

STATEMENT

Mr. Chairman, Ladies and Gentlemen:

*Little of Pa.
at invitation of Bob O'Connor
U.S. Steel
Meeting of President's
Committee on Education*

I am Robert A. Kehoe, Bachelor of Science, and Doctor of Medicine, lately having retired from the Professorship and the Headship of the Department of Preventive Medicine and Industrial Health, of the College of Medicine of the University of Cincinnati.

I became a member of the Faculty of the Department of Physiology of this Medical School in 1921, and later, as an Associate Professor, carried out experimental work therein, which resulted in the founding of the Kettering Laboratory of Applied Physiology in 1930. With the amalgamation of the Laboratory with the Department of Preventive Medicine in 1948, the Department indicated above came into being, and persisted until my retirement in 1964, since which time, I continue to work and teach within the same group of investigators and teachers, now renamed the Department of Environmental Health, as Emeritus Professor of Occupational Medicine.

My own principal work, both in experimentation with a group of colleagues and technical assistants and in the practice of Occupational Medicine, has been concerned with the physiology and toxicology of trace and heavy metals, with particular emphasis upon the metabolism of lead in the human body under a variety of normal and abnormal conditions, and the relationship of these matters to the prevention and therapy of lead poisoning. A fairly large number of other potentially harmful substances has been investigated by individuals and groups in the Kettering Laboratory. In addition to my direction of, or participation in, a variety of such experimental investigations, inside and outside of American and, in a few instances, foreign industrial plants, and in certain remote areas of the earth, I have served as consultant to a number of industrial organizations, and governmental officials and agencies, and have participated in the affairs in international professional organizations. While continuing to fulfill academic responsibilities in the

University, I served as Medical Director of Ethyl Corporation for thirty-three years, and as a consultant to that Company afterward until the present time.

One of the early and persistent concerns of the Kettering Laboratory, during the period of my direction of its affairs, had to do with the pollution of the land, the waters, the atmosphere, and the involved population of the United States and, to a lesser degree, that of certain other European countries, with waste materials of industries and municipalities, as such materials have been distributed, scattered about, and occasionally disposed of effectively. The main effort of the Laboratory, in the past, beginning with its founding, formally, in 1930, has been to investigate problems of human health derived mainly from industrial operations and materials, both those involving industrial employees and people in the general population of industrial cities into which products of combustion and other effluent materials have escaped in the neighborhood of industrial operations or of vehicular traffic, or have been transported into more distant regions by winds and waters, and by commercial vehicles. Such investigations, for the most part, were carried out by the Laboratory at the expense of the industries or municipalities involved, or of local, regional or federal governmental agencies.

I wish to call emphatic attention, with a modest degree of professional pride, to this feature of the work of the Kettering Laboratory, as one, but only one, example of responsible investigations, without which we, as a people, shall hardly succeed in accomplishing the task before us. The cynicism of the times, with respect to investigations conducted by University personnel under University policies, by means of industrial or other third party financing, is unworthy of a one-time fearless and fair-minded people. We shall have to rise above such petty and juvenile attitudes, if our universities are to fulfill the role which they should in the practical and intellectual life of our people. It is neither necessary nor true that human integrity can persist only when there is no opportunity or temptation to deviate from a thoroughly

honest performance of public duties. Moreover, neither the monastery, nor the ivy-covered walls of an innocent Academe, can preserve the truth and honor of weaklings or grasping servants of mammon or personal ambition.

Beginning in the year 1947, the Laboratory became the center in the University of Cincinnati, of graduate, professional education and training, of, first, doctors of medicine and, a little later, engineers (and certain other accessory professional personnel) in the practice of medical and technical industrial hygiene. In recent years, a greater variety of graduate training has been extended to qualified persons entering various practical fields of Environmental Health, as well as those seeking careers in toxicology and epidemiology.

This somewhat elaborate introduction of myself and the Kettering Laboratory, to those responsible for this meeting, and to those in attendance, is intended to convey some idea of the period of time during which certain significant problems of Occupational and Environmental Health have been under consideration and systematic investigation in the United States, as well as some insight into the role of education in preparation for competent professional service in the closely related fields of Occupational and Environmental Health. This is not to suggest that the staff of the Kettering Laboratory, in the University of Cincinnati, has worked alone in this field of investigation and education, but only that it was among the first in American institutions of learning, devoted, primarily, to this area of human health and disease. Other persons, professional groups, in Universities, other organizations, and in governmental agencies, unfortunately too few in number, have entered this field during the past four decades, and have extended the knowledge and practice of the medical and engineering procedures of industrial hygiene, which, more than any other group of scientific and professional disciplines, represent the body of theory and practice of environmental appraisal and control. There is not, therefore, a vacuum of pertinent knowledge and technical competence, on which to base the attack upon the group of

toxicologic, biological and technical problems derived from the pollution of the air of work places or that of entire communities or parts of communities which now bear the brunt of the rapid and amazingly productive but inadequately supervised and controlled applications of technology in American life.

One aspect of this matter deserves brief comment, since it is a crucial issue. The shortage of physicians in the United States has brought serious attention, and, in certain quarters, severe criticism, upon physicians and their principal medical organization, and also upon medical education. This is not the time or place for a just and critical appraisal of the physicians of our time, and on the merits or demerits of medical education. Nevertheless, it should be said, pointedly and intentionally, that the number of physicians engaged in the investigational or practical performance of both Occupational and Environmental Medicine, is woefully small. So small, indeed, is this number, that the principal problems which stem from technology (which has indeed come to represent the basic mechanisms of our national life) are not within the scope of present day medical training and comprehensive medical investigation in this country. The most unfortunate aspect of this situation lies in the fact that the effort to deal effectively with these problems must, apparently, be made without benefit of the full assistance of physicians, who should be the most knowledgeable group in the country concerning the effects of the modern environment upon the health of our people. One may ask, in futility, how satisfactory understanding and control of environmental factors are to be achieved, without medical surveillance, based upon the best medical and biological information which can be had. This function really is only served, in the first instance, by the acute and persistent efforts of well-trained physicians, regardless of the availability of sophisticated instrumentation to record or to augment their observations.

I. THE PRESERVATION AND RESTORATION OF THE ENVIRONMENT

There are, in reality, two distinct approaches and groups of persons involved in modern concepts of the protection or the restoration of our environment, whether in the urban, rural or remote areas of the country. The one is concerned with the preservation of our natural resources, as well as the beauties and untold delights of unspoiled, as well as primitive America, for the benefit of present and future generations of mankind. The other is concerned with the prevention of the injurious effects of natural and artificial substances, including the residual materials, by-products, combustion products and wastes, which result from the use (or misuse) of the materials of the earth, seas and skies, upon mankind.

These two are (or may be) very different concepts, and to a large extent, they should not be dealt with by the same types of people. There is, for example, a present awareness, in at least some people, of the social significance, at present or in the future, of the preservation of various species of plants or animals, and unspoiled, historical and wilderness areas in their present status. Certain primitive areas of this land have been dedicated in perpetuity, through governmental actions, to remain unchanged. Seemingly, few people, even or, perhaps, especially, in official circles, realize what is required of human behavior in order to carry out this wise purpose, and thus far, it must be said that, as a rule, such areas are destined to remain in their natural, primitive state, only so long as they are not too obviously exploitable resources for the cultivation of the wealth, comfort or defense of our people. Here, generally, the alternative to the exploitation of a natural resource, lies in the preservation of ultimately educational, purely scientific, recreational, or asthetic values, which ought not to be denied to subsequent generations of men. This definitely does not mean that access to them should be made easier. Rather, their remoteness must be maintained against the insistent customs of our mobile society for congregating in ease and comfort, and their penchant for littering and otherwise destroying the

beauty and natural order of their surroundings.

The other concept, which, I believe somewhat reluctantly, is the more imperative of the two, in relation to the lives of men, is that of providing for the healthy survival of living things which are endangered by the presence in the lands, in the waters, and in the gaseous envelope of the earth, of substances and physical forces which are harmful, whether they occur naturally or artificially in sufficient concentrations in the environment to exert toxic or otherwise injurious effects, when brought into contact with, or absorbed by plants and animals, and men, women, or children. This undertaking presents a whole series of medical and technical problems, which can be dealt with only by medically and technically trained persons, in an effort to learn hastily through research, and through trial and error, what should have been learned long ago, as the need for information of a biological type became apparent (to those with the necessary vision to see).

The significant facts of this situation are that an amazingly effective technologic production has furnished to a very large segment of American society a scale of living largely free of drudgery, comfortable, actually luxurious beyond the imagination of earlier peoples. That this national affluence was not diffused throughout the entire American society, and that not all of its effects were beneficial is unfortunate, but not surprising. Its principal defect, from the aspect of the problems under consideration at this meeting, may be found in the almost utter failure of technologic and political leaders to call upon physicians and scientists to determine the biological properties of materials being exploited for use, and to explore the injurious potentialities of situations in the making, so as to prevent dire consequences to industrial employees in the production and distribution of the commodities of industry, as well as to the consumers of unsatisfactory products. In retrospective consideration of the productive record of industry during past decades, the failure to appreciate the need for toxicological, biological and medical information

as a regular concomitant of the astounding accumulation of chemical and physical knowledge over the years, seems incredibly short sighted. By the same token, the failure of the growing body of biological and medical knowledge to find application in an intelligent society of doers and thinkers, seems as shocking as it is surprising. We must come to the conclusion that our people who are vested professionally with the responsibility for the health and welfare of our people, have not been alerted to environmental threats, and that our technologists have not had anything like a comprehensive grasp of the broad world of technology, which includes information concerning biological phenomena. In fact, most of the persons within the galaxy of the discrete disciplines of applied science have been so intent upon their own acts, as to be oblivious to the activities in other fields. In like measure, a large proportion of technologists versed in the applications of the physical sciences, have been concerned with expanding their own fields of knowledge, and so preoccupied with their individual and combined contributions to the gross national product of the nation, as to be remarkably devoid of other effective knowledge which would enable them to find application for it in the course of the day's work. Thus, in hindsight, it is now easy to lay the blame for our environmental hazards, as most of us are prone to do in any difficulty, upon the leaders in various fields of our national life. However, the truth is that all of our people, who so proudly claim their share in the good things which come from their governance, are the dolts and villains in this bit of human folly. In the automatic sense, in which no great intellectual competence is involved, it is the people, collectively, who are responsible for pollution, for it is due, largely, to ordinary acts of man, and its proportional component due to human acts, rather than to natural phenomena, grows with increase in the population. For example, a few fires for destroying combustible trash, or for providing heat in the household, contribute little to the quantity of combustion products in the surrounding air, but a million chimney-pots in London, or in any other limited space, may so befoul

the air, under appropriate climatic conditions, as to make it lethal for certain of those who must breathe it. Likewise, a few automobiles operating in a town or city, contribute merely to ease and comfort in the transportation of people, but six million automobiles, in topographically unfortunate Los Angeles, render imperative the curtailment of their numbers, or the radical alteration of their operation. It is a sobering thought, or should be, that the numerous people in localized areas of the world, many in our own country included, are responsible basically for degradation of their own environment. For all of us build fires for a variety of purposes and in various places; most of us drive automobiles, which, sometimes, we keep in good operating condition; many of us litter our surroundings with various types of debris. Indeed, none of us, until the rude awakening, early or lately, to the fact that all is not well in American life, have questioned seriously the competence of science, technology and hard work, in shaping our environment or the pattern of our lives and those of our children. We have acted as though our space, our resources and their adaptability to change were infinite, and that the living things which are dependent upon our part of the earth for sustenance - that they too, including ourselves, were also infinitely adaptable to all circumstances. And certainly, the desensitizing, brutalizing and grossly dehumanizing influences of our almost continuous participation in international wars and their aftermath, throughout most of this century, has not contributed to the enlightened thought which might otherwise have accompanied the pursuit of comfort, wealth and power through technology. We shall not succeed in locating those in our society who have perpetrated this gross lapse of vision and judgment upon us. All of us but a negligible proportion, have shared in the guilt - if that is not too harsh a term to apply to preoccupation with other affairs. We have been caught up, unawares, in the midst of activities influenced by the abundance and variety of American life, to such an extent as to have given little thought to its unequal quality on various sides, until its deterioration on almost all sides became too obvious to miss.

II. THE AUTOMOBILE AS A SOURCE OF POLLUTION

While speaking above of automobiles, it is pertinent to comment further upon certain of the future prospects for difficulty in coping with this highly important element in our national life and that of certain other nations. It is agreed that the automobile, powered by the modern internal combustion engine, must be modified so as to discharge less injurious materials from its tailpipe into the atmosphere, and around this issue huge volumes of words and many reams of paper have come forth. Certain changes in the engine and its fuel have been considered and some effected, and the discussion now seems to revolve around the achievement of the maximum reduction in the effluents, and their intrinsic propensities for polluting the air with toxic, injurious or otherwise objectionable materials. Meanwhile, the congestion of automobile traffic in most of the cities of the country continues and is increasing. It seems likely that the projected increase in the number of motor cars will be sufficient to wipe out most, if not all, of the improvement that can be effected in the quantity and quality of the material exhausted from the individual car. The difficulties of reducing the congestion of urban traffic, or providing adequate parking facilities grow apace, with increase in the numbers of cars and their drivers, and with the increased wasting of precious space used for merely parking empty cars.

Whatever may be the early or ultimate disposition of these matters, it does not appear that the motor car, alone, is a reasonable answer to the problems of the transportation of our urban population, ^{that of} much less the seemingly endless quantities of supplies and other impedimenta which maintain urban life. What, one may ask, is being done or considered for action in this matter? One hears on all sides that the people of this country will not give up their motor cars or the freedom to use them as they choose. Is mass transportation of one kind or another in the urban centers to replace the motor car? Is the use of an automobile to provide the transportation of one passenger to and from his work or to or from other individually chosen objectives, to

persist unchallenged? Are there to be compulsive laws for the regulation of the area or type of use of automobiles? One might inquire, what should be done, before our urban traffic has come to a standstill, for the sheer lack of space in which to move? And one might suggest, reasonably perhaps, that several means of solving the problem of urban transportation might be tried out, one in each of several cities, in order to find one or more satisfactory answers.

One of the possibilities, it would seem, is the development of municipal mass transportation, with ample parking facilities in the outskirts of cities, so distributed as to render feasible the limitation of the use of motor cars within the central city to such categories as may appear to be essential and readily identified. Certainly, the right of any individual to drive his automobile where and when he chooses, must be subject to such regulation as may be in keeping with the public health and the reasonable convenience of citizens. Unless a distinctly better arrangement than this can be devised to limit the numbers of automobiles which operate in areas of chronically heavy traffic, we should certainly not wait to find out the consequences of further delay. There will be political backlash from this or any similarly oriented governmental action, but one may question the motivation and stamina of public officials who wait for the emergency to soften the public mind.

III. INDUSTRY AS A SOURCE OF POLLUTION

No one who has familiarized himself with the environment of any industrial city in the United States or other industrial nations, can question the significance of the pollution of the lands, streams or other bodies of water, including the oceans, or the air within or around most of our industrial plants. Neither can any person who can see, smell or feel some effects from foreign substances in the air which he breathes, in any of our large cities, or in most of our medium-sized to small industrialized cities. The problems of pollution, dealt with after or before their development into significant disagreeable or frankly injurious features are with us to stay. The important national

policy to be cultivated and applied in this situation, as it relates to industry and to kindred activities of various types, for which localities, municipalities, and other geographic and political units are responsible, in view of the hopefully long span of time during which organized community life in America shall persist, must certainly be that of developing means whereby the operations of industry, whether they result in potentially objectionable or dangerous products, by-products or waste materials, can be handled in such a manner as to prevent injurious effects upon the environment around the industrial area, and upon the people who work within industrial plants situated within our communities. This statement may have the sound of a Utopian ideal to many people, but this is certainly the only acceptable goal of the governmental authorities, the involved public servants, and the people of a truly civilized nation. I wish to stress the necessity for protecting the environment of the nation, "its rocks and rills, its tempted hills," its majestic streams and mountains, and its bordering oceans, for these, our joint heritage, have been abused too long - so long in fact that many of us seek the unspoiled beauty of our diminishing wilderness areas, to convince ourselves, periodically, that the creation of the earth was, in the main, good for the body and soul of man. I wish especially, however, to emphasize the stern necessity of protecting the long neglected manpower of this nation, as it is represented in those who work in office and plant in the production of the goods of America. These, more than the general population of the country, most of whom thrive in one way or another, on the products of the efforts of these workmen, are the people of our country among whom most frequently, illness, disease, disability and death result from daily exposure to hazards much more severe and treacherous than those to which the public is subjected. One may wonder why so many of our citizens can be so vociferous about some of the discomforts, inconveniences and nuisances which they experience, without even mentioning the hazards of the men and women who toil in the workrooms, laboratories and offices of industry. The only charitable conclusion that one can arrive at in this situation

is that only a few of those who speak so volubly, have any realization of the facts. In times past, when, indeed, people generally, were more accustomed to drudgery and hardship in ordinary life, the workman was adjudged, in the popular mind and in the common laws of this and other lands, to have accepted the risks to life, limb and health which were associated with his choice(!) of occupation. This, I fear, is the tacit attitude of many of our people, including our law givers and legal interpreters, who base the value of the limbs and life of the industrial workman, in common practice, upon his earning capacity. How else could the value of a life be determined, in the cold facts of economy, for the purposes of litigation? But is this a proper social basis for behavior in this matter? I am not prepared to accept that this is so.

But can we undertake now to make up for the public and private neglect of the health of the workman, and, at the same time, extend our efforts to the entire community of the nation. If not, which becomes the first priority? I would say, firmly, that the worst offenses deserve the most vigorous and earliest attention, and certainly in my mind, the need to protect the health of those who labor in industry is, if one must choose, the most urgent of the health needs of the country. Moreover, what has been learned of the medical and engineering techniques required to understand the hazards of the industrial workman, can be extended and sharpened for application to the community, through the experiences of occupational medicine and industrial hygiene. I should like to see industry, with the help of government, devote its sincere efforts to cleaning up our environment, as it is threatened by current industrial operations, first within its own household, and then (or simultaneously) learn how best to keep its hazardous gases and solid wastes within its walls, until they can be released or otherwise disposed of safely. This is where much of the practical technical knowledge of this country is to be found, and this is the point at which it can best and most effectively be applied. This is not to say that the

technical knowledge in other areas of our society should stand by idly. Nor is it to say that this dual task can be achieved by expenditures taken from the profits of industry. Nor, even further, is the role of government in these matters to be purely surveillance and compulsion. This is a job of our entire society, with such funding as may be required to achieve the success that we must have in time to come, if we are to survive. I quote, and, at the same, recommend to the attention of all who may hear or encounter these remarks, the concluding words of Peter Drucker, in a truly remarkable discussion of this subject, in the January, 1972 issue of Harper's Magazine. "The time for sensations and manifestos (on this subject) is about over; now we need rigorous analysis, united effort, and very hard work."

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