255.

The need for a protest, or opposition, procedure appears to have become a matter of fairly general agreement by the great majority of users of the patent system. It is recognized that the volume of prior art has become so great that the Patent and Trademark Office needs the participation of interested third parties in uncovering all relevant art which might show that third party users should not be excluded from what is properly in the public domain. Exclusively ex parte prosecution has not proven to be an entirely satisfactory procedure as shown by the substantial proportion of patents that become involved in litigation which are found invalid by the courts on the basis of available art not considered by the examiner or of which he was not informed during prosecution.

S.2255 provides in paragraph 135 an opposition proceeding, available for 12 months after issue. Participation of the opposer in inter partes arguments before the Board of Examiners-in-Chief is required. Depositions, discovery and oral testimony are allowed.

December 8, 1975

The American Chemical Society finds several disbutring elements in the opposition procedure of S.2255. The Society sees no reasonable basis for an arbitrary twelve-month limit on the time for initiating opposition. The Society also believes that the scope of the procedure which is contemplated, involving discovery and testimony with respect to not only publicly available art but also private defenses, is beyond the reasonable capability of the Patent and Trademark Office, and will also constitute an excessive burden for persons of limited resources, even in the absence of the intentional harassment which is potentially present. Limitation of the opposition to publicly available art in an inter partes proceeding brought initially before the Examiner would substantially remove the need for discovery and testimony, thus reducing the burden to a tolerable level. This unbalance would, in the opinion of the Society, better serve the aims of the patent system.

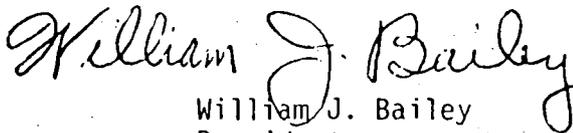
In short, the Society sees manifold problems with the opposition procedure of S.2255 and urges that it not be adopted in its present form. In fact, the Society believes that the matter is so important that it might better be considered in separate legislation rather than as part of an otherwise complex and controversial omnibus bill.

As a possible aid to the consideration of this matter by your committee, there is appended an analysis of the matter of opposition procedures and a proposal for a procedure that the Society believes would be an effective and workable compromise among the several proposals contained in earlier bills submitted to the Senate and the many comments of other interested users of the patent system. The Society considers this compromise proposal as a fair, equitable and workable solution to the question of reexamination and opposition. By such a compromise the Patent and Trademark Office would be assigned responsibility for what they do best.

The American Chemical Society would like to see the importance of patents issued in the United States maintained at a high level. The Society believes that a careful, selective revision including some of the proposed changes that are referred to here would go far toward achieving these objectives. It further believes that the concept of reexamination and opposition proceedings should be addressed in separate legislation rather than being included in an omnibus bill, such as S.2255.

In conclusion, the Society would like to reiterate its expressed expectation that the long period of delay in enacting constructive reforms to the patent system can come to an end. Although general revisions of the present statute along the lines proposed in S.2255 are desirable and long overdue, the specific provisions discussed in this letter serve to negate the generally constructive provisions of the bill, thus rendering S.2255 in its present form less than acceptable.

Sincerely yours,


William J. Bailey
President

cc: Members, Committee on the Judiciary

APPENDIX

A Proposed Compromise Procedure for Reexamination of Issued Patents

I. General Considerations

There appears to be fairly general agreement among those who have commented on patent reform that some opportunity for public participation in review of the granting of a patent should be provided. On the other hand, there is general disagreement as to the form and scope of such a review. The following factors need to be considered in establishing a procedure:

1. Timing of the action, i.e., pre-issuance or post-issuance
2. Permissible grounds for review
3. Nature of the proceedings, i.e., ex parte or inter partes
4. Duration of the period available for initiating review.

II. Comment

Timing of the Action

The initial bias toward pre-issuance procedures shown in earlier bills submitted to the Senate seems largely to have been dissipated in view of the obvious disadvantages of such procedures as contrasted with post-issuance procedures. Important factors have been the recognition of the costs of multiple publication of applications and finally granted patents, and the realization that art may be found at any time in the great body of published technology. Post-issuance procedures also avoid undue delay in issuance of a patent - a matter of immediate concern to the patentee once a law goes into effect limiting patent life to 20 years from date of application.

Grounds for Review; Nature of the Proceedings

These are the matters upon which there are wide differences of opinion. It is convenient to consider them together since review based on publicly available art alone is susceptible to either ex parte or inter partes procedure, whereas review in which private grounds of invalidity can be raised will of necessity require a full blown de novo procedure with testimony and discovery. In either case the initial review can be before the Examiner (with possible participation by the Solicitor) or it can be directly before the Board of Examiners.

The proponents of inter partes review contend that only by this procedure can the public be induced to cite known grounds of invalidity with confidence that these grounds will be properly interpreted and evaluated by the reviewing tribunal. Opponents point out that the expense involved and the opportunity for harassment may, in the end, actually defeat the goals of the patent system. They point out that whereas such an expense to both the public and the private participants is necessary in the relatively few cases where a patented subject matter has become commercially important and is in actual controversy, this expenditure would be premature and wasteful in the larger number of cases which had not yet developed, and might never develop, commercial value. This procedure places a considerable advantage in the

party with substantial resources since a person with limited resources cannot afford to commit large amounts to a project without sufficiently demonstrated promise of return.

On the other hand, it is argued that mere ex parte review will discourage citation of art because of the belief that examiners cannot cope effectively with vigorous ex parte prosecution and may misinterpret references or allow claims with trivial distinctions. Such cited art, after being ineffectively treated by the examiner, would lose considerable weight as a defense in a later court proceeding. In addition, ex parte opposition raises a basic issue of unfairness to a party to a controversy if he is denied opportunity to be present at the proceedings and urge his case, whereas his opponent is given that opportunity.

Those who oppose the whole reexamination or opposition principle point out that prior art cannot be put in full perspective in the absence of a real infringement controversy, that quite often the defense is a conditional one, namely that "the claim is invalid over the prior art if interpreted to read on the allegedly infringing subject matter." Those having such a ground of defense against a patent claim would therefore prefer to hold it until such time as both the scope of the claim and its relation to the prior art are being simultaneously evaluated.

There is merit in all of these views. Probably no solution can be found to satisfy even a majority of these concerns, but hopefully a middle ground can be found which can be accepted by all.

Duration of the Period Available for Review

S.2255 provides a limited time period for challenging an allowed application or an issued patent in the Patent Office. This limitation appears to be based on the belief that at some point there should be an end to the administrative proceedings. It should be recognized that there is of necessity an open question of validity throughout the life of the patent and that it is not productive to maintain the separation of administrative and judicial procedures. Allowing administrative challenge of validity throughout the life of the patent would appear to offer the promise of sounder patents, provided the procedures do not become oppressive.

III. The Proposed Procedure

Taking into consideration these various viewpoints, it would appear that an acceptable procedure might well have the following characteristics:

1. Reexamination should be solely post-issuance.
2. Challenges to validity (divorced from priority determinations) should be limited to publicly available art, namely patents and publications. Private defenses, with their involved proofs, are better held off until a real controversy develops and are better tested in a trial court which is better equipped to handle the procedure.

3. This citation of art should, if appropriate, include art already considered before issuance, to take care of the situation where a pertinent portion has been overlooked or there has been a misinterpretation. (Art overcome by affidavit of prior invention [Rule 131] may require reconsideration as set forth in item 7 below.)
4. The right to request reexamination should obtain throughout the life of the patent.
5. Copying of patent claims for priority determination should be subject to the present one year rule. Defense of prior invention, other than by way of copied claims, should be raised only in court proceedings when a real infringement controversy has developed.
6. Reexamination in the Patent Office should be inter partes, being referred in the first instance to the appropriate examiner for determination, with the right of all parties to present written argument and affidavits. Upon appeal to the Board, all parties should be entitled to present briefs and have opportunity for oral hearing.
7. Inasmuch as the basis for reexamination would be limited to publicly available art, there would ordinarily be no necessity for testimony or discovery. Where, however, the party whose patent was under reexamination purported to remove a cited reference by proof of invention date prior to the effective date of the reference, this evidence of prior invention would of necessity be subjected to inter partes scrutiny, including cross-examination of witnesses. Thus the Examiner could be empowered to authorize upon a prima facie affidavit showing, the taking of depositions in the manner now practiced in interference, proofs being limited, however, to the one issue, namely whether the party whose patent was under reexamination had made the invention prior to the date of the reference. The present 35 U.S.C. 24 would provide adequate powers of compulsion in the rare situations where this should become necessary. Other rare situations in which a genuine issue of fact developed which could not, in the opinion of the Examiner, be decided satisfactorily without additional evidence (i.e., dispute over actual date of publication) could be handled in the same manner.
8. The patentee should be permitted to present amended claims of equal or more limited scope during reexamination, subject however to intervening rights as in the case of reissue.
9. Appeals from the Board decisions should be only to the CCPA without the option of a de novo proceeding in the district court. Whatever historical reason may exist for the precedent of the 35 U.S.C. 145 de novo district court proceeding to compel issuance of a patent, there appears to be no reason for such a proceeding at this stage. A decision on the record by the more technically competent CCPA would appear desirable.

10. Any district court in which a suit involving patent validity has been brought where the allegation of invalidity is based on newly cited publicly available art (or previously considered art which the court believes may have been misapplied) should have the right, at its option, to request reexamination by the Patent Office (with appeal to the CCPA), all proceedings in such case being inter partes and advisory only.

THE AMERICAN CHEMICAL SOCIETY'S
OFFICIAL PUBLIC POLICY STATEMENTS AND COMMUNICATIONS
1976

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April 8, 1976	Statement of Executive Director Robert W. Cairns on behalf of the American Chemical Society to the Subcommittee on HUD-Independent Agencies of the House Committee on Appropriations on the HUD-Independent Agencies Appropriations Act, 1977, regarding science information systems.	ACS 76-004
April 12, 1976	Statement of Executive Director Robert W. Cairns on behalf of the American Chemical Society to the Subcommittee on HUD-Independent Agencies of the Senate Committee on Appropriations on the HUD-Independent Agencies Appropriations Act, 1977, regarding science information systems.	ACS 76-005

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May 28, 1976	Letter of President Glenn T. Seaborg on behalf of the American Chemical Society to President Gerald R. Ford, President of the United States, regarding a national energy policy.	ACS 76-007
May 28, 1976	Letter of President Glenn T. Seaborg on behalf of the American Chemical Society to the Honorable George H. Mahon, Chairman of the House Committee on Appropriations, regarding the National Science Foundation's 1977 budget.	ACS 76-008
July 21, 1976	Statement of Dr. Kurt M. Dubowski on behalf of the American Chemical Society to the Office of the Assistant Secretary for Health, United States Department of Health, Education, and Welfare on the Proposed Standards for Personnel in Chemical Laboratories.	ACS 76-009

STATEMENT
of
DR. CHARLES G. OVERBERGER
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
GRANTS PEER REVIEW STUDY TEAM
NATIONAL INSTITUTES OF HEALTH
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
on
PEER REVIEW AND GRANTS MANAGEMENT
Chicago, Illinois
February 12, 1976

Madame Chairman and members of the Study Team:

My name is Charles G. Overberger. I am Chairman of the Society's Committee on Chemistry and Public Affairs, and I appear before you today with the authorization of the Society's Board of Directors to present this statement. Accompanying me is Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the Society.

We appreciate being given this opportunity to comment before the Study Team on peer review and grants management. It is appropriate that we give this testimony since our National Charter imposes obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a nonprofit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and nonprofit institutions.

The American Chemical Society, primarily through its Board and Council Committees on Publications and its Joint Board-Council Committee on Chemistry and Public Affairs, has studied in depth the issues surrounding peer review. The Society recognizes 'peer review' as a decision-making mechanism primarily used when a large number of choices must be made for which generally applicable objective standards cannot be specified. Each decision must be made on the basis of one or more value judgments. Peer review decisions serve to establish and to maintain quality through the judicial allocation of limited resources such as editorial pages or research funds. Review decisions significantly influence the professional future of individuals, the future of scientific and technological institutions and both the rate and direction of scientific and technological development. We agree that a process of such significance as peer review must be subjected to periodic scrutiny.

The American Chemical Society has had extensive experience with the system of peer review. The Society has used this system for well over fifty years in the screening and pre-publication improvement of manuscripts for its scientific and technical journals. These journals, which presently number seventeen, are universally acknowledged to be among the best in the world. The Society has also used the peer review system for some 15 years in the screening of research proposals for funding by the Petroleum Research Fund (PRF), a

private research foundation administered by ACS. PRF annually distributes approximately \$4 million in research grants. We believe that the choice of PRF awardees by this system has been excellent. For example, a recent survey of the number of times scientific papers are cited by subsequent authors showed that PRF-supported research led to the highest number of citations per paper of any identifiable group having a common source of support.

The concept of peer review rests squarely on two related and time-tested propositions: First, that the value to science of a written piece of work (a research paper) or of a request for funding to undertake a line of research (a research proposal) should be evaluated on the basis of scientific merit. Second, that those scientists who perform work in the same or closely related fields to that of the paper or proposal can make the most meaningful scientific evaluation. In essence, the peer review system is based on the premise that judgments on scientific competence and significance must be made on the basis of scientific knowledge -- which in effect means that they must be made by scientists familiar with the context in which the scientific questions are posed. It is true that this requirement inevitably restricts, in practice, the number of individuals who qualify as competent reviewers in a given subject. It is also true that the same factors may sometimes produce a situation where a scientist who has reviewed the work of another scientist may subsequently have his own work reviewed by that person. To a large degree, conflict-of-interest and subjectivity problems are minimized by the common practice of editors or review administrators of removing the reviewer's name before transmitting his comments to the author of the grant proposal or manuscript. The vast majority of scientists exhibit the highest degree of integrity in evaluating the proposals and papers of others, in the fundamental belief that the system operates to the benefit of all concerned.

In the vast majority of cases, the judgment of a peer group leads to decisions which are in the best interests of scientific advancement. Exceptions can be cited when an individual researcher was so far in advance of his peers that they were unable to grasp his ideas and render adequate judgments. Instances of personal pique or vendetta occur, but in our experience, they are exceedingly rare.

The system may not be perfect. Nevertheless, we oppose any action which might institute a requirement that a specified fraction of reviewers be selected at random from pre-set lists of experts in the area of the proposal. Specialization of expertise in science is such that, unless the lists of experts are made unreasonably small (and the number of such lists correspondingly large), there is great risk that proposals will be sent to reviewers who are not well equipped to render credible and competent judgment. There are other ways to protect the proposer's interest, for example by an appeals process or by having him participate in the selection of a fraction of the reviewers.

The ACS recognizes that practical realities dictate that in some situations-- such as in the current climate of intense competition for research funds-- considerations other than scientific merit must occasionally be taken into account, for example, the importance of supporting good young scientists and engineers who are just beginning their careers. In such situations we deem it to be of paramount importance that these other considerations should be applied in addition to peer review and not instead of it, and should be applied after the peer review process has been completed.

Bureaucratic systems of reaching decisions on scientific matters which do not rely on peer review can lead to erroneous judgments on a large scale. We are firmly convinced, on the basis of our own experience, that the advantages of the peer review system far outweigh its disadvantages. In the absence of peer review, an agency would have to make its selections based only on its internal

review; an editor would have to reach his conclusions strictly on his own judgment. Such decisions made entirely in-house, may become narrow and fall behind the times; important aspects of the research to be supported or published are apt to be overlooked, in the absence of the broad oversight of a peer review group.

In the operation of peer review, we support the principle of anonymity because one will obtain a more candid, credible, complete and critical review when the reviewer remains anonymous. We do recognize the desirability of transmitting to the author of a proposal or manuscript the criticism embodied in reviews so that he may utilize this information in re-evaluating his plans. The ACS recognizes also the difficult problems which must be assessed in administering a peer review process. Many factors, of course, have to be balanced. Choices, however, need to be made in such a manner as to prevent any weakening in the quality of our scientific and technological resources.

In our own experience no better method of reaching judgments on scientific matters than the peer review system has thus far been devised. Indeed, the strongest argument for the validity of the system is the vitality of the scientific enterprise to which it is the cornerstone.

STATEMENT
of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY
COMMITTEE ON SCIENCE AND TECHNOLOGY
UNITED STATES HOUSE OF REPRESENTATIVES
on the
NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT, 1977
regarding
SCIENCE INFORMATION SYSTEMS
March 1, 1976

The American Chemical Society appreciates being given this opportunity to comment on the National Science Foundation Authorization Act, 1977, regarding science information systems. Primarily through its Committee on Chemical Abstracts Service of the Board of Directors, the Society has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views presented by the American Chemical Society represent a consensus of the nation's science community.

We wish to offer for the consideration of the Subcommittee the following specific recommendations:

- That \$9 million be authorized in the NSF budget for FY 1977 to allow for continued systematic development of information systems in the public interest;
- That funding for development of information systems be increased over the next several years to 4% - 5% of the NSF budget.

The Society has made similar recommendations in past years which have been supported by testimony describing the nature of the flow of scientific and technical information, the need for systematic development of information-transfer technology, and the crises in support that are faced by private-sector information services. In earlier testimony, the American Chemical Society has focused on the role of the Office of Management and Budget in NSF information support programs. In preparing the FY 1975 budget, OMB instructed NSF that the Office of Science Information Service (OSIS) (now the Division of Scientific Information, DIS) could no longer provide support for systematic development of information services. This restriction, in combination with the OMB-imposed reduction of approximately 33% in the OSIS FY75 budget, was the culmination of OMB pressures which are readily apparent from a review of the history of OSIS funding (see Attachment 1). The DIS FY76 budget has increased to \$6 million from the FY75 level of \$5.4 million -- still 25% below the FY74 spending level. The President's FY77 budget again proposes a limit of \$6 million for Science Information activities. We recommend that the FY 1977 Authorization Bill contain provisions for the allocation of funding support for information activities by the Foundation and the National Science Board which is more adequate for the long-range national interest.

The problem of information transfer is not a problem for only science and technology; it is a general problem that pervades all of society. Information may be technical, financial, or social. The needs for it may be governmental, academic, or industrial. Therefore, the solutions must involve support and expertise from both the public sector and the private sector. The net result must be a coordinated, systematic development without wasteful duplication.

A brief review of the development program undertaken at the Society's Chemical Abstracts Service (CAS) division can serve as an illustration of the aforementioned problem. CAS is one of a small handful of discipline informa-

tion services operating in the United States today. (There are only a dozen or so such services in the world at the present time.) All but one of these services are provided by scientific and educational societies outside the Federal Government. Discipline services are intended to provide access to information content which appears in source publications in all areas of science and technology, with no restriction as to country of origin or language of publication. The services are used to locate principles, facts, and observations which are buried in primary publications. Each serves to correlate information in such a way as to extend the usefulness of the information not just in that discipline, but throughout science and technology and the world at large. The intent is to organize a continuous record of accomplishment which will provide consistent access through time to all scientific and technical literature. Although the nature of the information differs from one discipline to another, the same basic processing problems exist.

The CAS development program began in 1965 with an evaluation of the concept of automatically identifying chemical substances based on computer processing of structural formula diagrams. During 1965-68, this work was supported jointly by the Department of Defense, the National Institutes of Health, the National Science Foundation, and the American Chemical Society. In 1969, the Society, with NSF support, launched a program directed at limited automation of other CAS processing operations. A primary objective of this development was to make chemical information more easily accessible by automated search of computer-readable files. It should be noted that in 1969, CHEMICAL ABSTRACTS, the main CAS service, included almost 45,000 pages of English-language abstracts and indexes which provide access to over 285,000 journal papers, reports, and patents, from more than 100 countries and in about 50 languages.

In 1971, encouraged by the initial results in automation of CAS process-

ing operations, NSF requested the Society to prepare a long-range development plan to produce an information accessing system which could be a prototype for such systems in various other disciplines of science and technology. The National Science Board reviewed this plan, which included implied support, and approved the funding requested by the Society. In 1971, CAS launched, with NSF and Society funding, a program to combine all CAS processing operations into a single integrated system which would provide printed, microform, and computer-readable information services depending on the user's need.

The success of the CAS automation program can perhaps be assessed best by comparing CHEMICAL ABSTRACTS in 1975 with its 1969 data. The 1975 CHEMICAL ABSTRACTS (publication of the indexes to be completed by June, 1976) will include nearly 66,000 pages of English-language abstracts and indexes which provide access to almost 455,000 journal papers, reports, and patents coming from over 125 countries in some 50 languages. This represents a 60% increase in source documents covered by CHEMICAL ABSTRACTS in 1975 in comparison to 1969. During this same period, the time lag on CHEMICAL ABSTRACTS indexes has been reduced by over nine months. Also, the cost of processing a document for CHEMICAL ABSTRACTS has been slightly lowered on a constant dollar basis, despite a nearly 12% increase in the average number of index entries per document.

Progress in CAS automation has followed the strategy of a stepwise shift of pre-1971 manual operations to an automated base as the new system has developed. Until now, the cost reductions, resulting from the increased efficiency gained at each step of the continuing shift from the manual to the automated system, have more than offset the additional cost and time resulting from the increased flow of paper generated by the automated system. At the present stage of our basic conversion to an automated system, continued growth of the work load will lead to a rapid escalation in processing costs and serious losses in timeliness of CAS services, because the checking, proofing, and correcting functions are still manual paper work. A shift of these functions

to interactive computer terminals would eliminate this paper problem. The development of such a so-called on-line processing system was part of the CAS 1971-77 program approved by the National Science Board. Although the American Chemical Society intends to continue its investment in the development of the CAS system, the funds available from the Society and from users of CAS services are far from sufficient to accomplish this objective. The program approved in 1971 included more than \$5 million in government support to implement the required on-line processing capability at CAS. (This need has recently been reviewed. The required government support has not changed.) Now is the time to start such development before the viability of CAS services is severely reduced.

In response to a request which the American Chemical Society sent to OSIS in 1975, L. Burchinal, Director of OSIS, stated in his letter of January 16, 1976:

"The Foundation recognizes what an outstanding job CAS had done in substantially automating preparation of Chemical Abstracts, creating a machine-readable data base, and deriving various related information products. We are proud to be associated with your effort. We are also pleased to see other organizations benefit from your work, as represented by contracts CAS has negotiated with the National Library of Medicine and use of your software and methods by other public and private information organization. Further development of CAS would also benefit chemistry, science and the country as a whole. However, you recognize, I am sure, that there are numerous competing needs for research in information science and for development of new and improved methods of creating access to scientific literature and data. To meet these needs, there exists only one major source of funds in the Nation -- the budget for the Office of Science Information Service in the National Science Foundation. As with all programs today, hard choices have to be made.

It is now clear that funds available for scientific information activities in FY 1976 and the estimated level for FY 1977 make it unlikely that \$5.1 million would be available for further CAS development. We understand the disappointment which this must bring to you and your staff, and we recognize the difficulty of maintaining the high quality of your service without unduly increasing its cost to subscribers."

Since CAS is the only English-language service in the world that provides comprehensive access to chemical information, CAS development is not just a

problem for the United States. It is not surprising that nearly two-thirds of the users of CAS services live outside the United States and, therefore, nearly two-thirds of the ACS investment in CAS system development comes from outside the United States. Certainly, failure to bring the CAS system to stability will have a very serious international impact on United States leadership in scientific and technical affairs throughout the world.

The timing of NSF's withdrawal from supporting systematic development and information systems is especially bad from an international standpoint. During the past two years, agreements have been reached which share responsibility for producing and using CAS services between the Society and the Internationale Dokumentationsgesellschaft fuer Chemie (IDC) of the Federal Republic of Germany and between the American Chemical Society and The Chemical Society of the British Isles. These agreements are the first steps toward spreading the burden of continuity of CAS services beyond the United States. Additional agreements are under active consideration with France and Japan. The agreement with IDC was initiated partly as a result of a national program of the West German Government directed at making scientific and technical information more accessible throughout Germany. The French and Japanese agreements, should they be established, will be based on support from their national governments.

The need for easy access to scientific and technical information can be justified in several ways, for example: the role of information in the creative processes and the need for logical development of knowledge by reasoning forward from what is already known; greater return on investment by eliminating wasteful duplication of time and effort resulting from unknowing repetition of work which is already a matter of public record, and fruitless investigations which could have been avoided by correlation of related but uncoordinated published facts; and, improved responsiveness in dealing with unexpected social crises in matters of health, food, energy, materials, et cetera.

But all such justifications are no more than facets of an effective information supply system. Public and private enterprise do not demand separate sources of information supply. In fact, to permit such separateness can become impossibly expensive for those who are served. Nevertheless, there is a strong tendency among federal agencies to establish independent information services, disregarding the other governmental and nongovernmental services in existence. The result is the erection of a technology barrier which not only cuts off federal agencies from privately operated sources of information, but also prevents private services from working effectively together and with federal agencies. This barrier could be removed by automation. However, with OSIS support for systematic development cut off, at the present time only the government services have the resources for such automation. Wasteful duplication of processing effort, and user problems in recognizing useless overlap in content among governmental and nongovernmental information services, will continue to grow unabated until systematic development of existing information supply services is undertaken. Systematic development implies a carefully planned, stepwise buildup of information systems in a way that permits the diversity of information users to utilize efficiently combinations of corresponding services for specialized purposes. The only productive systematic development of information services -- inside or outside of government -- has come through the OSIS initiative and leadership, and its momentum can only be continued through adequate funding for NSF's Division of Scientific Information.

In order that you may place the recommendations of the Society in perspective, we should mention that we are an individual member organization. Chemical or other companies are not eligible for membership. Approximately 110,000 individual

chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits, constitute the membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Its National Charter imposes obligations on the Society to provide assistance to the government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

We offer the foregoing recommendations to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

FEDERAL OBLIGATIONS FY65-77

National Science Foundation
Research and Development

	1965	1966	1967	1968	1969	1970	1971
1. Total Federal R&D	15,745,900,000	16,178,800,000	17,149,000,000	16,525,000,000	16,310,100,000	15,865,800,000	16,175,400,000
2. Total NSF	415,966,689	466,428,184	465,103,802	505,227,669	432,645,493	460,617,954	494,408,290
3. Total Nat'l & Internat'l Prog.	77,309,758	75,341,674	61,107,176	89,768,018	77,577,827	105,214,409	121,892,099
4. Nat'l & Special Research Prog.	42,194,266	25,978,383	11,887,318	15,483,326	13,474,919	18,964,164	49,856,551
5. National Research Centers	19,480,000	23,017,805	24,503,656	31,464,080	28,565,361	27,211,800	37,174,506
6. Computing (1) Activities	4,512,503	4,000,000	12,690,598	21,997,555	16,979,280	16,918,585	15,042,905
7. Science Information	11,122,989	11,445,486	40,074,737	14,396,057	10,664,541	11,433,279	10,694,898
8. Research Applied to Nat'l Needs							33,955,291

Estimated

	1972	1973	1974	1975	1976	TQ	1977
1. Total Federal R&D	17,014,000,000	17,595,600,000	17,407,000,000	19,844,000,000	22,247,000,000	5,552,000,000	24,680,000,000
2. Total NSF	597,720,263	605,928,214	639,998,974	689,575,000	726,268,000	167,605,000	806,000,000
3. Total Nat'l & Internat'l Prog.	160,492,101	165,341,441	150,157,347	146,900,000	189,200,000	43,600,000	X
4. Nat'l & Special Research Prog.	85,885,701	112,463,727	91,641,465	86,500,000	116,000,000	26,400,000	X
5. National Research Centers	39,734,697	39,750,000	43,200,000	50,400,000	62,200,000	15,000,000	60,000,000
6. Computing (1) Activities	20,915,968	9,895,322	9,762,500	11,800,000	12,500,000	X	15,800,000
7. Science Information	9,710,922	8,464,408	8,077,358	5,400,000	6,000,000	X	6,000,000
8. Research Applied to Nat'l Needs	53,766,889	69,887,314	75,079,165	83,590,000	73,615,000	17,300,000	64,900,000

X - Data not available

(1) FY65 University only
FY66 Not available - estimate only

Data Sources:

For Federal R&D -

- FY65-73 from Federal Funds for Research Development and Other Scientific Activities Vol. XXIII, NSF 74-320
- FY74-77 from FY77 U.S. Government Budget

For NSF Total and all programs -

- FY65-74 from NSF Annual Reports - Financial Section
- FY75-77 from News Release NSF 75-9

STATEMENT
of the
AMERICAN CHEMICAL SOCIETY
to the
SPECIAL SUBCOMMITTEE ON THE NATIONAL SCIENCE FOUNDATION
COMMITTEE ON LABOR AND PUBLIC WELFARE
UNITED STATES SENATE
on the
NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT, 1977
regarding
SCIENCE INFORMATION SYSTEMS
March 4, 1976

The American Chemical Society appreciates being given this opportunity to comment on the National Science Foundation Authorization Act, 1977, regarding science information systems. Primarily through its Committee on Chemical Abstracts Service of the Board of Directors, the Society has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views presented by the American Chemical Society represent a consensus of the nation's science community.

We wish to offer for the consideration of the Subcommittee the following specific recommendations:

- That \$9 million be authorized in the NSF budget for FY 1977 to allow for continued systematic development of information systems in the public interest;
- That funding for development of information systems be increased over the next several years to 4% - 5% of the NSF budget.

The Society has made similar recommendations in past years which have been supported by testimony describing the nature of the flow of scientific and technical information, the need for systematic development of information-transfer technology, and the crises in support that are faced by private-sector information services. In earlier testimony, the American Chemical Society has focused on the role of the Office of Management and Budget in NSF information support programs. In preparing the FY 1975 budget, OMB instructed NSF that the Office of Science Information Service (OSIS) (now the Division of Scientific Information, DIS) could no longer provide support for systematic development of information services. This restriction, in combination with the OMB-imposed reduction of approximately 33% in the OSIS FY75 budget, was the culmination of OMB pressures which are readily apparent from a review of the history of OSIS funding (see Attachment 1). The DIS FY76 budget has increased to \$6 million from the FY75 level of \$5.4 million -- still 25% below the FY74 spending level. The President's FY77 budget again proposes a limit of \$6 million for Science Information activities. We recommend that the FY 1977 Authorization Bill contain provisions for the allocation of funding support for information activities by the Foundation and the National Science Board which is more adequate for the long-range national interest.

The problem of information transfer is not a problem for only science and technology; it is a general problem that pervades all of society. Information may be technical, financial, or social. The needs for it may be governmental, academic, or industrial. Therefore, the solutions must involve support and expertise from both the public sector and the private sector. The net result must be a coordinated, systematic development without wasteful duplication.

A brief review of the development program undertaken at the Society's Chemical Abstracts Service (CAS) division can serve as an illustration of the aforementioned problem. CAS is one of a small handful of discipline informa-

tion services operating in the United States today. (There are only a dozen or so such services in the world at the present time.) All but one of these services are provided by scientific and educational societies outside the Federal Government. Discipline services are intended to provide access to information content which appears in source publications in all areas of science and technology, with no restriction as to country of origin or language of publication. The services are used to locate principles, facts, and observations which are buried in primary publications. Each serves to correlate information in such a way as to extend the usefulness of the information not just in that discipline, but throughout science and technology and the world at large. The intent is to organize a continuous record of accomplishment which will provide consistent access through time to all scientific and technical literature. Although the nature of the information differs from one discipline to another, the same basic processing problems exist.

The CAS development program began in 1965 with an evaluation of the concept of automatically identifying chemical substances based on computer processing of structural formula diagrams. During 1965-68, this work was supported jointly by the Department of Defense, the National Institutes of Health, the National Science Foundation, and the American Chemical Society. In 1969, the Society, with NSF support, launched a program directed at limited automation of other CAS processing operations. A primary objective of this development was to make chemical information more easily accessible by automated search of computer-readable files. It should be noted that in 1969, CHEMICAL ABSTRACTS, the main CAS service, included almost 45,000 pages of English-language abstracts and indexes which provide access to over 285,000 journal papers, reports, and patents, from more than 100 countries and in about 50 languages.

In 1971, encouraged by the initial results in automation of CAS process-

ing operations, NSF requested the Society to prepare a long-range development plan to produce an information accessing system which could be a prototype for such systems in various other disciplines of science and technology. The National Science Board reviewed this plan, which included implied support, and approved the funding requested by the Society. In 1971, CAS launched, with NSF and Society funding, a program to combine all CAS processing operations into a single integrated system which would provide printed, microform, and computer-readable information services depending on the user's need.

The success of the CAS automation program can perhaps be assessed best by comparing CHEMICAL ABSTRACTS in 1975 with its 1969 data. The 1975 CHEMICAL ABSTRACTS (publication of the indexes to be completed by June, 1976) will include nearly 66,000 pages of English-language abstracts and indexes which provide access to almost 455,000 journal papers, reports, and patents coming from over 125 countries in some 50 languages. This represents a 60% increase in source documents covered by CHEMICAL ABSTRACTS in 1975 in comparison to 1969. During this same period, the time lag on CHEMICAL ABSTRACTS indexes has been reduced by over nine months. Also, the cost of processing a document for CHEMICAL ABSTRACTS has been slightly lowered on a constant dollar basis, despite a nearly 12% increase in the average number of index entries per document.

Progress in CAS automation has followed the strategy of a stepwise shift of pre-1971 manual operations to an automated base as the new system has developed. Until now, the cost reductions, resulting from the increased efficiency gained at each step of the continuing shift from the manual to the automated system, have more than offset the additional cost and time resulting from the increased flow of paper generated by the automated system. At the present stage of our basic conversion to an automated system, continued growth of the work load will lead to a rapid escalation in processing costs and serious losses in timeliness of CAS services, because the checking, proofing, and correcting functions are still manual paper work. A shift of these functions

to interactive computer terminals would eliminate this paper problem. The development of such a so-called on-line processing system was part of the CAS 1971-77 program approved by the National Science Board. Although the American Chemical Society intends to continue its investment in the development of the CAS system, the funds available from the Society and from users of CAS services are far from sufficient to accomplish this objective. The program approved in 1971 included more than \$5 million in government support to implement the required on-line processing capability at CAS. (This need has recently been reviewed. The required government support has not changed.) Now is the time to start such development before the viability of CAS services is severely reduced.

In response to a request which the American Chemical Society sent to OSIS in 1975, L. Burchinal, Director of OSIS, stated in his letter of January 16, 1976:

"The Foundation recognizes what an outstanding job CAS had done in substantially automating preparation of Chemical Abstracts, creating a machine-readable data base, and deriving various related information products. We are proud to be associated with your effort. We are also pleased to see other organizations benefit from your work, as represented by contracts CAS has negotiated with the National Library of Medicine and use of your software and methods by other public and private information organization. Further development of CAS would also benefit chemistry, science and the country as a whole. However, you recognize, I am sure, that there are numerous competing needs for research in information science and for development of new and improved methods of creating access to scientific literature and data. To meet these needs, there exists only one major source of funds in the Nation -- the budget for the Office of Science Information Service in the National Science Foundation. As with all programs today, hard choices have to be made.

It is now clear that funds available for scientific information activities in FY 1976 and the estimated level for FY 1977 make it unlikely that \$5.1 million would be available for further CAS development. We understand the disappointment which this must bring to you and your staff, and we recognize the difficulty of maintaining the high quality of your service without unduly increasing its cost to subscribers."

Since CAS is the only English-language service in the world that provides comprehensive access to chemical information, CAS development is not just a

problem for the United States. It is not surprising that nearly two-thirds of the users of CAS services live outside the United States and, therefore, nearly two-thirds of the ACS investment in CAS system development comes from outside the United States. Certainly, failure to bring the CAS system to stability will have a very serious international impact on United States leadership in scientific and technical affairs throughout the world.

The timing of NSF's withdrawal from supporting systematic development and information systems is especially bad from an international standpoint. During the past two years, agreements have been reached which share responsibility for producing and using CAS services between the Society and the Internationale Dokumentationsgesellschaft fuer Chemie (IDC) of the Federal Republic of Germany and between the American Chemical Society and The Chemical Society of the British Isles. These agreements are the first steps toward spreading the burden of continuity of CAS services beyond the United States. Additional agreements are under active consideration with France and Japan. The agreement with IDC was initiated partly as a result of a national program of the West German Government directed at making scientific and technical information more accessible throughout Germany. The French and Japanese agreements, should they be established, will be based on support from their national governments.

The need for easy access to scientific and technical information can be justified in several ways, for example: the role of information in the creative processes and the need for logical development of knowledge by reasoning forward from what is already known; greater return on investment by eliminating wasteful duplication of time and effort resulting from unknowing repetition of work which is already a matter of public record, and fruitless investigations which could have been avoided by correlation of related but uncoordinated published facts; and, improved responsiveness in dealing with unexpected social crises in matters of health, food, energy, materials, et cetera.

But all such justifications are no more than facets of an effective information supply system. Public and private enterprise do not demand separate sources of information supply. In fact, to permit such separateness can become impossibly expensive for those who are served. Nevertheless, there is a strong tendency among federal agencies to establish independent information services, disregarding the other governmental and nongovernmental services in existence. The result is the erection of a technology barrier which not only cuts off federal agencies from privately operated sources of information, but also prevents private services from working effectively together and with federal agencies. This barrier could be removed by automation. However, with OSIS support for systematic development cut off, at the present time only the government services have the resources for such automation. Wasteful duplication of processing effort, and user problems in recognizing useless overlap in content among governmental and nongovernmental information services, will continue to grow unabated until systematic development of existing information supply services is undertaken. Systematic development implies a carefully planned, stepwise buildup of information systems in a way that permits the diversity of information users to utilize efficiently combinations of corresponding services for specialized purposes. The only productive systematic development of information services -- inside or outside of government -- has come through the OSIS initiative and leadership, and its momentum can only be continued through adequate funding for NSF's Division of Scientific Information.

In order that you may place the recommendations of the Society in perspective, we should mention that we are an individual member organization. Chemical or other companies are not eligible for membership. Approximately 110,000 individual

chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits, constitute the membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Its National Charter imposes obligations on the Society to provide assistance to the government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

We offer the foregoing recommendations to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

FEDERAL OBLIGATIONS FY65-77

National Science Foundation
Research and Development

	1965	1966	1967	1968	1969	1970	1971
1. Total Federal R&D	15,745,900,000	16,178,800,000	17,149,000,000	16,525,100,000	16,310,100,000	15,864,800,000	16,175,400,000
2. Total NSF	415,966,689	466,428,184	465,103,802	505,227,669	432,645,493	460,617,964	494,408,290
3. Total Nat'l & Internat'l Prog.	77,309,758	75,341,674	61,107,176	89,768,038	77,477,872	105,214,409	121,892,099
4. Nat'l & Special Research Prog.	42,194,266	25,978,383	11,887,338	15,483,326	13,479,919	38,964,163	49,856,331
5. National Research Centers	19,480,000	23,017,805	24,503,656	31,464,080	28,564,461	27,211,800	37,174,506
6. Computing Activities (1)	4,512,503	4,000,000	12,690,598	21,997,555	16,979,280	16,918,585	15,042,905
7. Science Information	11,122,989	11,445,486	10,024,737	14,396,057	10,664,541	11,433,279	10,694,898
8. Research Applied to Nat'l Needs							33,955,291

Estimated

	1972	1973	1974	1975	1976	TQ	1977
1. Total Federal R&D	17,014,000,000	17,595,600,000	17,407,000,000	19,844,000,000	22,247,000,000	5,552,000,000	24,680,000,000
2. Total NSF	597,720,263	605,928,234	639,998,974	689,575,000	726,268,000	167,605,000	806,000,000
3. Total Nat'l & Internat'l Prog.	160,492,101	165,341,441	150,157,347	146,900,000	189,200,000	43,600,000	X
4. Nat'l & Special Research Prog.	85,885,701	112,463,727	91,641,465	86,500,000	116,000,000	25,400,000	X
5. National Research Centers	39,734,697	39,750,000	43,200,000	50,400,000	62,200,000	15,000,000	60,000,000
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STATEMENT
of
DR. ROBERT W. CAIRNS
ON BEHALF OF THE
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON HUD-INDEPENDENT AGENCIES
COMMITTEE ON APPROPRIATIONS
UNITED STATES HOUSE OF REPRESENTATIVES
on the
HUD-INDEPENDENT AGENCIES APPROPRIATION ACT, 1977
regarding
SCIENCE INFORMATION SYSTEMS
April 8, 1976

Mr. Chairman and Members of the Subcommittee:

My name is Robert W. Cairns. I am the Executive Director of the American Chemical Society and I appear before you with the authorization of the Board of Directors to present this statement. Accompanying me today are Mr. Fred A. Tate, Associate Director of Administration of the Society's Chemical Abstracts Division, and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the Society.

We appreciate being given this opportunity to comment on the National Science Foundation Authorization Act, 1977, regarding science information systems. Primarily through its Committee on Chemical Abstracts Service of the Board of Directors, the Society has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views

presented by the American Chemical Society represent a consensus of the nation's science community.

We wish to offer for the consideration of the Subcommittee the following specific recommendations:

- o That \$9 million be authorized in the NSF budget for FY 1977 to allow for continued systematic development of information systems in the public interest:
- o That funding for development of information systems be increased over the next several years to 4% - 5% of the NSF budget.

The Society has made similar recommendations in past years which have been supported by testimony describing the nature of the flow of scientific and technical information, the need for systematic development of information-transfer technology, and the crises in support that are faced by private-sector information services. In earlier testimony, the American Chemical Society has focused on the role of the Office of Management and Budget in NSF information support programs. In preparing the FY 1975 budget, OMB instructed NSF that the Office of Science Information Service (OSIS) (now the Division of Scientific Information, DIS) could no longer provide support for systematic development of information services. This restriction, in combination with the OMB-imposed reduction of approximately 33% in the OSIS FY75 budget, was the culmination of OMB pressures which are readily apparent from a review of the history of OSIS funding (see Attachment 1). The DIS FY76 budget has increased to \$6 million from the FY75 level of \$5.4 million -- still 25% below the FY74 spending level. The President's FY77 budget again proposes a limit of \$6 million for Science Information activities. We recommend that the FY 1977 Authorization Bill contain provisions for the allocation of funding support for information activities by the Foundation and the National Science Board which is more adequate for the long-range national interest.

The problem of information transfer is not a problem for only science and technology; it is a general problem that pervades all of society. Information may be technical, financial, or social. The needs for it may be governmental, academic, or industrial. Therefore, the solutions must involve support and expertise from both the public sector and the private sector. The net result must be a coordinated, systematic development without wasteful duplication.

A brief review of the development program undertaken at the Society's Chemical Abstracts Service (CAS) division can serve as an illustration of the aforementioned problem. CAS is one of a small handful of discipline information services operating in the United States today. (There are only a dozen or so such services in the world at the present time.) All but one of these services are provided by scientific and educational societies outside the Federal Government. Discipline services are intended to provide access to information content which appears in source publications in all areas of science and technology, with no restriction as to country of origin or language of publication. The services are used to locate principles, facts, and observations which are buried in primary publications. Each serves to correlate information in such a way as to extend the usefulness of the information not just in that discipline, but throughout science and technology and the world at large. The intent is to organize a continuous record of accomplishment which will provide consistent access through time to all scientific and technical literature. Although the nature of the information differs from one discipline to another, the same basic processing problems exist.

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6. Computing (1) Activities	20,915,968	9,895,322	9,762,500	11,800,000	12,500,000	X	15,800,000
7. Science Information	9,710,922	8,464,408	8,077,358	5,400,000	6,000,000	X	6,000,000
8. Research Applied to Nat'l Needs	53,766,889	69,887,314	75,079,165	83,590,000	73,615,000	17,300,000	64,900,000

X - Data not available

(1) FY65 University only
FY66 Not available - estimate only

Data Sources:

For Federal R&D -

- FY65-73 from Federal Funds for Research Development and Other Scientific Activities Vol. XXIII, NSF 74-320
- FY74-77 from FY77 U.S. Government Budget

For NSF Total and all programs -

- FY65-74 from NSF Annual Reports - Financial Section
- FY75-77 from News Release NSF 75-9

STATEMENT

of

DR. ROBERT W. CAIRNS

ON BEHALF OF THE

AMERICAN CHEMICAL SOCIETY

to the

SUBCOMMITTEE ON HUD-INDEPENDENT AGENCIES

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

on the

HUD-INDEPENDENT AGENCIES APPROPRIATION ACT, 1977

regarding

SCIENCE INFORMATION SYSTEMS

April 12, 1976

Mr. Chairman and Members of the Subcommittee:

My name is Robert W. Cairns. I am the Executive Director of the American Chemical Society and I appear before you with the authorization of the Board of Directors to present this statement. Accompanying me today are Mr. Fred A. Tate, Associate Director of Administration of the Society's Chemical Abstracts Division, and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the Society.

We appreciate being given this opportunity to comment on the National Science Foundation Authorization Act, 1977, regarding science information systems. Primarily through its Committee on Chemical Abstracts Service of the Board of Directors, the Society has monitored the amounts previously allocated in the National Science Foundation Budget for science information systems. The Society recognizes this federal support as fundamental to national science and technology policy and of vital significance to the ability of our nation to resolve many of the problems which confront it. We believe that the views

presented by the American Chemical Society represent a consensus of the nation's science community.

We wish to offer for the consideration of the Subcommittee the following specific recommendations:

- o That \$9 million be authorized in the NSF budget for FY 1977 to allow for continued systematic development of information systems in the public interest:
- o That funding for development of information systems be increased over the next several years to 4% - 5% of the NSF budget.

The Society has made similar recommendations in past years which have been supported by testimony describing the nature of the flow of scientific and technical information, the need for systematic development of information-transfer technology, and the crises in support that are faced by private-sector information services. In earlier testimony, the American Chemical Society has focused on the role of the Office of Management and Budget in NSF information support programs. In preparing the FY 1975 budget, OMB instructed NSF that the Office of Science Information Service (OSIS) (now the Division of Scientific Information, DIS) could no longer provide support for systematic development of information services. This restriction, in combination with the OMB-imposed reduction of approximately 33% in the OSIS FY75 budget, was the culmination of OMB pressures which are readily apparent from a review of the history of OSIS funding (see Attachment 1). The DIS FY76 budget has increased to \$6 million from the FY75 level of \$5.4 million -- still 25% below the FY74 spending level. The President's FY77 budget again proposes a limit of \$6 million for Science Information activities. We recommend that the FY 1977 Authorization Bill contain provisions for the allocation of funding support for information activities by the Foundation and the National Science Board which is more adequate for the long-range national interest.

The problem of information transfer is not a problem for only science and technology; it is a general problem that pervades all of society. Information may be technical, financial, or social. The needs for it may be governmental, academic, or industrial. Therefore, the solutions must involve support and expertise from both the public sector and the private sector. The net result must be a coordinated, systematic development without wasteful duplication.

A brief review of the development program undertaken at the Society's Chemical Abstracts Service (CAS) division can serve as an illustration of the aforementioned problem. CAS is one of a small handful of discipline information services operating in the United States today. (There are only a dozen or so such services in the world at the present time.) All but one of these services are provided by scientific and educational societies outside the Federal Government. Discipline services are intended to provide access to information content which appears in source publications in all areas of science and technology, with no restriction as to country of origin or language of publication. The services are used to locate principles, facts, and observations which are buried in primary publications. Each serves to correlate information in such a way as to extend the usefulness of the information not just in that discipline, but throughout science and technology and the world at large. The intent is to organize a continuous record of accomplishment which will provide consistent access through time to all scientific and technical literature. Although the nature of the information differs from one discipline to another, the same basic processing problems exist.

The CAS development program began in 1965 with an evaluation of the concept of automatically identifying chemical substances based on computer processing of structural formula diagrams. During 1965-68, this work was

supported jointly by the Department of Defense, the National Institutes of Health, the National Science Foundation, and the American Chemical Society. In 1969, the Society, with NSF support, launched a program directed at limited automation of other CAS processing operations. A primary objective of this development was to make chemical information more easily accessible by automated search of computer-readable files. It should be noted that in 1969, CHEMICAL ABSTRACTS, the main CAS service, included almost 45,000 pages of English-language abstracts and indexes which provide access to over 285,000 journal papers, reports, and patents, from more than 100 countries and in about 50 languages.

In 1971, encouraged by the initial results in automation of CAS processing operations, NSF requested the Society to prepare a long-range development plan to produce an information accessing system which could be a prototype for such systems in various other disciplines of science and technology. The National Science Board reviewed this plan, which included implied support, and approved the funding requested by the Society. In 1971, CAS launched, with NSF and Society funding, a program to combine all CAS processing operations into a single integrated system which would provide printed, microform, and computer-readable information services depending on the user's need.

The success of the CAS automation program can perhaps be assessed best by comparing CHEMICAL ABSTRACTS in 1975 with its 1969 data. The 1975 CHEMICAL ABSTRACTS (publication of the indexes to be completed by June, 1976) will include nearly 66,000 pages of English-language abstracts and indexes which provide access to almost 455,000 journal papers, reports, and patents coming from over 125 countries in some 50 languages. This represents a 60% increase in source documents covered by CHEMICAL ABSTRACTS in 1975 in comparison to 1969. During this same period, the time lag on CHEMICAL ABSTRACTS indexes

has been reduced by over nine months. Also, the cost of processing a document for CHEMICAL ABSTRACTS has been slightly lowered on a constant dollar basis, despite a nearly 12% increase in the average number of index entries per document.

Progress in CAS automation has followed the strategy of a stepwise shift of pre-1971 manual operations to an automated base as the new system has developed. Until now, the cost reductions, resulting from the increased efficiency gained at each step of the continuing shift from the manual to the automated system, have more than offset the additional cost and time resulting from the increased flow of paper generated by the automated system. At the present stage of our basic conversion to an automated system, continued growth of the work load will lead to a rapid escalation in processing costs and serious losses in timeliness of CAS services, because the checking, proofing, and correcting functions are still manual paper work. A shift of these functions to interactive computer terminals would eliminate this paper problem. The development of such a so-called on-line processing system was part of the CAS 1971-77 program approved by the National Science Board. Although the American Chemical Society intends to continue its investment in the development of the CAS system, the funds available from the Society and from users of CAS services are far from sufficient to accomplish this objective. The program approved in 1971 included more than \$5 million in government support to implement the required on-line processing capability at CAS. (This need has recently been reviewed. The required government support has not changed.) Now is the time to start such development before the viability of CAS services is severely reduced.

In response to a request which the American Chemical Society sent to OSIS in 1975, L. Burchinal, Director of OSIS, stated in his letter of January 16, 1976:

"The Foundation recognizes what an outstanding job CAS had done in substantially automating preparation of Chemical Abstracts, creating a machine-readable data base, and deriving various related information products. We are proud to be associated with your effort. We are also pleased to see other organizations benefit from your work, as represented by contracts CAS has negotiated with the National Library of Medicine and use of your software and methods by other public and private information organizations. Further development of CAS would also benefit chemistry, science and the country as a whole. However, you recognize, I am sure, that there are numerous competing needs for research in information science and for development of new and improved methods of creating access to scientific literature and data. To meet these needs, there exists only one major source of funds in the Nation -- the budget for the Office of Science Information Service in the National Science Foundation. As with all programs today, hard choices have to be made.

It is now clear that funds available for scientific information activities in FY 1976 and the estimated level for FY 1977 make it unlikely that \$5.1 million would be available for further CAS development. We understand the disappointment which this must bring to you and your staff, and we recognize the difficulty of maintaining the high quality of your service without unduly increasing its cost to subscribers."

Since CAS is the only English-language service in the world that provides comprehensive access to chemical information, CAS development is not just a problem for the United States. It is not surprising that nearly two-thirds of the users of CAS services live outside the United States and, therefore, nearly two-thirds of the ACS investment in CAS system development comes from outside the United States. Certainly, failure to bring the CAS system to stability will have a very serious international impact on United States leadership in scientific and technical affairs throughout the world.

The timing of NSF's withdrawal from supporting systematic development and information systems is especially bad from an international standpoint. During the past two years, agreements have been reached which share responsibility for producing and using CAS services between the Society and the Internationale Dokumentationsgesellschaft fuer Chemie (IDC) of the Federal Republic of Germany and between the American Chemical Society and The Chemical Society of the British Isles. These agreements are the first steps toward spreading the burden of continuity of CAS services beyond the United States.

Additional agreements are under active consideration with France and Japan.

The agreement with IDC was initiated partly as a result of a national program of the West German Government directed at making scientific and technical information more accessible throughout Germany. The French and Japanese agreements, should they be established, will be based on support from their national governments.

The need for easy access to scientific and technical information can be justified in several ways, for example: the role of information in the creative processes and the need for logical development of knowledge by reasoning forward from what is already known; greater return on investment by eliminating wasteful duplication of time and effort resulting from unknowing repetition of work which is already a matter of public record, and fruitless investigations which could have been avoided by correlation of related but uncoordinated published facts; and, improved responsiveness in dealing with unexpected social crises in matters of health, food, energy, materials, et cetera.

But all such justifications are no more than facets of an effective information supply system. Public and private enterprise do not demand separate sources of information supply. In fact, to permit such separateness can become impossibly expensive for those who are served. Nevertheless, there is a strong tendency among federal agencies to establish independent information services, disregarding the other governmental and nongovernmental services in existence. The result is the erection of a technology barrier which not only cuts off federal agencies from privately operated sources of information, but also prevents private services from working effectively together and with federal agencies. This barrier could be removed by automation.

However, with OSIS support for systematic development cut off, at the present time only the government services have the resources for such automation. Wasteful duplication of processing effort, and user problems in recognizing useless overlap in content among governmental and nongovernmental information services, will continue to grow unabated until systematic development of existing information supply services is undertaken. Systematic development implies a carefully planned, stepwise buildup of information systems in a way that permits the diversity of information users to utilize efficiently combinations of corresponding services for specialized purposes. The only productive systematic development of information services -- inside or outside of government -- has come through the OSIS initiative and leadership, and its momentum can only be continued through adequate funding for NSF's Division of Scientific Information.

In order that you may place the recommendations of the Society in perspective, we should mention that we are an individual member organization. Chemical or other companies are not eligible for membership. Approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum of academic, governmental, and industrial professional pursuits, constitute the membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Its National Charter imposes obligations on the Society to provide assistance to the government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

We offer the foregoing recommendations to the Congress in a spirit of cooperation in the hope of developing the best possible mechanism for achieving fast, efficient, and comprehensive dissemination of scientific and technical information. We recognize, as surely you do, that the availability of scientific and technical information is vitally necessary to the conduct of research and development in this country. Our hope is that we can continue to contribute to sustaining the tradition of scientific excellence and technological competency in the United States, on which our national well-being is dependent.

FEDERAL OBLIGATIONS FY65-77

National Science Foundation
Research and Development

	1965	1966	1967	1968	1969	1970	1971
1. Total Federal R&D	15,745,900,000	16,178,800,000	17,149,000,000	16,525,000,000	16,310,100,000	15,864,800,000	16,175,400,000
2. Total NSF	415,966,689	466,428,186	465,103,802	505,227,669	432,645,493	460,617,954	494,408,390
3. Total Nat'l & Internat'l Prog.	77,309,758	75,341,675	61,107,176	89,768,018	77,471,872	105,214,409	121,892,099
4. Nat'l & Special Research Prog.	47,194,266	25,978,383	11,887,338	15,483,326	13,479,919	38,964,163	49,856,551
5. National Research Centers	19,480,000	23,017,805	24,503,656	31,464,080	28,564,461	27,211,800	37,174,536
6. Computing Activities (1)	4,512,503	4,000,000	12,690,598	21,997,545	16,979,280	16,918,585	15,042,905
7. Science Information	11,122,989	11,465,486	10,024,737	14,396,057	10,664,541	11,433,279	10,694,898
8. Research Applied to Nat'l Needs							33,955,291

Estimated

	1972	1973	1974	1975	1976	TQ	1977
1. Total Federal R&D	17,014,000,000	17,595,600,000	17,407,000,000	19,844,000,000	22,247,000,000	5,552,000,000	24,680,000,000
2. Total NSF	597,720,263	605,928,234	639,998,974	689,575,000	726,268,000	167,605,000	806,000,000
3. Total Nat'l & Internat'l Prog.	160,492,101	165,341,441	150,157,347	146,900,000	189,200,000	43,600,000	X
4. Nat'l & Special Research Prog.	85,885,701	112,463,727	91,641,465	86,500,000	116,000,000	25,400,000	X
5. National Research Centers	39,734,697	39,750,000	43,200,000	50,400,000	62,200,000	15,000,000	60,000,000
6. Computing Activities (1)	20,915,968	9,895,322	9,762,500	11,800,000	12,500,000	X	15,800,000
7. Science Information	9,710,922	8,464,408	8,077,358	5,400,000	6,000,000	X	6,000,000
8. Research Applied to Nat'l Needs	53,766,889	69,887,314	75,079,165	83,590,000	73,615,000	17,300,000	64,900,000

X - Data not available

(1) FY65 University only
FY66 Not available - estimate only

Data Sources:

For Federal R&D -

- FY65-73 from Federal Funds for Research Development and Other Scientific Activities Vol. XXIII, NSF 74-320
- FY74-77 from FY77 U.S. Government Budget

For NSF Total and all programs -

- FY65-74 from NSF Annual Reports - Financial Section
- FY75-77 from News Release NSF 75-9



American Chemical Society

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4600

Glenn T. Seaborg, *President*

May 25, 1976

The Honorable Harley O. Staggers
Chairman
Committee on Interstate and Foreign Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Congressman Staggers:

I have been authorized by the Board of Directors of the American Chemical Society to again bring to your attention our views with respect to certain provisions of the Toxic Substances Control Act. The Society in previous testimony presented by Dr. Herman S. Bloch, Chairman of the Board of Directors, on July 9, 1975 to the Subcommittee on Consumer Protection and Finance of the House Committee on Interstate and Foreign Commerce outlined some general considerations and specific recommendations regarding toxic substances control legislation.

After reviewing the Senate passed Toxic Substances Control Act, S.3149, we believe that the recommendations made in the Society's statement should be emphasized more directly in the provisions of any legislation on this subject that passes into law. Therefore, we recommend that you give serious consideration to the principles outlined in the Society's testimony during your Committee's markup of H.R.10318. These recommendations were developed through the expertise of a large number of scientists and engineers and we believe represent a reasonable consensus of the chemical science community.

A copy of the Society's statement as presented by Dr. Bloch is enclosed for your information. We would like to briefly highlight the principal points contained therein:

1. The American Chemical Society gives strong support to the basic concept of toxic substances control. The Society believes that with proper safeguards new substances can be introduced and used without the threat of significant hazard to human health or the environment.



2. The regulation of new substances or new uses of substances must be based on the best available scientific evidence in judging any hazard posed. The hazard of a substance depends not only upon its toxicity but must be evaluated in terms of the amount of material to be introduced into the environment, the manner of introduction, and the time-duration of exposure to the material.
3. The Society also supports the concept of pre-use clearance of all materials that are likely to pose a significant hazard, either to man or the environment, based on the properties of the material or the use for which it is intended. The basic consideration in regulating toxic chemical substances is the hazard to man and the environment, not the inherent toxicity of specific chemicals.
4. Though the Society fully supports the pre-use clearance of all materials likely to pose significant hazards to man or the environment, exhaustive testing for possible impact on man and the environment is not necessary for every new substance or new form of a substance proposed to be introduced into commerce. There is a very large body of data available on different classes of compounds, and experts can predict in many cases those chemical substances most likely to pose hazards.
5. With the amount of work to be done, it would be unwise to utilize scientific resources and manpower to conduct extensive tests which scientific judgment indicates would have little chance of providing significant data. Obviously, the development of the best procedures for hazard screening will require a variety of scientific skills. In establishing such screening procedures, the Environmental Protection Agency and other federal agencies concerned with this problem should seek to achieve a rational balance between consideration of:
 - Safety to human health and the Environment
 - Maintenance of the opportunities for discovery and innovation in the development of useful new substances
 - And the optimum use of limited facilities and trained manpower which are now available for testing new substances. (Testing requirements should be reasonable in terms of cost/benefit and should be determined for each specific case.)

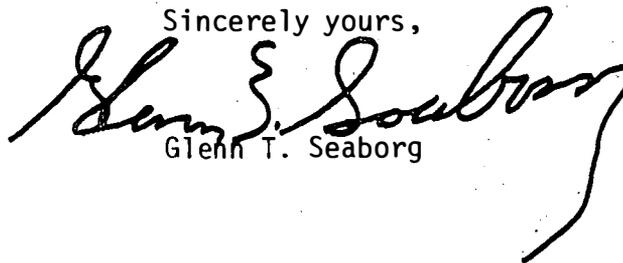
May 25, 1976

6. The American Chemical Society believes that research and development of new chemical substances should be encouraged, as should the compilation of information relevant to any significant hazards associated with new substances. In order to do so, materials which are synthesized and used solely for research and testing purposes, in our view, should be exempt from clearance prior to experimental use. (Such research chemicals do not normally enter the environment and therefore there is no public exposure to them.)
7. To deal with inevitable differences of opinion between applicants and the Government, the American Chemical Society recommends provision be made in the law for the participation of panels of qualified scientific experts, independent of the parties involved, in the appeal process. There should also be provision for eventual appeal to the courts. Independent experts could also be extremely useful in establishing scientific procedures for hazard evaluation.

We are also enclosing a copy of the Question and Answer portion of the Hearing record of Dr. Bloch's testimony. This discussion further clarifies some of the recommendations which he presented at that time.

The American Chemical Society strongly recommends that every effort be made to reach agreement on a comprehensive "Toxic Substances Control Act" in the 94th Congress. In this regard, we hope that you will give serious consideration to the thoughts and recommendations of the American Chemical Society, as outlined in the enclosed statement and as delineated above during your Committee's final deliberations on this legislation. If we can be of any further assistance, we would be happy to cooperate.

Sincerely yours,



Glenn T. Seaborg

Enclosures (2)

cc: Members, House Committee
on Interstate and Foreign Commerce

STATEMENT
of
DR. HERMAN S. BLOCH
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
SUBCOMMITTEE ON CONSUMER PROTECTION AND FINANCE
of the
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES
on the
TOXIC SUBSTANCES CONTROL ACT, H.R.7229
Wednesday, July 9, 1975

Mr. Chairman and members of the Subcommittee:

My name is Herman S. Bloch. I am Chairman of the Board of Directors of the American Chemical Society and Director, Catalysis Research, at Universal Oil Products Co., and I appear before you today with the authorization of the Society's Board of Directors to present this statement. Accompanying me today are Dr. Thurston E. Larson, Chairman of the Society's Committee on Environmental Improvement and Assistant Chief and Head of the Chemistry Section of the Illinois State Water Survey; Dr. Donald G. Crosby, a member of the Committee on Environmental Improvement and Professor of Environmental Toxicology at the University of California at Davis and Toxicologist at the California Experiment Station; and Dr. Stephen T. Quigley, Director of the Department of Chemistry and Public Affairs of the American Chemical Society.

Consideration of the Issues

We appreciate being given this opportunity to comment before this Subcommittee on the Toxic Substances Control Act, H.R.7229. It is appropriate that we give this testimony since our National Charter imposes obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement of chemistry in the broadest and most liberal manner, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a nonprofit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is approximately 110,000 individual chemists and chemical engineers, reflecting a broad spectrum in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and nonprofit institutions.

The American Chemical Society, primarily through its Joint Committees on Environmental Improvement and on Chemistry and Public Affairs of the Board of Directors and the Council, has fostered an ongoing consideration of the issues addressed by this legislation. The Society recognizes these issues to be fundamental and vital to the formulation of sound national health and environmental policies, and thus, the Society views regulation of toxic substances as an important factor in the maintenance of the future health and welfare of the citizens of the United States. We believe the views presented here by the American Chemical Society represent a reasonable consensus of the chemical science community.

The American Chemical Society recognizes that the progress achieved during the 93rd Congress by the House-Senate Conference Committee on S.426 is reflected in H.R.7229, and the Society wishes to take this opportunity to commend the efforts of those who served on the Conference Committee. Indeed, the Society is pleased to note the similarities between the House and Senate versions of the Toxic Substances Control Act and hopes the legislation will be enacted by this Congress. The Society believes that the approach to control of toxic substances in H.R.7229 is a sound one, particularly in that it defines to a great extent the context in which the Administrator of the Environmental Protection Agency is required to take action. Thus, in outlining some general considerations and specific recommendations, the Society hopes to bring to your attention improvements to a generally sound piece of legislation.

Relation of Toxicity to Hazard

The American Chemical Society gives strong support to the basic concept of toxic substances control. The Society believes that with proper safeguards new substances can be introduced and used without the threat of significant hazard to human health or to the environment. This can be accomplished only by exercising careful control, based on scientific judgment, over the use of such substances. The Society also supports the concept of pre-use clearance of all materials that are likely to pose a significant hazard, either to man or the environment, based on the properties of the material or the use for which it is intended.

The basic consideration in regulating toxic chemical substances is the hazard to man and the environment, not the inherent toxicity of specific chemicals. As chemists, we recognize that toxicity cannot be treated in a

simplistic fashion. Many substances that are required for good nutrition in small amounts become lethal in larger doses. In addition, hazard is a function not only of toxicity, but also of the degree of exposure. Thus, the hazard of a substance must be evaluated in terms of the amount of material that may be introduced into the environment (rather the total production), the manner of introduction, and the time-duration and level of exposure to the material.

The Society, therefore, recommends that H.R.7229 include more explicit recognition that both human health and environmental effects of chemical substances can be totally different at different exposure levels. This might be accomplished by an insertion in Section 2(b)(1) at line 4 to read "...and the environment as a function of their respective concentrations and that such testing...." Similarly, Section 3(5) might contain an insertion at line 5 to read "...environmental effects of a chemical substance as a function of its concentration, (B)...." It should be recognized that all chemical substances, both those occurring naturally and those prepared synthetically and even those beneficial in normal amounts, are harmful at some level.

While the beneficial intent of H.R.7229 seems clear -- namely, to regulate substances which pose significant hazards to man and the environment -- it might be useful to reflect this intent in the title and body of the bill. The Society's concern is that attention be focused on truly hazardous materials rather than on potentially toxic materials where exposure is minimal, and therefore, hazard is minimal.

Hazards Related to Changes in Form

Since a material which is essentially innocuous in one form may be hazardous in other forms and under other conditions, each new form in which

a product is introduced should be examined for possible changes in hazard related to the change in form. Many substances undergo transformations upon introduction into the environment to form products which may either be more or less toxic than the original substances. Also, the toxicity of a substance may be due to impurities or byproducts associated with a given process or method of manufacture. Therefore, it is important that, within the limits of detection, the true levels of exposure as well as the nature, products, and rates of reaction be ascertained under the expected exposure conditions rather than relying exclusively upon tests performed under artificial or unrealistic conditions.

The authority vested in the Administrator of the Environmental Protection Agency should be flexible enough to allow the Administrator to determine a rational approach in selecting the appropriate degree of regulation, and we believe that the flexibility provided to the Administrator in H.R.7229 accomplishes this to a reasonable degree.

Definition of Human Health

The Society notes the absence of a definition of human health which might profitably be added to Section 3, since it would affect the scope of substances covered by the Act. Were one to be included, the Society recommends the following: "Health is a state of relatively high physical, mental, and social well-being and not merely the absence of identifiable disease or infirmity."

Testing Requirements and Costs

Though the Society fully supports the pre-use clearance of all materials likely to pose significant hazards, exhaustive testing for possible impact on man and the environment is not necessary for every new substance or new form

of a substance proposed to be introduced into commerce. The testing requirements for these substances must be based on the best available scientific evidence in judging any hazard posed. There is a very large body of data available on different classes of compounds, and experts can predict in many cases those chemical substances most likely to pose hazards.

Some testing will require long periods of time before effects may become evident, and in certain cases, there is no general agreement among experts on reliable test protocols for major industrial chemicals. Thus, testing requirements should be reasonable in terms of cost/benefit and should be determined for each specific case, giving due consideration to existing data on closely related compounds and to the uses for which the substance is intended. The high potential benefit to society of a particular substance would justify increased testing costs in order to permit widespread usage. Adequate testing can best be accomplished by developing hazard-testing schemes which provide a high degree of confidence that the substance, as used, presents negligible hazards and which take into account the information already available on related compounds.

With the amount of work to be done, it would be unwise to utilize scientific resources and manpower to conduct extensive tests which scientific judgment indicates would have little chance of providing significant data. Obviously, the development of the best procedures for hazard screening will require a variety of scientific skills. And, in establishing such screening procedures, the Environmental Protection Agency and other federal agencies concerned with this problem should seek to achieve a rational balance between considerations of:

- safety to human health and the environment;
- maintenance of the opportunities for discovery and development of useful new substances;

- and the optimum use of limited facilities and trained manpower which are now available for testing new substances.

Lists of Chemical Substances

The Society has carefully considered the provisions of H.R.7229 requiring (1) the listing of 300 high priority candidates for data development -- Section 4(b); (2) the listing of substances that the Administrator estimates will pose, or are likely to pose, an unreasonable risk to human health or the environment -- Section 5(a); and (3) the inventory of substances manufactured, processed, or imported into the United States -- Section 8(b). With regard to the first listing, the Society sees no scientific basis for specifying that the list contain three hundred chemical substances. While there is no doubt that there are that many substances with unknown health and environmental effects, it might be preferable to allow the Administrator to determine what materials can be given adequate thought and consideration, especially during the first year after enactment. It is obvious that relatively few substances can be tested at any one time due to lack of facilities and therefore, those materials which appear to pose the greatest hazards must be tested first.

The Society supports the provision that, in selecting the materials for testing, the Administrator establish a priority list based on the best available information on the hazards posed to both human health and the environment. If one of a series of closely related substances does not present a hazard to human health or the environment, the Administrator may determine that pre-market testing requirements for others in the series are minimal. If a member of a class of substances is determined to be hazardous, or likely to be hazardous, to human health or the environment,

the Administrator may then require extensive testing of all related materials prior to their introduction into commerce.

The Society is concerned that the third list, the inventory, might become simply a listing of all known chemical substances and, therefore, become nearly impossible to compile and maintain or use. There are nearly a third of a million new compounds synthesized in laboratories each year, but only a few of them are ever important enough to be introduced into commerce. Since this third list is the basis for characterizing new substances, its utility in this regard would be diminished if it were to become a list of all known substances. Thus, substances which have been known for years, but which later become commercially significant, might not be identified as new substances or significant new uses. In any event, the Society hopes that the specific requirements for these lists will not prove to be a significant barrier to agreement with the Senate.

Exemption for Research Samples

The American Chemical Society believes that research and development of new chemical substances should be encouraged, as should the compilation of information relevant to any significant hazards associated with new substances. In order to do so, materials which are synthesized and used solely for research and testing purposes, in our view, should be exempt from clearance prior to experimental use. The Society recognizes the exemption in Section 5(k) given to chemical substances for test marketing purposes, upon a showing of no unreasonable risk, or otherwise as the Administrator considers appropriate. However, we would only emphasize the importance to innovation that research samples distributed for testing and development purposes be exempt. We suggest the following addition to Section 3(12), "...in commercial amounts for commercial purposes." Since temporary or experimental use permits issued during data collection in the case of pesticides have been important because of the lengthy

development time necessary to satisfy those criteria, consideration might be given to doing so here.

Sharing the Costs of Testing

The Society supports the principle that a manufacturer should be required to pre-test new materials for hazards to man and the environment before their introduction into the marketplace, if the requirements for testing utilize scientific resources effectively. However, despite the best application of limited resources, the time and expense involved in testing will still be considerable, and unless adequate provision is made to protect the "pioneer," there will be little or no testing of anything except patentable compounds or products. The Society believes that protection of the "pioneer" is essential. A number of potentially useful products have never been made available to commerce because of their lack of patent protection.

To ensure that compounds other than only patentable ones are tested, the Society has recommended previously that exclusive use certificates valid for a definite period of time be issued to the original applicant, or alternatively, that subsequent applicants be required to share the costs of testing. We are pleased to note that Section 4(c) provides for the sharing of testing costs. However, we believe the provision is not clear with regard to new competitors entering the market after a cost-sharing arrangement has been made.

Independent Panels of Qualified Experts

To deal with inevitable differences of opinion between applicants and the Government, the American Chemical Society recommends provision be made in the law for the participation of panels of qualified scientific experts, independent of parties involved, in the appeal process. There should also be provision for eventual appeal to the courts. Independent experts could also be extremely useful in establishing scientific procedures for hazard evaluation.

The Society would hope that participation of this type could provide a basis for sound scientific judgment, uninfluenced by either public or political pressure.

Availability of Chemical Information

The American Chemical Society believes that the quality of scientific and technical information that would be available to the Administrator of the Environmental Protection Agency is another important consideration. Access to data on the toxicological, carcinogenic, mutagenic, and teratogenic properties of such substances is crucial to the evaluation of the hazards posed by these substances. In addition, information which might provide insight into other properties of these materials -- such as decomposition patterns, byproducts, possible reaction with other compounds prevalent in the environment, etc. -- will necessarily be part of the evaluation of hazards posed. As a major publisher of primary literature and of secondary services -- indexing and abstracting -- in the discipline of chemistry, the Society is willing to cooperate with the Environmental Protection Agency and any other federal agencies concerned with information-handling to ensure the comprehensive compilation, storage, and expeditious access to chemical information.

Confidentiality of Information

The Society believes that an essential safeguard to proprietary rights is the confidentiality of information supplied to the Administrator. Although Section 14 covers this necessity to some degree, additional requirements to ensure confidentiality might be added, particularly if qualified panels of experts are involved in administering the Act.

Relationship to Federal, State, and Local Laws

The Society believes that the principal focus of this Act, in its relationship to other federal laws, should be to provide authority in those areas where other laws provide it only partially or not at all. The specific aspects of Section 9, concerning other federal laws, appear reasonable and balanced.

However, with due regard for the advantages of uniformity, the Society views with some concern the pre-emptive nature of Section 19, despite the possible exemption of local jurisdictions under Section 19(b). The United States is not environmentally homogeneous, and substances tolerable in one part of the country may be damaging in other parts. It might be preferable to provide explicitly for the delegation of enforcement to states and other local jurisdictions that demonstrate, to the satisfaction of the Administrator, that their own laws and regulations will accomplish the purposes of the Act, thereby avoiding the need for such a large federal inspectorate.

Authorization of Appropriations

Section 26 authorizes the appropriation of \$11,100,000 for the implementation of the Act, a reasonable budget for the early stages of such a new program. However, the Society is aware of the recent history of the Environmental Protection Agency where a number of new programs have been initiated within that Agency without authorization to increase the number of personnel. The result has been a continuous reshuffling of staff with the inevitable deterioration of morale and fragmentation of work. Programs of this sort have been necessarily contracted out, which is not wrong in itself, but there has frequently been insufficient manpower even to monitor those contracts effectively.

If the work required by this Act is to be carried out in the manner

prescribed, there will apparently need to be an explicit authorization for enough additional employees to do the work. The Society believes that this increased staff should be highly trained technically, and the Administrator should be able to designate the appropriate number of new employees required.

Summary

In summary, the American Chemical Society strongly supports the need for controlling toxic substances in our environment. The authority vested in the Administrator is substantial. We believe that careful exercise of these powers, based on the best scientific judgment, will allow substances to be introduced into commerce without the threat of significant hazard to human health or the environment and without undue interference to innovation. In compliance with its National Charter responsibilities, the Society would be pleased to identify experts or otherwise cooperate in the implementation of legislation to regulate toxic substances.

TOXIC SUBSTANCES CONTROL ACT

WEDNESDAY, JULY 9, 1975

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON CONSUMER PROTECTION AND FINANCE,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D.C.

The subcommittee met at 10 a.m., pursuant to notice, in room 2322, Rayburn House Office Building, Hon. Lionel Van Deerlin, chairman, presiding.

Mr. VAN DEERLIN. We are resuming this morning our hearings on several bills dealing with regulation of toxic substances. The first witness is Dr. Herman S. Bloch, speaking for the American Chemical Society.

Will you introduce your partners and proceed with your testimony.

STATEMENT OF HERMAN S. BLOCH, PH. D., CHAIRMAN, BOARD OF DIRECTORS, AMERICAN CHEMICAL SOCIETY; ACCOMPANIED BY DONALD G. CROSBY, PH. D., COMMITTEE ON ENVIRONMENTAL IMPROVEMENT, ACS, AND PROFESSOR OF ENVIRONMENTAL TOXICOLOGY, UNIVERSITY OF CALIFORNIA; AND NATHAN J. KARCH, ASSISTANT TO STEPHEN T. QUIGLEY, PH. D., DIRECTOR, DEPARTMENT OF CHEMISTRY AND PUBLIC AFFAIRS, AMERICAN CHEMICAL SOCIETY

Mr. BLOCH. Mr. Chairman, and members of the subcommittee, my name is Herman S. Bloch. I am chairman of the board of directors of the American Chemical Society and director, catalysis research, at Universal Oil Products Co., and I appear before you today with the authorization of the Society's board of directors to present this statement.

Accompanying me today are Dr. Donald G. Crosby, a member of the Committee on Environmental Improvement and professor of environmental toxicology at the University of California at Davis and toxicologist at the California Experiment Station; and Dr. Nathan Karch, assistant to Dr. Stephen T. Quigley, director of the Department of Chemistry and Public Affairs of the American Chemical Society.

Dr. Larson, who was to have been with us today, regrettably was taken suddenly ill in Washington and cannot appear.

Question and Answer Discussion

Mr. VAN DEERLIN. Dr. Bloch, I was interested in some of the things you had to say on page 8 of your statement. As a layman, I was amazed to realize that we are talking about something over 300,000 substances, compounds, a year which might be affected by this legislation.

I don't suppose I had any figure really in mind. But you have urged exemption from the premarket notification procedures of those substances which are used solely for research and testing. Should this exemption also extend to the reporting procedures of section 8 of this legislation?

Mr. BLOCH. What I have to say I must give as my personal opinion, since this has not been considered in the official statement.

Mr. VAN DEERLIN. We won't hold you to anything like that.

Mr. BLOCH. It would be my opinion that chemicals used for purely experimental purposes by professional chemists could be exempted both from the coverage of this act and from the reporting provisions as well. I say this for several reasons.

Professional scientists know the hazards involved. In any sizable organization, safety and hazard controls are major considerations in every research program. The provisions for handling hazardous and potentially toxic substances are generally adequate. If they are inadequate, OSHA makes certain they are corrected, and I do not think that such experimental materials, which have limited exposure even to professional people and others under professional control, constitute hazard either to the general public or to the environment.

Such materials are destroyed in safe manners, in procedures used in most laboratories, when their use is finished. They are made generally in relatively small amounts. The vast majority of them never find their way into channels of commerce, and it would simply multiply the task of EPA without contributing much to the public safety to require that such experimental chemicals be included in this act.

Mr. VAN DEERLIN. The only peril would be to other chemists that might be working on these compounds?

Mr. BLOCH. That is correct, and this peril is normally recognized and dealt with.

Mr. VAN DEERLIN. You suggest that the term "manufacturer" be limited to "manufacturing commercial amounts for commercial purposes." Does this refer specifically to offering them for sale to the general public? What do you mean by "commercial amounts"?

Mr. BLOCH. No, it would include offering them for sale either to the general public or to processors who would convert them to other products. This suggestion was incorporated as a simple way in which to exempt chemicals made for experimental or internal use rather than to be offered for sale to others, or manufactured in large quantities.

Mr. VAN DEERLIN. Ms. Kinney, would you state the additional question you wanted to have covered?

Ms. KINNEY. Dr. Bloch, what if someone manufactured a chemical to sell to, say, a university or a testing laboratory, would you consider that then a commercial chemical and, therefore, subject to the act?

Mr. BLOCH. I would, yes, because chemicals that are manufactured and find their way into supply houses for sale to anyone who wishes to purchase them are often purchased by high school students or people who have home laboratories in their basements, and I think the public should be protected from exposure to such chemicals.

Ms. KINNEY. Thank you.

Mr. VAN DEERLIN. Now, Mr. Brodhead is the author of H.R. 7548, the most recent of the bills introduced on this subject. Would you care to question the witness, Mr. Brodhead?

Mr. BRODHEAD. I wanted to ask Dr. Bloch to comment upon my bill. I know that the bill was introduced relatively recently, and you probably have not had time to do a complete analysis.

Mr. BLOCH. That is correct.

Mr. BRODHEAD. I wondered if anybody has any comments with respect to the particular bill I introduced?

Mr. BLOCH. You are correct in the presumption we have not analyzed it completely. We have a large and heterogeneous organization, and before we can subject one of these bills to proper analysis by the many committees through which it must pass and get a consensus of opinion, we require a considerable length of time.

I have read a comparison analysis of your bill with H.R. 7229, and I note that in many respects the two are similar. I can only say that in our statement we outlined what we considered to be the desirable features to be incorporated in such a bill, and in many respects your bill, like H.R. 7229, incorporates some of these features.

I noted particularly that you do have some exemptions, I believe, for experimental chemicals.

Mr. BRODHEAD. Thank you, and thank you, Mr. Chairman.

Mr. VAN DERMAAN. Mr. McCollister.

Mr. MCCOLLISTER. Thank you, Mr. Chairman. I am sorry I was late. I think someday if we have to reform this Congress we should do something about multiple committee assignments that intrude on a Member's other responsibilities.

Dr. Bloch, it seems to me one of the key issues on the full subject is how to best guide the actions of the Administrator so that his efforts are the most effective that we can make them, to test those chemicals that are truly hazardous and not waste his energies on a wide range of products that pose no substantial risk to health or environment.

It seems also that we must adopt a policy that while inhibiting the introduction to the marketplace of potentially dangerous chemicals, we do not go so far overboard as to discourage the introduction of substances that will be very beneficial to mankind. It is on these two issues, I think, that we, in the conference last year, were hung up, and I think that some difficulty exists in this committee.

Now, your testimony, as I have scanned it, addresses itself to this point. You, in your testimony, recommend a direction of the Administrator's efforts to those potentially dangerous chemicals, and Mr. Eckhardt's bill requires this list of 200 chemicals, but uses the phrase "That the Administrator has reason to believe," seeming to me to vest a whole lot of discretion in the Administrator. That bothers me. What are your comments about it?

Mr. BLOCH. I think you pretty well defined the dilemma which faces any such bill, Mr. McCollister. Any such bill inevitably must vest a great deal of discretionary control in some Administrator. The bill itself, the Eckhardt bill, and I presume the others, requests or states that he should act in a prudent manner, or words to that effect, and we would hope that he would.

To help him, some means must be found of mustering the best scientific, the most knowledgeable advice available. I would hope that the Administrator would set up advisory groups comprised of scientists who either are impartial or whose biases are known and stated, to advise him on such matters.

As we said in our statement, the American Chemical Society, through its committee structures, and with access to over 100,000 professional chemists, is ready to identify experts in the necessary fields and to recommend those who might be of assistance to the Administrator.

I noticed in your bill and in Mr. Broadhead's bill provision is made for advisory committees of one type or another which include scientists, and I would commend this strategy.

Mr. McCOLLISTER. Dr. Bloch's Administrators have been known to act imprudently and unreasonably. We, in previous legislation, and in the bill I have introduced, propose to establish a procedure by which this list of potentially dangerous chemical substances, or rather a rule-making procedure whereby some right of testimony, some right of opportunity to present dissenting views is guaranteed, as opposed to the concept of leaving it to the good sense of the Administrator.

Would you have any comment on those two alternative proposals?

Mr. BLOCH. I personally would prefer the latter, in which objection may be voiced as a matter of right.

Mr. McCOLLISTER. That was the former.

Mr. BLOCH. Was that the former? Excuse me.

Mr. McCOLLISTER. Yes. You tripped me up for a moment.

Mr. BLOCH. However, I recognize that there are an enormous number of substances that must be considered, and this might lead to an endless series of hearings and potentially judicial reviews; however, I think that even so this course is preferable to arbitrary decision.

Mr. McCOLLISTER. Now it is quite likely that the arbitrary decision would be more useful in eliminating every conceivable hazard, and I don't doubt that, but what bothers me on the other side a great deal more is what I think is a likelihood, that the introduction of new beneficial chemical substances would be similarly inhibited because I think we are dealing with a situation where those potential dangerous chemicals are a smaller percentage of the total number that are in use and which will be introduced in time, it seems to me that discretion requires us to formalize a procedure, and it is on that point that I am grateful for your testimony.

Mr. BLOCH. Perhaps Dr. Crosby would care to add to my comments; perhaps the point on which Dr. Crosby might wish to add comments is the relationship of the degree of exposure and the concentration of the material to which there is exposure.

Mr. McCOLLISTER. And the predictability of reaction?

Mr. BLOCH. Yes, predictability of reaction, as against any concept of inherent toxicity which is implicit perhaps in some of the judgments that may be rendered.

Mr. CROSBY. I think perhaps another feature of this is the different impression that a chemist has about chemicals compared to what a layman would have as his definition of a chemical.

Mr. McCOLLISTER. A layman is likely to think that all of you are sorcerers?

Mr. CROSBY. Yes, I suppose that is preferred.

Mr. VAN DEERLIN. Except in California, of course.

Mr. CROSBY. The fact, of course, is that every chemical substance is a chemical and it seems as though there would need to be some specifics of this, more clearly of what is meant when we talk about hazardous materials or hazardous chemicals.

For example, just in the case of crude oil, whether we recognize environmental hazards connected with some of the constituents of crude oil and how does one characterize these constituents?

The same kind of problem is going to, I believe, become more and more extensive, especially in connection with trying to develop means of detecting or analyzing for chemicals in the environment. A chemical that shows some toxic property in the laboratory, under highly ideal conditions, is not necessarily going to exhibit a hazard related to those particular properties once it is released into the environment.

One important feature of this that is recognized now is environmental transformation of the chemical. Some original compounds may have been tested and perhaps found to be toxic and as a matter of fact if one of these chemicals was released to the environment, no toxicity or no hazard might be evident.

We also have the opposite extreme in which a chemical would be tested by a screening procedure and found to be nontoxic, but when released into the environment then would provide an unexpected decomposition, unexpected transformation or accumulation then would make it hazardous.

Mr. McCOLLISTER. Dr. Crosby, that seems to argue against the scientific ability to predict what is going to be dangerous 25 years from now.

Mr. Crosby. Well, at the present time, I think that both chemistry and toxicology as sciences, are rapidly developing means for prediction of what properties, be it physical, chemical, or toxicological, are inherent in certain types of compounds and especially then be able to consider what the chemicals are that are actually in the environment or to which people actually are exposed, but I would have to say that many of those types of information are really in a rather early stage of development and perhaps a means of handling this large volume of chemical or chemicals and chemical data is indeed by a priority system in which the chemicals that we know the most about in terms of hazard or those in which we suspect hazard could be handled in a systematic and thoughtful way and then, as more information and more predictability is obtained, continue the priority listing.

This I believe, is the basis for our statement that we do not see a scientific basis for selecting 300 chemicals for a list, that rather, with some scientific backing, some scientific guidance, the Administrator might more realistically be able to work with a somewhat smaller list at the beginning, a list of chemicals, where we do have some confidence that we know how to judge a hazard.

Mr. McCOLLISTER. Dr. Crosby, could we somehow put a handle on the size of this problem to give, as a percentage of figure, or in some way express how many of all of the new chemical substances that are developed in any year that might come under, and I am thinking of the Senate bill last year where there was to be premarket screening, and I never was able to figure out where it would stop, but what number of predictable hazardous chemical substances is a part of that overall list of new suspect, or however you want to phrase that, chemical substances that might be introduced in the marketplace in a year and I recognize that now uses possibly could be a part of that consideration, too. How big a problem have we?

Mr. Crosby. I don't think there is a reliable way of applying a percentage to the properties of new compounds as they come along. However, I think at the present time there is enough toxicological information to be able to reason, by some analogy, and I think it is presented in the statement here, that by considering those chemicals that we know now to be hazardous or toxic, we have a considerable amount of predictability. The percentage of course would be based on what types of these chemicals are being developed and for what uses. I don't think certainly for me it would be predictable.

Mr. McCOLLISTER. I am afraid that is the same answer I come out with, too. But it has a very real bearing on what kind of policy decision we make on how best to use our resources and how best to avoid the exposure to the public it would have.

I don't have any more questions, Mr. Chairman. Maybe I didn't have any to begin with.

Mr. VAN DEERLIN. Questions or comments?

Majority counsel, Ms. Kinney.

Ms. KINNEY. Dr. Bloch, I have one question for you regarding the premarket notification and premarket screening provisions of the bill. You just finished talking with Mr. McCollister about the priority listing that relates to the testing requirement. The McCollister bill and the Eckhardt bill require that a manufacturer of a new chemical substance or a substance which is going to be used for a significant new use submit certain information to the Administrator prior to the introduction of that chemical into commerce if the chemical had been included on a list which the Administrator has promulgated by rule. The Brodhead bill requires that the manufacturer of all new chemical substances or any manufacturer of a substance for a significant new use shall submit certain basic information to the Administrator. There is no requirements of a listing prior to imposing a premarket notification requirement on the manufacturer. Then the Brodhead bill requires affirmative action by the Administrator before the manufacturer can actually put that product on the market. The Administrator has to approve the chemical beforehand. The Eckhardt and McCollister bills merely require a lack of action by the Administrator.

Now the Senate bill has a third approach, which is to require premarket notification for all new chemical substances but no affirmative action by the Administrator prior to the substance going on the market.

Of those three approaches, which do you think is the most feasible? Which would you prefer?

Mr. BLOCH. Again, I can only give you my personal opinion. My preference would be for the Senate approach. Notification, but no mandatory action by the EPA Administrator. The EPA Administrator, if he had reason to believe that a hazard was involved, could still, under that provision, take the initiative and require that the material, if he suspected it might pose a hazard, be handled in certain prescribed ways so as to minimize exposure of workers or the public.

Mr. McCOLLISTER. Excuse me. Do you want prenotification of all chemicals rather than those on the list?

Mr. BLOCH. Except the experimental chemicals. I assume we are talking about articles of commerce?

Ms. KINNEY. Right. Well, I am not sure of the Senate bill, but both the McCollister and Eckhardt bills deal with only those things which are manufactured for introduction into commerce. I understand your desire is that experimental chemicals be exempted completely.

Mr. BLOCH. Yes; I think this should apply to all chemicals which have not previously been cleared as nonhazardous, because the fact that a new chemical does not appear on the list provides no assurance that it does not embody some hazards.

Mr. McCOLLISTER. What list?

Mr. BLOCH. The list that will have been prepared by the Administrator.

Mr. McCOLLISTER. Under the terms of the Senate bill?

Mr. BLOCH. Under the terms of the Eckhardt bill.

Mr. McCOLLISTER. Oh. Do you visualize there being such a list? That is rather than just all new chemicals?

Mr. BLOCH. Yes; I would think that there would be a list of potentially hazardous materials which are being investigated or for which future investigation is slated as time permits.

Mr. McCOLLISTER. Jane, didn't you say that the Senate bill was everything, or is there a list under that?

Ms. KINNEY. There are different kinds of lists envisioned in Mr. Eckhardt's bill and I am not sure about the Senate bill. I think what Dr. Bloch may be talking about is the list envisioned for setting priorities for establishing testing protocols rather than the premarket notification and premarket screening. Is that correct, Dr. Bloch?

Mr. BLOCH. Yes.

Ms. KINNEY. I have one further question for you. You suggested that advisory panels should be utilized by the Administrator. If advisory panels are utilized, would you recommend that their meetings be open to the public?

Mr. BLOCH. Yes.

Ms. KINNEY. Thank you, Mr. Chairman.

Mr. VAN DEERLIN. Minority counsel, Ms. Nord.

Ms. NORD. Dr. Bloch, H.R. 7518 goes on to require that the Administrator review all chemical substances subject to the act that are on the market over the next 5 years and formulate some opinion as to the toxicological effect of the chemicals. Do you have an opinion on that provision?

Mr. BLOCH. I think it is unrealistic. I think that it would take the entire chemical community to do a job like that in 5 years.

Ms. NORD. One further question. Section 10 of H.R. 7664 would establish a chemical review board made up of scientists from the academic community and industry, and to which the Administrator would submit information before he acts under sections 4, 5, and 6. Do you have an opinion as to whether this sort of review board would be a helpful device?

Mr. BLOCH. Yes; I believe it would be.

Ms. NORD. Thank you.

Mr. VAN DEERLIN. Any further questions?

Mr. BRODHEAD.

Mr. BRODHEAD. No.

Mr. VAN DEERLIN. Mr. McCollister?

Mr. McCOLLISTER. No.

Mr. VAN DEERLIN. Thank you, Dr. Bloch and also we thank your associates.

Mr. VAN DEERLIN. Our next group will be an environmental panel of Dr. Fritsch, director of the Center for Science in the Public Interest here in Washington, Ms. Linda Billings of the Sierra Club, Ms. Jackie Warren, Environmental Defense Fund, and Mr. J. G. Speth of the Natural Resources Defense Council.

Who is going to captain the team? Ms. Billings?

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4600

Glenn T. Seaborg, *President*

May 28, 1976

The President
The White House
Washington, D. C. 20500

Dear Mr. President:

The American Chemical Society strongly urges the development of a coherent and realistic national energy policy and its implementation as a matter of high national priority. The foundation for such an energy policy should be (a) the definition of our national energy requirements, and (b) the establishment of definite programs, including research and development, with appropriate timetables for meeting those requirements. Inherent in such a policy should be an equitable balance of energy conservation with the development of adequate energy sources through a judicious application of science and technology.

The American Chemical Society pledges its scientific and technical resources to assist in the development and in the implementation of such a national energy policy.

Sincerely yours,



Glenn T. Seaborg





American Chemical Society

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4600

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May 28, 1976

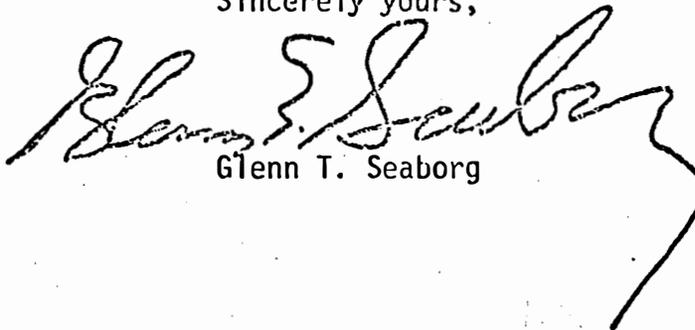
The Honorable Mike Mansfield
Majority Leader
United States Senate
Washington, D. C. 20510

Dear Senator Mansfield:

The American Chemical Society strongly urges the development of a coherent and realistic national energy policy and its implementation as a matter of high national priority. The foundation for such an energy policy should be (a) the definition of our national energy requirements, and (b) the establishment of definite programs, including research and development, with appropriate timetables for meeting those requirements. Inherent in such a policy should be an equitable balance of energy conservation with the development of adequate energy sources through a judicious application of science and technology.

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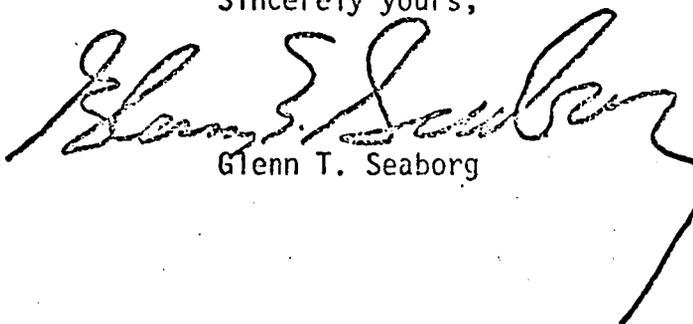
The Honorable Carl Albert
Speaker
United States House of Representatives
Washington, D. C. 20515

Dear Congressman Albert:

The American Chemical Society strongly urges the development of a coherent and realistic national energy policy and its implementation as a matter of high national priority. The foundation for such an energy policy should be (a) the definition of our national energy requirements, and (b) the establishment of definite programs, including research and development, with appropriate timetables for meeting those requirements. Inherent in such a policy should be an equitable balance of energy conservation with the development of adequate energy sources through a judicious application of science and technology.

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Sincerely yours,



Glenn T. Seaborg





American Chemical Society

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
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Glenn T. Seaborg, *President*

May 28, 1976

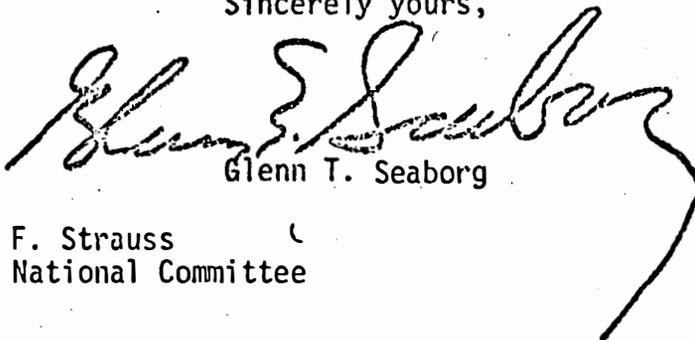
The Honorable Wendell R. Anderson
Chairman
Democratic Platform Committee
1625 Massachusetts Avenue, N.W.
Washington, D. C. 20036

Dear Governor Anderson:

The American Chemical Society strongly urges the development of a coherent and realistic national energy policy and its implementation as a matter of high national priority. The foundation for such an energy policy should be (a) the definition of our national energy requirements, and (b) the establishment of definite programs, including research and development, with appropriate timetables for meeting those requirements. Inherent in such a policy should be an equitable balance of energy conservation with the development of adequate energy sources through a judicious application of science and technology.

The American Chemical Society pledges its scientific and technical resources to assist in the development and in the implementation of such a national energy policy. We strongly recommend that this issue be given serious consideration by your Committee in the development of the Democratic Party Platform.

Sincerely yours,



Glenn T. Seaborg

cc: The Honorable Robert F. Strauss
Chairman, Democratic National Committee





American Chemical Society

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4600

Glenn T. Seaborg, *President*

May 28, 1976

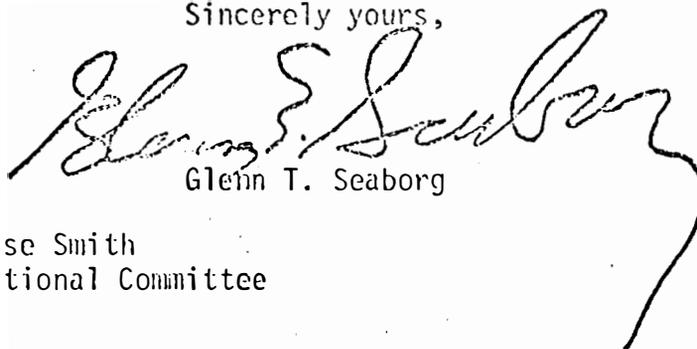
The Honorable Robert D. Ray
Acting Chairman
Republican Platform Committee
310 First Street, S. E.
Washington, D. C. 20003

Dear Governor Ray:

The American Chemical Society strongly urges the development of a coherent and realistic national energy policy and its implementation as a matter of high national priority. The foundation for such an energy policy should be (a) the definition of our national energy requirements, and (b) the establishment of definite programs, including research and development, with appropriate timetables for meeting those requirements. Inherent in such a policy should be an equitable balance of energy conservation with the development of adequate energy sources through a judicious application of science and technology.

The American Chemical Society pledges its scientific and technical resources to assist in the development and in the implementation of such a national energy policy. We strongly recommend that this issue be given serious consideration by your Committee in the development of the Republican Party Platform.

Sincerely yours,



Glenn T. Seaborg

cc: The Honorable Mary Louise Smith
Chairman, Republican National Committee





American Chemical Society

OFFICE OF THE
PRESIDENT

1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036
Phone (202) 872-4800

Glenn T. Seaborg, *President*

May 28, 1976

The Honorable George H. Mahon
Chairman
Committee on Appropriations
House of Representatives
Washington, D.C. 20515

Dear Congressman Mahon:

The American Chemical Society believes it is vitally important that the United States maintains its capacity for increasing our knowledge of chemistry and those other sciences which, in applied form, provide the basis of our industrial economy.

The Society therefore supports without any disproportionate reduction the Administration's Fiscal 1977 recommended budget for the National Science Foundation (NSF). This budget provided a significant increase in research in mathematical, physical science and engineering; astronomical, atmospheric, earth and ocean sciences, and biological, behavioral and social sciences. Exploratory research of this type yields the new knowledge on which advances in applied science and technology depend. The Fiscal 1977 budget is the first to propose an increase in the support of these research activities by NSF after a lengthy period in which annual increases were smaller than the increased costs due to inflation.

This country and the world are faced with diminishing material resources of all kinds (for example, food, fuel and minerals) which are necessary for the well being of the world population. In view of the importance of new knowledge in the solution of societal problems and in ensuring the growth of our economy, it is important that the United States maintain and improve its pioneering role in science and engineering. The Fiscal 1977 budget of the NSF provides an opportunity to take a step which partially restores federal support of research in the physical sciences to earlier levels. We recommend this action as being in the national interest as well as in the interest of peoples throughout the world who look to us for scientific and technological leadership.

Sincerely yours,



Glenn T. Seaborg

cc: **Members**, House Committee on Appropriations
Identical letters were sent to the Chairman and Members,
Senate Committee on Appropriations.



STATEMENT
of
DR. KURT M. DUBOWSKI
on behalf of the
AMERICAN CHEMICAL SOCIETY
to the
OFFICE OF THE ASSISTANT SECRETARY FOR HEALTH
UNITED STATES DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
on the
PROPOSED STANDARDS FOR PERSONNEL IN CLINICAL LABORATORIES
July 21, 1976

Your Honor:

My name is Kurt M. Dubowski. I am Chairman of the American Chemical Society's Committee on Clinical Chemistry, and appear before you with the authorization of the Society's Board of Directors to present this statement. Accompanying me today is Dr. Stephen T. Quigley, Director of the Society's Department of Chemistry and Public Affairs.

We appreciate the opportunity to respond to the request for comments and recommendations regarding the proposed standards for personnel in clinical laboratories, under consideration by the Office of the Assistant Secretary for Health of the Department of Health, Education, and Welfare. It is appropriate that we give this testimony since our National Charter imposes obligations on the Society to provide assistance to the Government in matters of national concern related to the Society's areas of competence and also to work for the advancement, in the broadest and most liberal manner, of chemistry, "thereby fostering public welfare and education, aiding the development of our country's industries, and adding to the material prosperity and happiness of our people."

Founded in 1876, the American Chemical Society was chartered as a non-profit, scientific and educational organization by an act of Congress which was signed into law on August 25, 1937. Current membership in the Society is about 110,000 individual chemists and chemical engineers, reflecting a broad spectrum of engagement in academic, governmental, and industrial professional pursuits. Chemical or other companies are not eligible for membership. About 60% of our members are employed by industry, about 25% by academic institutions, and 15% by government and non-profit institutions.

The Society primarily through its Board Committee on Clinical Chemistry, has a long-standing active interest in the qualifications of clinical laboratory personnel, especially of those working in the field of clinical chemistry, and has been involved in the establishment and periodic enhancement of qualifications for such personnel for several decades. A copy of our current position paper "Principles of Legislation for Regulation of the Practice of Clinical Chemistry" is attached. We are also a sponsoring organization of both the American Board of Clinical Chemistry and the National Registry in Clinical Chemistry. The Society endorses the intent of the proposed Standards for Personnel in Clinical Laboratories and particularly the planned extension of those Standards to the clinical laboratories of hospitals. We support also the policy of promulgating a single appropriate set of criteria to be uniformly applicable to clinical laboratories in various settings. The proposed Standards are in substantial agreement, in most applicable regards, with the Society's "Principles of Legislation for Regulation of the Practice of Clinical Chemistry."

The following comments are offered on certain of the proposed specifications for Laboratory Personnel Standards:

1. *"Condition I - Laboratory Director."*

The American Chemical Society endorses and supports the continued recognition of certification by the American Board of Clinical Chemistry as one alternate

designated pathway for establishment of clinical laboratory director qualifications.

2. *"Condition II - Laboratory Supervisors."*

The Society recommends that provision be made under the Qualifications Standard for Technical Supervisor in Clinical Chemistry (IIb.12), for persons who possess at least a bachelor's degree in chemical science from an accredited institution and are certified by the National Registry in Clinical Chemistry at the "Clinical Chemist" level.

The Society suggests that the proposed standard for Technical Supervisor Qualifications in Clinical Chemistry (IIb.12) be amended to read:

"12. Clinical Chemistry: Has at least an earned master's degree in a *chemical science* from an accredited institution, or is a physician, and subsequent to graduation has at least 4 years of experience in clinical chemistry, or has at least an earned bachelor's degree in a chemical science from an accredited institution and subsequent to graduation has at least 6 years of experience in clinical chemistry."

A parallel alternative is contained in IIb.14(vi).

The Society also would like to point to an apparent inconsistency in the experience requirement specified under IIb.14(iv), Radiobioassay. As published, this section calls for only one year of experience. In each of the other categories of IIb.14 the experience level required is at least equivalent to that specified for individuals who qualify under sections IIb.7 through IIb.13. For consistency the requirement specified under IIb.14(iv) should read "a minimum of 4 years experience in radiobioassay."

These qualifications for Technical Supervisor in Clinical Chemistry would then closely follow both the Society's "Principles of Legislation for Regulation of the Practice of Clinical Chemistry," and with the current "Standards for Certification" for clinical chemists of the National Registry in Clinical

Chemistry, a copy of which is appended.

3. *"Condition III - Technical Personnel."*

The current "Standards for Certification" for Clinical Chemistry Technologists of the National Registry in Clinical Chemistry coincide fully with the Assistant Secretary's proposed Standards for Technologist Qualifications (IIIb.2). Therefore, the Society recommends an additional alternative be added in IIIb, viz:

Is certified by the National Registry in Clinical Chemistry at the "Clinical Chemistry Technologist" level.

This opportunity to participate in the development by the Department of Health, Education, and Welfare of regulations relating to personnel standards in clinical laboratories is greatly appreciated by the Society and its membership, and we stand ready to assist in any way possible in further steps in the development of these regulations.

- Attachments: (1) "Principles of Legislation for Regulation of the Practice of Clinical Chemistry," American Chemical Society
(2) "Standards for Certification 1976," National Registry in Clinical Chemistry



AMERICAN CHEMICAL SOCIETY

Principles of Legislation for Regulation of the Practice of Clinical Chemistry

Revision of September 1970

1. The primary objective of legislation to regulate the practice of clinical chemistry is protection of the public health. Desirably, this should be accomplished by licensing or otherwise regulating professional personnel and by granting operating permits to clinical laboratories whose staffs comply with generally accepted standards of training and performance.

2. Protection of the public health by regulation of scientists or laboratories providing health services involves several disciplines in addition to chemistry; therefore, legislation should encompass these fields as well.

3. The need for specialization in single fields of science should be recognized and encouraged. A scientist should be required to qualify only in those fields in which he seeks a license.

4. For purposes of licensure, clinical chemistry may be defined as the application of chemical science to materials derived from the human body in order to provide factual data to authorized persons for the purpose of making a diagnosis, preventing or treating a disease, or otherwise assessing a medical condition. Since the performance of a chemical examination is an action separated from the application of the result by a practitioner of the healing arts, the practice of clinical chemistry is not the practice of medicine and should not be so construed.

5. Since the practice of clinical chemistry requires the exercise of independent judgment, the issuance of a license authorizing such practice should be based on good character and high standards of professional competence. Competency should be demonstrated by satisfactorily passing an impartial examination in clinical chemistry science and technology.

6. A majority of the members of a board for establishing competence of candidates for licensure should

consist of scientists representing the several laboratory sciences related to health, but principal responsibility for examining the qualifications of candidates in a given laboratory specialty should reside with individuals competent in that field.

7. It is generally recognized that the practice of clinical chemistry occurs at three distinct levels, depending upon the extent of academic training, laboratory experience, and competency in general and specific laboratory techniques. In addition to high standards of moral character, practitioners should possess the following minimal qualifications at each level:

a. **Director:** (1) an earned doctorate from an accredited institution with a major in some branch of chemical science or a doctorate in medicine; and (2) certification by the American Board of Clinical Chemistry, or, subsequent to receiving the doctorate, the acquisition of four or more years of pertinent laboratory training and experience, no less than two of which should be principally in clinical chemistry.

b. **Supervisor:** (1) a bachelor's degree with a major in chemical science from an accredited institution; and (2) six years of pertinent laboratory training and experience, no less than two of which should be in clinical chemistry. For holders of a master's degree in chemical science, the requirement for pertinent laboratory experience should be four years, and two years for those with an earned doctorate in chemistry.

c. **Technologist:** (1) a bachelor's degree from an accredited institution with a major in chemical science; and (2) at least one year of practical experience as a clinical chemistry technician or trainee.

It is recognized that lower classifications occur among clinical laboratory workers, but such classifications would not ordinarily apply to professional chemists.

In order to provide for the orderly implementation of new regulations without impairing the availability of

clinical chemistry services, provision should be made for waiver of the respective academic requirements for any person who holds a minimum of a bachelor's degree with a major in chemical science and, within one year of the date such regulations become effective, submits proof that he has been practicing clinical chemistry as a director or supervisor for a period of at least four years.

8. Provisions should be made for waiver of examinations for persons already qualified in another state, providing that requirements for licensure in that state are at least equivalent to those of the state in which licensure is requested.

9. Licensure should be required for all practicing clinical chemists, including those in the employ of federal, state, or municipal governments and those employed by physicians to perform tests on the physician's own patients, but not for those clinical chemists whose work consists exclusively of teaching or research.

10. Licensure as a clinical chemist shall convey authority to practice in a clinical chemistry laboratory and to collect blood and remove stomach contents upon authorization by a physician or other person with authority granted under any provisions of law.

11. Since physicians and others authorized by law to use clinical laboratory data should be fully informed as to the nature of determinations available from a clinical laboratory, regulations should not proscribe the free dissemination to them of information concerning such services.

12. As a condition of licensure, clinical laboratories should be required to participate in a recognized proficiency testing program. Laboratories should be required to be tested only in those procedures or categories of procedures for which a license application has been filed.

13. Clinical laboratories to be licensed should maintain an adequate system of quality control.

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Some information on the national program
to certify clinical chemists and
clinical chemistry technologists . . .

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American Society of Clinical Pathologists

January 1, 1976

PURPOSES AND CERTIFICATION PROGRAM

The need to identify chemists and technologists qualified by education and experience to provide essential health services of a chemical nature in the nation's clinical laboratories is well recognized. It was primarily in response to this need that the National Registry in Clinical Chemistry was organized in 1967. Its objective is to provide an annual evaluation of clinical laboratory specialists in the chemical field who voluntarily present their credentials to the Registry, and to certify persons who meet the Standards for Certification.

The Registry is a non-profit organization incorporated in the District of Columbia. Its sponsors include all major organizations in the United States known to have a direct interest in the field of clinical chemistry (see cover). Each of these organizations periodically nominates individuals to the Registry's governing board.

As a reflection of views held by the sponsoring organizations and in line with state and national standards for clinical laboratories, the Registry grants certification at two levels, namely, "Clinical Chemistry Technologist" and "Clinical Chemist". The category of "Clinical Chemistry Technologist" is designed primarily for applicants with recent bachelor's or master's degrees in chemistry or for those with academic degrees in other disciplines who regularly perform clinical chemistry determinations. The category of "Clinical Chemist" exists for more experienced graduates who have majored in chemical science and who are active in the field of clinical chemistry.

The responsibility for evaluating applicants is vested in the Credentials Committee of the Registry, assisted by practicing clinical chemists and academic faculty members throughout the United States.

Annually, the Registry compiles and publishes a directory of all individuals who have been certified for the current year. Such registrants are supplied with a copy of this directory at no cost. Other controlled public distribution of the directory also may be made from time to time. Additionally the Registry will serve as a reference acknowledging the credentials of registrants to designated individuals, including current employers.

Interested persons should complete and return the attached request form.

STANDARDS FOR CERTIFICATION 1976

Section 1. General

- a. Applicants must be of good moral character and of high ethical and professional standing.
- b. Certification is limited to residents of the United States or its territories and possessions.
- c. Applicants submitting foreign credentials may be requested to provide credential evaluation by an acceptable evaluation service or organization.
- d. Applicants who also meet the requirements described in Section 2 will be admitted to an examination designed to test their knowledge of both the fundamental and practical aspects of clinical chemistry. Examinations are given twice a year at locations geographically convenient to the applicants.
- e. Certificates are valid for the calendar year for which they are issued and may be renewed upon reapplication; in exceptional circumstances, applicants for renewal may be required to take an examination. Renewal applicants seeking upgrading of their certification level will also be subject to examination and fees therefor.
- f. Certificates are not transferable.
- g. Applicants who are denied certification may appeal this action to the Board of Directors within sixty days after the issue date of such notification.

Section 2. Levels of Certification

- a. **Clinical Chemistry Technologist**
 - (1) Applicants for certification as a Clinical Chemistry Technologist must possess a minimum of a bachelor's degree in chemical science or a closely related discipline from an institution acceptable to the Registry, including at least 16 semester hours (24 quarter hours) of appropriate college level studies in chemistry.
 - (2) Applicants also must have acquired a minimum of one year of acceptable experience in clinical chemistry subsequent to attaining the bachelor's degree. Such experience must have been acquired during the five years immediately preceding the date of application.
 - (3) Applicants otherwise eligible for certification as a Clinical Chemistry Technologist who do not meet the requirements of Standard 2.a.(2) may be admitted to examination, provided they make proper application to the Registry, pay the prevailing examination fee, and request final consideration of their application, including payment of the application fee, when they are in compliance with Standard 2.a.(2).
- b. **Clinical Chemist**
 - (1) Applicants for certification as a Clinical Chemist must possess a minimum of a bachelor's degree in chemical science or in a closely related discipline from an institution acceptable to the Registry, including at least 32 semester hours (48 quarter hours) of appropriate college level studies in chemistry.
 - (2) Applicants also must have acquired a minimum of six years of acceptable experience in clinical chemistry subsequent to attaining the bachelor's degree. At least one year of such experience must have been acquired

during the five years immediately preceding the date of application. Graduate education in chemistry or a closely related discipline may be substituted for the required experience on the following basis:

- (a) Master's degree: two years (only one Master's degree will be accepted as substitute).
- (b) Earned doctor's degree: four years.
- (3) Applicants otherwise eligible for certification as a Clinical Chemist who do not meet the requirements of Standard 2.b.(1) may be admitted to examination, provided:
 - (a) They possess a minimum of a bachelor's degree from an institution acceptable to the Registry, including at least 16 semester hours (24 quarter hours) of appropriate college level studies in chemistry;
 - (b) They have accumulated six or more years of acceptable experience in clinical chemistry subsequent to receipt of such degree;
 - (c) The number of years of such experience in excess of six when added to the number of semester hours in chemistry totals at least 32.

Section 3. Fees

- a. An application for certification by the Registry must be accompanied by an application fee of \$30.00.
- b. Applicants who are admitted to examination will be charged an examination fee of \$40.00.
- c. If an applicant fails his examination, he may apply within one year for re-examination upon payment of a re-examination fee of \$40.00.
- d. If an applicant fails his re-examination, he may apply for re-examination after a year upon payment of a re-examination fee of \$40.00 and a handling fee of \$10.00.
- e. Certificates may be renewed upon reapplication and payment of a renewal fee of \$15.00. In the event applicants for renewal are required to take an examination, they will also be charged an examination fee of \$40.00.
- f. Fees are not refundable, except in those instances in which the applicant withdraws his application prior to transmittal to a Credentials Committee. In such cases, a refund of \$10.00 will be made, and any subsequent re-application will be subject to the fees described in Sections 3.a., 3.b. and 3.c.

Section 4. Denial or Withdrawal of Certification

- a. The right to deny certification is reserved.
- b. Certificates granted by the Registry may be suspended, their surrender requested, or they may be revoked for any of the following reasons:
 - (1) A misstatement or misrepresentation in an application for certification or in any other communication to the Registry, the correction of which would render the individual ineligible for certification.
 - (2) Conviction by a court of competent jurisdiction, while an applicant for certification or holder of a certificate, of a felony or of any crime involving moral turpitude.
 - (3) Issuance of a certificate contrary to or in violation of any of the rules, laws, or regulations governing the Registry at the time of certification.No adverse action concerning a certificate will be taken by the Registry without providing the individual involved at least thirty days advance notice of the charges and an opportunity to be heard.

National Registry in Clinical Chemistry
1155 Sixteenth Street, N.W.
Washington, D. C. 20036

Please send me _____ application(s) for certification by the National Registry in Clinical Chemistry. My name and address are: _____

Name

Street

City

State

Zip

Date