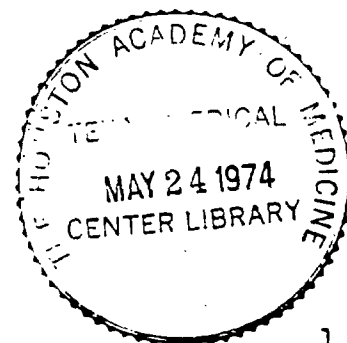


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"TEAMWORK IN INDUSTRIAL HYGIENE"

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Industrial Hygiene Engineer
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New York City
October 12

If we consider the objective of industrial hygiene in the positive sense, having optimum health among the gainfully employed as its goal, then it becomes quickly apparent that no single individual is able, by training or experience, to anticipate and provide an idealized working environment. It requires the combined efforts of many in exactly the way that the ball carrier in a football game is dependent on the integrated efforts of ten other players if the game is to have a successful outcome based on their objectives. Although I have listed that number, the industrial hygiene team has more than eleven players. As in football, there is no place on the team for the prima donna, the spotlight stealer; each must be imbued with the concept of service which precludes selfish aggrandizement.

1. Management. The most important man on the team is management and too frequently this is ignored. If any hazards exist in an industrial process, management is morally and financially responsible for the correction of that hazard. In a competitive economy, an enlightened and foresighted management realizes that a high maintenance level is as important for the human machine as it is for a mechanical machine. All of us are familiar with the types of dividends accruing to management as a result of their participation on the team other than the elimination of occupational disease - more and better production, better employee relations, and others.

Management is in a position to provide a spot in the organization of the company that will go far in making an industrial health program successful. Wherever it is placed it should be in a position to cut across organizational lines in carrying out its work. Management will be disappointed in any program that is set up to provide a scape-goat or whipping boy that can be blamed if things go wrong. They will be disappointed if they wish to prove that they and their industry are not culpable without getting all the facts and letting them speak for themselves. They will be disappointed if they are simply trying to be in style and they feel that they are constrained to keep up with the industrial Joneses.

2. Employees. Any program aimed at the protection and improvement of the health of the employees can only succeed if it has the full and complete cooperation of the employees. They should be apprized of the need for any action taken in their behalf so that they can cooperate intelligently. In order to secure his confidence and cooperation, every evidence should be provided the employee that the industrial health program is operating without bias. This means the development of rapport between the personnel carrying out a program and the people for whom it is planned. The physician will not have the confidence of the individual employee if that employee feels that any confidences will be violated or that he may be subsequently penalized or restricted. The work of the industrial hygienist will be viewed with suspicion if he investigates only complaints and then finds them negative without exception, or if he is brusque or curt with the worker. Behind the machine is a man and he must be treated as one.

3. The Medical Department. The Medical Department, the physicians, the nurses, the technicians, the first-aiders, all are on the team. How would a problem be located if it were not for the physical manifestations found by the Medical Department? How would or could it be developed without their records and perhaps special examinations? After controls have been initiated, a clinical follow-up is necessary for the final assaying of their effectiveness. The Medical Department will be of infinite help if their advice and guidance are sought wherever such might be helpful.
4. The Chemist. The services of the chemist are indispensable in the appraisal of the working environment. He must be capable, alert and honest. Far reaching decisions that affect the lives of his fellow employees and the economy of the company for which he works will be made on the basis of his results. His is not the place for a cook-book chemist. The chemist responsible for industrial hygiene analyses must be alert to unusual factors or conditions which may affect his results. He must check his work all the way, from the calibration of his equipment to the analyses of test samples duplicating the actual sample as closely as possible. Much of his work will be micro chemical and he must be careful and accurate. His professional honesty must be unimpeachable.
5. The Safety Department. The Safety Department is certainly on the team. Safety men know the plant operations and the personnel associated with them. They provide continuous coverage and thus augment the eyes and ears of the industrial hygienist. The safety man is alert to the possibility of hazardous exposure and can thus help in identifying health hazards before they have produced disability. The Safety Department is responsible for the repair, sterilization, and issuance of protective equipment. The department distributes such items as goggles, face shields, shoes and other personal protective devices. The latter function places the Safety Department in an ideal position to administer permit systems wherever these are desirable or necessary for protection of workers.
6. Governmental Health Agencies. Have you ever stopped to think what the local health department does in keeping the employee healthy. They insure the safety of the water and milk supply, both of which are consumed on the premises of the plant. They insure that food consumed in a nearby restaurant or the box lunch purchased just outside the gate has been prepared and kept hygienically. The immunizations provided for the family of the worker protect their health and make him a better, more efficient worker than he would be if members of his family were ill. There are many others.

Perhaps the local health department is not prepared to give advice and consultation in the field of industrial health. Should this be true, this service is available from nearly every State Health Department. For the small plant they can provide free services that would otherwise be inaccessible to the employee. With the larger plant they will be able to offer proven solutions to comparable problems, problems that they have seen solved successfully by other plants. Any complaints of workers will come to them and much embarrassment will be saved by all concerned if they are apprized of a known health problem, told of the protective program contemplated, and asked for their comments and suggestions. After all, two heads are better than one.

7. Technical Service Department. The department that maintains technical surveillance of the whole process, by whatever name it is called, is eminently qualified

to discuss any problem involving health. They know, or can find out, why a certain step is carried out in a particular manner, or with the use of specific equipment. Any proposed solution to a problem should invariably be brought to their attention. They may be able to think of a better or a cheaper way of solving the problem. They have, or can get, the information needed to strike a material balance from which one can determine losses, their amounts and their locations.

8. Engineering Department. The planning and design group are able to design health protection into a process, better and more cheaply than can be applied at a later date. If they have been educated to their responsibility in the protection of the health of the worker they will recognize the need for such protection at an early date or will discuss a proposed installation with someone able to anticipate such a need. A pre-blueprint discussion may be more valuable than many, many subsequent conferences. The Engineering Department, properly oriented, will thus bring to the industrial hygienist for review those plans that are pertinent to industrial health.
9. Industrial Hygienists in Other Companies. Almost every problem encountered has been met and solved, at least analogously, by some other industry. The free interchange of industrial hygiene information between members of this profession is always desirable. Professional ethics forbid the transmission of irrelevant industrial know-how in such contacts. The exchange of industrial hygiene information, in addition to being directly helpful in the solution of a problem, may stimulate the study of a problem not yet acute or perhaps not even suspected. Such industrial hygiene personnel may be found in governmental agencies, in educational institutions, in companies from which materials are bought, and in companies to which materials are sold, in insurance companies and, most helpful of all, in competing companies. These people may not be on your payroll but they are on your team.
10. Other Professional Personnel. The technical sales group within your own company can be very helpful in determining a known or suspected hazard in perspective. They know where company products are going, in what quantities, and for what use. It is thus possible to add the experience of the consumer to that of the producer in the study of a problem. The makers of personal protective equipment can be helpful in the exchange of information. So can the manufacturers of processing equipment or the manufacturers of special control equipment, such as ventilation systems, dust and fume control systems, or other similar devices. The toxicologist, the physicist, the bacteriologist, all these and more are capable of helping the team. Let us not forget the secretary who finds those few minutes in the busy day of her boss so that you can see him and present your case personally and without delay.
11. The Industrial Hygienist. This is not the place nor do we have time to outline the duties of the industrial hygienist. From the environmental standpoint, his is the counterpart of the preventive medical approach. It is anticipated that his versatility may bring him in contact with all of the team members described above. His contribution will be as a coordinator such that the contributions of the other participating professions will be used most effectively.

No concern need be felt over the possibility that there is an overlapping of activities. The purpose of a roof is to keep the rain out of the house and it is

expected that the shingles will overlap. It is logical and necessary to insure the best coverage. In no sense should there be competition between the various members of the team - to prevent harm from coming to the employee by providing him with a safe and healthful place in which to work.

BIOGRAPHY

Clyde M. Berry

Born - June 18, 1913.

Education - Elementary School, Posey, Illinois. Grad. 1925.
High School, Carlyle, Illinois. Grad. 1929
McKendree College, Lebanon, Illinois. Grad. 1933 - B. S.
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Professional Experience

- 1941-43 - On loan to the Division of Industrial Hygiene,
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- 1946-48 - Chief Engineering Section, Industrial Hygiene
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- 1948- - Industrial Hygienist, Esso Standard Oil Company,
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"THE ENGINEER IN INDUSTRIAL HEALTH"

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October 12

In any discussion of the need for teamwork in industrial health, I believe that we should make clear at the outset that industrial health means teamwork. I think there is danger of selling short its importance if we speak of the "need", as though teamwork is an abstraction and not necessarily an inherent quality of the operation. It is true, of course, that teamwork will enhance the performance of any activity. It can act as a catalyst—speeding the action—or it can bring about more fruitful as well as harmonious results. Thus, with perhaps few exceptions, all operations have in common the desirability of teamwork. In the case of industrial health programs, however, the situation is entirely different, for ours is not an activity in which teamwork is merely to be desired. In all industrial health programs—whether they are conducted by the Federal, State, or local governments or by private industry—teamwork is the very keystone. To illustrate this premise, I should like to tell you about our work in the Division of Industrial Hygiene of the U. S. Public Health Service.

To begin with, our organizational structure is built on a foundation of teamwork. The various professional categories in the Division do not function as separate, totally disjointed, administrative entities. In other words, we do not have separate professional groupings—like a medical section, dermatological section, engineering section, laboratory section, and so on. Rather, there is a functional grouping of personnel. Thus, medical personnel, including physicians, dermatologists, and dentists, are considered part of the Clinical Investigations Branch of the Division. They are concerned with the personal health of the worker, as contrasted with the engineers, physicists, chemists, and toxicologists who are part of the Environmental Investigations Branch. Auxiliary personnel, such as analysts, statisticians, and information specialists, serving the Division as a whole or doing States relations work, are grouped in the Cooperative Health Services Branch. This functional alignment of personnel, we have found, permits the most effective teamwork approach to industrial hygiene problems.

Not only does the teamwork motif make for better administration, but in the field study it also becomes a vital, living factor which is apparent to all. Field studies are planned and executed with the closest amount of cooperation between the clinical and environmental teams. Then equally exacting cooperative work is required when the findings are correlated and analyzed in a complete report. Without such correlation, reports of investigations would present limited facets of a problem and could not pretend to be as conclusive as possible. It is the correlation—made possible through the teamwork operation—that gives real meaning to the survey.

This teamwork is both unilateral and bilateral. Here is how it works, for example, in the medical team, in the conduct of regular routine. The industrial hygiene physician's role in a study is to make a physical examination of the worker exposed to potential health hazards and to take an occupational history to determine if there

have been any prior exposures to hazardous substances. At the same time, the industrial hygiene dentist determines if there are any oral manifestations of occupational disease. If there are evidences of unusual dermatitis, dermatologists from the Division may be called upon for specialized assistance. All phases of the physical examination are closely wrapped together, since what one examination will not reveal may be brought to light by another. As a case in point, the medical examination may reveal no unusual symptoms; but, since the oral structure often is a sensitive indicator of trouble before it appears elsewhere in the body, the oral examination may give the first clue that a worker is being exposed to harmful substances on his job. I cite this as an example of the fine lengths to which cooperation must extend within the working of each individual group. Finally, the clinical findings must be correlated with the findings of the engineers and chemists, who have taken and analyzed samples of potentially dangerous gases, fumes, dusts, or other substances in the working environment to determine their concentrations and toxicity.

To indicate a little further the teamwork nature of industrial health operations, I should like to point out how complicated—and often barren—the work of the industrial hygiene physician and the industrial hygiene engineer can be if there is not close cooperation. For example, in differential diagnosis of occupational disease, the physician must know the patient's exposure to any hazardous conditions before he can make a definite diagnosis. Often, several diseases may present identical or similar symptoms, and for this reason information on potentially hazardous occupational exposure is absolutely essential. Thus, the engineer, with detailed knowledge of the industrial operations and the concentrations of contaminants in the working atmosphere, plus a general knowledge of the toxicity of these substances, may help to provide the answer to a medical problem. Conversely, the physician, by making his specialized knowledge available to the environmental investigators, may help in the solution of an engineering or toxicological problem. In fact, the working relationship is so close that, after many years of experience, engineers may learn quite a bit about industrial medicine, while the physicians become conversant with environmental conditions.

The operations that I have described revolve about the traditional medical and engineering teams. However, if a study warrants the inclusion of other specialized personnel, the Division of Industrial Hygiene does not hesitate to bring them into the investigation. In our Donora smog study, for example, in addition to industrial hygiene physicians, dentists, nurses, engineers, chemists, toxicologists, statisticians, and information specialists, we also drew upon Public Health Service veterinarians, sanitary engineers, and housing inspectors, as well as calling upon the U. S. Weather Bureau for meteorologists. The close cooperation of the various groups was excellent, and I think that this study will go down as a complex inter-professional teamwork classic.

Also notable in the Donora study was the degree of cooperation with the Pennsylvania State Health Department, the United Steelworkers of America, CIO, which has a local union in Donora, the Donora Borough Council, the industrial plants concerned, and other groups. This type of inter-and extra-agency cooperation, however, was not peculiar to the smog investigation, for it is employed in most of the Division's studies. For example, in the study of health hazards associated with the mining and milling of uranium, which we are presently conducting in the Colorado plateau, the Public Health Service personnel are working with the State Departments of Health of Utah, Colorado, New Mexico, and Arizona, the Naval Radiological Defense Laboratory of San Francisco, the National Bureau of Standards in Washington, and the Los Alamos Installation of the Atomic Energy Commission.

In all of these activities, of course, the industrial hygienist is the pivotal figure, and other technical personnel are brought into the study as they are needed. Since in this discussion I have been asked to talk chiefly about the engineer's role in industrial hygiene, I think it might be well at this point to attempt to clarify just what is meant by an industrial hygiene engineer.

As the engineers attending this conference know, there is no standard four-year course in industrial hygiene engineering. Thus, the industrial hygiene engineer is not the product of a traditional professional course. He has usually taken his professional degree in sanitary, mechanical, or chemical engineering, or in a related field, and he may have supplemented his education with graduate industrial hygiene courses which are offered by several universities. Or he may have received the additional training while working on an industrial hygiene job.

Industrial hygiene engineers, in the full sense of the word, are found in governmental industrial hygiene agencies and in some of the larger industries. The latter instances are comparatively few, however, because most industries do not yet feel it necessary to employ a specialized industrial hygiene engineer, as such, but rely on the plant engineers to keep the working environment free of hazardous exposures, in addition to their regular duties. Whenever these plant engineers need specialized assistance to control such conditions as excessive concentrations of fumes, dusts, gases, mists, and vapors; exposures to very high humidity; exposures to harmful amounts of radiation; exposures to noise; inadequate illumination; and unnecessary fatigue, the services of industrial hygiene engineers in official State agencies are available. The Public Health Service, in turn, is available to assist the States whenever called upon.

The extent to which State engineering personnel can assist industry is determined many times by the professional engineer registration act of that particular State. In all cases, however, the engineer can study the conditions in the plant—taking samples or making other tests with his instruments—and then recommend any needed control measures, such as exhaust ventilation, isolation of dangerous processes, substitution of less hazardous materials, and use of protective devices. Since State regulations may prohibit official State agencies from engaging in the practice of engineering in competition with private consulting firms, the State industrial hygiene engineer may not be permitted to design the needed control devices for the industrial plant. The plant must then call upon the services of consulting engineers, who usually have heating and ventilating backgrounds, to carry out the recommendations of the industrial hygiene engineer.

Very often, the consulting engineers are highly qualified to do the usual design job which occurs in the heating and ventilating field, but many times they are sadly lacking in technical know-how for the control of atmospheric contaminants.

They frequently make the mistake of just throwing in control equipment without application of the principles related to the industrial hygiene problem. Hence, there is a needless waste of money by industry—and, even more serious, a false sense of security develops through the belief that proper controls have been installed. When the awakening comes—when employees begin to complain or to get sick—the industry calls in the State industrial hygiene engineer, who must then point out the fallacy of the design. Industry is thus confronted with the necessity of revamping the old installations or removing them entirely and putting in new costly control devices. It all adds up to duplicate expenditures in terms of money and manpower, and it does not make for good public relations for the engineering profession as a whole.

The lesson to be drawn from such experiences, I believe, is clear. There must be closer cooperation—teamwork—between the official industrial hygiene engineer, the plant engineer, the heating and ventilating engineer, and the construction and consulting engineer, and the architectural engineer. Nor can the channeling of information be one-sided, for the plant and other engineers can help the industrial hygiene engineer by calling certain peculiarities of the operation to his attention. There must be a two-way flow of information, predicated upon close observation of the working environment.

Since, somewhere along the line, all engineering activities impinge on the industrial hygiene field, it behooves engineering personnel to familiarize themselves with the principles of the control of the working environment. The State industrial hygiene agency, I am sure, will be more than glad to give the necessary indoctrination.

In industry, which uses a financial yardstick as one measure of success, an industrial hygiene conditioning of plant engineers would greatly enhance their value to the firm. In official governmental work, where public service is the criterion, the engineer who is engaged in other than industrial hygiene work also has a moral obligation to acquaint himself with this important activity. In many States, for example, sanitary engineers greatly outnumber industrial hygiene engineers, and the success of industrial hygiene programs in those areas may be largely dependent on the interest manifested by sanitation personnel. Finally, all professional personnel—regardless of their position—must remember that their professional status cloaks them with a responsibility not usually found in the 9 to 5 worker. They must continue to grow—to develop their talents and abilities to the utmost—to make their greatest possible contribution. If they are true to their responsibility, their interests should broaden beyond their individual specialities. In the case of engineers, if they are conscientious followers of their profession, their interests cannot help but embrace industrial hygiene, and I would venture to say that any engineer can undergo industrial hygiene conditioning to good advantage.

So much for broad inter-professional cooperation. Now I should like to touch upon the engineer who wishes to make industrial hygiene his specialty. What are the qualifications that he must have? First of all, education-wise, as I have mentioned before, there are graduate courses available to him in a number of universities. This education must be supplemented by extensive in-plant experience. Second, he must realize that in industrial hygiene activities the human factor is equally important as technical competence and he must discipline himself accordingly. The ability to get along with people is an obvious asset in any walk of life, but, as I have emphasized previously, because of the teamwork required in industrial hygiene, it is a prime necessity for the industrial hygienist. He must also have an open and inquisitive mind and a searching intelligence. Since he will be called upon often to improve testing methods to design apparatus, or to devise new control procedures, he must have imagination and ingenuity. Furthermore, he must have a deeply ingrained desire to learn. In this connection, many of the State health departments are to be congratulated for making educational opportunities available to qualified engineering personnel and for encouraging attendance at professional meetings. In the constant process of learning, the industrial hygienist must also build up his professional library subscribe to professional journals and follow the progress made in his own and related fields. Finally, he must have the capacity for cooperation, for the extent to which he, as a representative of his organization, invites or repels cooperation will determine his success in his field. In short, he must sell himself.

Because of the scope of this discussion, I have stressed cooperation within the engineering profession, but I should like to make clear that teamwork possibilities are never ending. They transcend any one profession—even extending beyond the walls of the working environment, for in its broader concept industrial health concerns itself with the health of the "total man" 24 hours a day, not only the 8 hours that he spends on the job. Cooperation thus also takes the form of working actively with State and local health departments on public health programs, with community health and welfare agencies, and with labor and management groups in the betterment of the community as well as working environment and in the achievement of total health. And when general or total health is concerned, there is just no question of cooperation, for, as has been repeated many times, health is everybody's business!

BIOGRAPHICAL SKETCH

Joseph E. Flanagan, Jr.

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Received B.S. Degree in Chemical Engineering - 1935.

Experience — 1935-1940, Massachusetts Department of Public Health

1940 to Present — U. S. Public Health Service

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1940-1941 - Stream pollution and industrial waste investigations
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1941-1943 - Industrial Hygiene Engineer engaged in investigations
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1946-1948 - Industrial Hygiene District Consultant, District 3,
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1948-1950 - Chief, Cooperative Health Service Branch, Division of
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INDUSTRIAL HEALTH CONFERENCE BANQUET

P. P. Butler, Presiding

"HEALTH AND MANPOWER IN PEACE OR WAR"

Brigadier General James Stevens Simmons
U.S. Army (Retired)
Dean, Harvard School of Public Health
Boston, Massachusetts
October 12

It is a special pleasure for me to be back in Texas tonight to attend the Third Gulf Coast Regional Conference on Industrial Health. I say "back in Texas" because I feel very much at home here. I was reared in another great state, North Carolina, but some of the happiest years of my life have been spent in the Lone Star State.

As I recalled here a year ago at your Second Conference which I had the privilege of attending, my Army career in Preventive Medicine and Public Health started in Texas. I began prospecting for health as a First Lieutenant at Fort Bliss in 1917. That was my first Army station, and my second was at Fort Sam Houston as Commanding Officer of the Southern Department Laboratories.

And so, though my boyhood memories go back to North Carolina, I shall always hold in deep regard this spacious, friendly, enthusiastic, pioneering State of Texas where I got my start in a profession that, for me, has never ceased to be exciting and worthwhile.

I have always admired the adventurous spirit and the courage of Texans. I remember hearing of a party of Texans who went bear hunting in the mountains. One of the group got separated from the rest. After searching all day and all night, his friends found what was left of him, lying under the 300-pound carcass of a very dead bear.

It was a dreadful sight. It was plain that he had come upon the bear unexpectedly. A quick shot had wounded and infuriated the beast and then the gun jammed. The man was forced to fight with a knife. He finally killed the bear, but not before the animal had torn off one of the poor man's arms, clawed the scalp from his head, obliterated his features, broken his back and both legs and inflicted terrible gashes all over his body. Finally, the brute had fallen on top of the man, crushing the rib cage and obviously causing internal injuries.

The horrified hunters managed to lift aside the bear's heavy body and sorrowfully picked up the pieces of their friend, mangled as he was almost beyond recognition. As they were stumbling along the trail, they were astounded to hear a faint moan. Could it be he was still alive? They stopped. One hunter leaned down to the unfortunate victim and asked unbelievably:

"Bill, old man. Can you talk?"

At last they heard that Texan gasp:

"—, I am all right. It just hurts a little when I laugh."

Now, that's the kind of Texas spirit that the world respects.

Like Texas, Public Health is young. It is a vigorous, pioneering profession. In recent years it has branched off as a specialty of the much older medical profession. Traditionally, the mission of Curative Medicine is to heal the sick. Everyone recognizes the necessity and importance of medical care; but the Public Health Profession goes beyond this and has the preventive aim of keeping well people well. It preaches and practices the ancient truth that "an ounce of prevention is worth a pound of cure." It works to conserve American health and American manpower—manpower for agricultural production and for business, manpower for our schools, professions and for every civilian occupation, and manpower for our military forces. In short, Public Health conserves health and manpower for America in peace and in war. This is the subject of my discussion tonight.

It is good to know that this great objective of health conservation is recognized here in Texas and that industrial, civic and professional leaders are taking long steps toward its attainment through such means as this splendid Conference.

I am glad to have this opportunity to join in your discussion, along with some of my colleagues from The Harvard School of Public Health. Dr. Robert O'Connor, Assistant Professor of Industrial Medicine in our School and Medical Director of the New England Division, Loss Prevention Department of the Liberty Mutual Insurance Company, is an expert in industrial health organization. He appeared on today's program and will take further part tomorrow and Saturday. From our Department of Physiology comes Dr. Stanley Sarnoff, who is co-inventor of the Electro-Phrenic Respirator which is a godsend in certain dangerous cases of bulbar infantile paralysis.

Dr. Sarnoff will address your luncheon session tomorrow and demonstrate the respirator on a human subject. This is not his first visit to Texas. During the polio epidemic a few months ago, he and Dr. Whittenberger from our School responded to an emergency call and flew to Dallas to confer with Texas Physicians and to help in the treatment of a number of desperate bulbar polio cases. Tomorrow noon Dr. Sarnoff will tell a unique and thrilling story of developments in research on various aspects of respiration. His story is based on research at The Harvard School of Public Health where the iron lung was invented by Professor Philip Drinker and where great strides have been made in developing methods for purifying the air in industrial plants and communities.

Last year at your Industrial Health Conference I spoke as the Dean of a civilian School of Public Health and discussed the importance to both management and labor of providing good industrial health for civilians in peace time. Now a war is on and I am here tonight as an old soldier. Drawing on my background of 30 years' service, including my experience as Chief of Army Preventive Medicine during World War II, and my present participation in national planning, I should like to talk about the urgent need for better health in order to conserve both military and civilian manpower.

The need for manpower never lessens. We may admire the technological advances that have produced modern industrial machinery and the marvelous military weapons of today. But we still need manpower to run the machines. And one fighting factor which has not changed since the day of the caveman is the need for manpower to operate the instruments of war. The Second World War was no exception to the general truth that the

protection of the health of troops is an essential part of any well-planned military operation.

This has been strikingly demonstrated in Korea. From the start of this bloody war, it was evident that more than super-armaments would be needed to stop the aggressors. It took raw manpower. Furthermore, it took strong and healthy manpower.

To a public health specialist, no Korean war broadcast was more astounding than the erroneous announcement that North Korean troops had been attacked by yellow fever. Yellow fever has never existed in Asia, and if this report had been correct it would have meant a recent introduction of the disease. But our troops would have been safe because they had been inoculated against yellow fever. This is an example of the ounce of prevention which pays off in terms of G.I. health. Superior health protection for American military manpower can help turn the tide of this war which is being fought to establish a free world.

Public Health—which is the application of modern prevention medicine to large groups of people with the objective of keeping well people well—paid off during World War II. In the Spanish American War, 13 American soldiers died of disease to every one killed in battle. In the First World War the ratio was 1 to 1. As midcentury approached, public health knowledge and techniques had improved to such an extent and were so effectively applied that, in the European Theater of World War II, only one soldier died of disease to 85 killed in battle.

A clear picture of the progress made is afforded by the rates of disease deaths in these three wars. In the Spanish American War the rate was 25 per 1000 per annum. In World War I it was 16, and in World War II it was only 0.6.

Experts in all fields of Public Health—both military and civilian—were utilized in operating the giant military health program of World War II. Without it, our troops could not have been shipped overseas—much less fight there. It was a vital factor in winning that war—and it is just as important now.

In peace or war, this matter of American health and manpower is not just something nice we'd like to have. It's a necessity—and we've got to have it! We must have health, just as we must have tanks, airplanes, ships, guns and bombs. Indeed, of all these weapons against the enemies that now threaten our democratic way of life, the most essential weapon—and the single weapon without which we are lost—in manpower. Health and manpower must be maintained to keep our nation strong both on the home and the fighting fronts.

Strong Communist forces are at work in this country and throughout the world, taking advantage of sick and impoverished people, exploiting their discontent and hopelessness to undermine their political belief.

Health is one of the safeguards against this propaganda. Health is not charity, it is not missionary work, it is not merely good business—it is sheer self-preservation for us and for the way of life which we regard as decent.

Through health we can expand industrial production, strengthen our military forces and maintain the high morale of all our people. Through it we can prove, to ourselves and to the world, the wholesomeness and rightness of democracy. Through health we can defeat the evil threat of communism.

Moreover, we of this country are in a position to forward the cause of democracy outside our own borders by promoting industrial and community health in other countries where we have influence, especially in the underdeveloped regions of the world. It is gratifying to know that our American industrial leaders are aware of this opportunity and responsibility.

Next December, medical and health directors and members of management of 20 or more American industries with extensive operations in tropical areas - Latin America, Africa, the Near East and the Far East - are going to meet for three days at The Harvard School of Public Health in Boston. There they will be able to exchange information and, hopefully, work out solutions for some of the fundamental health problems which confront every industry employing natives in an underdeveloped region. Together, with members of our faculty of The Harvard School of Public Health, they will consider matters of Communicable Diseases and their Control, Nutrition, Organization of Health and Medical Service and other subjects vital to them and to the people who work for them.

Our School is proud to sponsor this Conference. We are confident that much good will come of it.

In recent months, as President of the Association of Schools of Public Health, I have been concerned over the mounting need for high level planning on a vast scale to train the health specialists needed for our armed forces and for our civilian population in the current emergency. As spokesman for the country's ten post-graduate Schools of Public Health, I have urged the President of the United States and the Congress to take action at once to provide this training and develop a program which will conserve the nation's health and manpower.

As a member of the Armed Forces Medical Advisory Committee to the Secretary of Defense, I have been attending sessions in Washington which should further this necessary planning. It is hoped that these plans will provide accurate estimates of the number of public health specialists required for the future; will enable us to recruit adequate medical personnel to take the necessary post-graduate training; and will provide adequate financing for the institutions responsible for providing this training.

Such sound planning should enable us to avoid the World War II situation in which the supply of specialists was inadequate. This led to competition for the available medical and health personnel.

All this planning for better health is of great importance to industry. Industry, like our military forces, is a vital factor in maintaining our national strength and security. Industry must not only supply the needs of our peace time economy but must build the weapons and provide the sinews of war. If it is to meet this challenging opportunity for service it too must participate in this planning for the conservation of American health and manpower.

Modern industrial health means more than providing medical care.

Good industrial medical care is essential, so long as we have sick people and accidents. But the fact must be faced that the highest profit to industry and to the country can come through the prevention of disease and the conservation of health for both management and labor.

More hospital beds will not protect the worker against infection or accidents; and more insurance will not keep him well. The real payoff is prevention and this requires the technics of Public Health in any language.

To industry, then, Public Health should mean much more than just first aid. It should mean the elimination of industrial hazards; the protection of workers against industrial poisons and diseases; accident prevention and safety engineering; sanitation; nutrition; and the education of both management and labor in all aspects of Public Health.

In brief, industry, like the Army, Navy and Air Forces, can increase its effectiveness by a fuller utilization of the accumulated scientific knowledge now available for the conservation of health and by using the services of the required trained experts in the professions of medicine and public health.

In this talk I have not mentioned the specific health problems of industry or the techniques now available for providing adequate health and medical services. These matters are being fully covered by the distinguished experts who are taking part in the rest of the program of the Conference. These speakers are concerned with all aspects of industrial health—not only with peace time programs but with the special plans required to guard against the possibility of atomic or biological attack, sabotage or other disaster situations.

My main purpose is to urge your serious consideration of the broad problem of providing the best health possible for Americans—and of doing this as a matter of national defense.

In closing, I wish to thank the Houston Chamber of Commerce for inviting me to attend this meeting. Also I wish to congratulate the Chamber and the other organizations sponsoring the Conference for the enlightened attitude and the energizing spirit that motivate this important gathering. You are acting in a positive, patriotic way that sets a pattern of action for the rest of the country. Finally, I wish to state my belief that through your work for better Public Health and Preventive Medicine as a method of increasing American industrial manpower, you are in the forefront of our fight against Communism; you are helping to forge the most powerful single weapon in the arsenal of democracy—the health and strength of the American people.

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Industrial Health Conference Panel

W. H. Hamrick, M. D., Moderator

"THE PLACEMENT OF THE PHYSICALLY
HANDICAPPED IN INDUSTRY"

T. M. Frank, M. D.

Medical Director

Pan American Refining Corporation

Texas City, Texas

October 13

1. What is the employer's reaction to the practice of hiring handicapped persons?

From a doctor's seat on the side lines, it is my impression that most employers favor the idea but unfavorable experiences in individual cases have occurred and these tend to wield a considerable influence on employers' actions and decisions.

2. What is the attitude of doctors toward hiring handicapped persons?

If the handicapped person can be hired on an individual basis, treated as individuals--that is, without allowing one to become a precedent for the next case, doctors highly approve the practice. The work assignment must be within the handicapped person's abilities. Transfer to other work must not be made without medical approval. Any person who is handicapped has the physical condition to overcome, plus the blow to his morale and often this is the greater damage. Anything which helps to restore his self-respect, his regard for himself as a functioning individual, his ego as a unit of our society, is of great help in overcoming his handicap and recovery from this and future illness.

3. What are the advantages in the practice of employing handicapped persons?

A handicapped person who is determined to work and do a good job, can be a real prize. Certain of them are grateful for the chance to earn a living and if the job is properly selected to suit the individual, they may do better than a person without a handicap. In some cases the handicap tends to immobilize them and they stay on the job better, waste less time in going to the drinking fountain, toilet, and/or visiting. Often they have fewer natural distractions.

4. What should be the criteria for refusal to employ handicapped individuals?

When there is no work available which they could do without danger of:

1. Injuring themselves
2. Injuring other personnel
3. Injuring equipment

5. What is the biggest difficulty encountered in employment of the handicapped?

As a personal opinion, I believe this is the present tendency to standardization. Our constitution; our laws in general; our labor laws in particular; our union

contracts are based on the assumption that we are all equal. We point to the Declaration of Independence for support. However, it says we are born equal and actually that is merely a point of departure. (I personally believe we are born with equal rights but not equal.) We do not stay equal after we are born. And it is a rare law, or tariff, or rule, that fits every one with equal acceptability.

As a doctor I have learned that we humans are very much individualists. A 1/4 gr. dose of morphine will put most people to sleep in spite of pain, but I know some people who become nauseated, irritable, and hyperactive with the same dose. Just as it is true of medicines, so is it true of diseases. The invasion of the body by a given type of germs will bring about one result in one case, and a very different result in another. Treatment must be highly individualized.

And so it is with handicaps. If we insist on treating the handicapped all alike, we will fail. If we treat all persons with the same handicap exactly alike, we will fail. Each must be accepted on an individual basis or the employment of the handicapped will get a bad local reputation. Precedent must be scrapped. Not only as to hiring, but it must be acknowledged by all, that the work, care, treatment of one such person sets no precedent for any other.

6. What are the limits of employability of the handicapped?

Whether they can perform the work available.

Whether they can work in safety.

Whether they will endanger others.

Whether they endanger property.

Whether they acquire seniority rights that could enable them to demand to other work for which they are not fitted.

7. Can every industry use handicapped employees?

1. Almost any industry can use a few handicapped employees, depending on what the handicap is and what the work is.

2. Hardly any industry has unlimited capacity to use handicapped employees.

3. The nature of the industry determines how many handicapped persons can be used, also the types of handicaps that matter; e. g., a blind truck driver is not to be considered. Yet a blind person may make a good worker in the dark room tending machinery that makes photographic film. Even bed-ridden persons have been known to turn in a more than creditable performance of certain types of profitable work.

8. What are the obstacles in the way of employment handicapped?

Most employers don't know the problems of the handicapped. Educative efforts must be on an individual basis because each employer has different problems.

Some efforts in the past have failed to produce all they might, because they were not projected to the employer's view. Some employers are influenced unfavorably by experience to the point where they would like to hire only perfect physical specimens.

9. How can one evaluate the degree of the physically handicapped?

There are many answers. Perhaps the answer nearest the truth is that only the one who is handicapped can evaluate the degree. To take an extreme case, go to a side show of a big circus and see the man without arms write on the typewriter (with his toes, of course). It is easy to dismiss this as a stunt, impractical in business. But we can't dismiss the fact that, although based on impairment of an organ, the degree of handicap is influenced to a major degree by the person's reaction to it. If he succumbs to it, the result is serious. If he uses his ingenuity and determination, he can minimize it to an amazing degree.

Two persons with ankylosis of the hip joint present themselves as prospective employees. They have had injuries in some game at school, years before, and each one is unable to move the thigh in relation to the pelvic bone. They state their intention to turn in a good day's work and let the handicap interfere with their work or safety not at all. They are hired.

Within three months, one of them reports that in stooping over to pick up something he has injured the already injured hip. He indicates that he is holding the company responsible for it and will sue if it is denied. Investigation shows he is presently engaged in a suit against another company on the same allegation.

The other person remains at work, a valuable employee, with never a complaint about his hip, for several years.

These two cases illustrate the fact that most handicaps can be a prison cell, or a hurdle, depending on the person involved.

10. What is meant by the term "physically handicapped"?

Different persons use these words with different meaning.

Certain handicaps may be obvious, such as the loss of finger, arm, leg, eye. Others are less obvious—heart disease, kidney or liver impairment, tuberculosis, hernia, cancer of various organs, arteriosclerosis, hypertension, syphilis, brain changes, blindness—the list is almost indefinite.

Almost every one has something wrong. Most people do not allow it to impair their usefulness, or we wouldn't get much done. And until it interferes, it is hardly fair to call it a handicap, at least from one viewpoint.

The opposite of handicap—that is, physical fitness—means nothing until you state the object of the fitness; that is, physically fit for what purpose? A person physically fit for playing big league baseball at 20 years of age is usually unfit at 35 years of age, but on the other hand, may be quite fit for something else. Similarly, a certain physical handicap may be disastrous to one person and of little or no consequence to some one else.

One definition of the term "physically handicapped" is that it is the inability to do something one needs or wants to do because of some abnormal condition of the body or its parts.

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Hardy A. Kemp, M.D.
Baylor University, College of Medicine
Houston, Texas
October 13

1. Is a blind person of any possible use to industry?

In some industries the blind have been found very valuable in jobs which involve the handling and assembling of small parts. Their production record, as a rule, was very good and their attendance record exemplary. They need not be segregated. As a matter of fact, it has been found that the output of the whole section was increased because those who could see would try to keep up.

2. It is rather generally believed that the person handicapped by an orthopedic injury is a bad risk. Is this true?

As far as available statistics show, the opposite seems to be true. For example, R. N. Anderson states in his monograph, "The Disabled Man and His Vocational Adjustment", published in 1932 in New York by the Institute for the Crippled and Disabled, that only 8 out of 4400 men had a second injury over a period of 13 years they were studied.

The Office of Vocational-Rehabilitation states that nearly 60 percent of a large number of employees replying to questionnaires found second injuries less frequent; about 40 percent found them to be the same in frequency. Only 2 percent reported them to be higher. There are many reports of a similar nature.

3. You three men of the panel are M.D.'s. Two of you are full-time industrial physicians and Dr. Kemp heads a department in a medical college (Baylor) which concerns itself with industrial medicine. As such you are familiar with placement practices, but where would some of us find at least some of your experience reduced to writing?

There are several useful publications. One is "Operations Manual for Placement of the Physically Handicapped." Its second edition came from the U. S. Government Printing Office, Washington, D. C. in 1943. It was compiled for the U. S. Civil Service Commission. Another is "Physical Demands and Capacities Analysis" published by the Permanente Foundation Hospitals (Oakland and Richmond, California) in May, 1944. These could be supplemented by the article "Physical Capacity for Work" by Harvey and Luongo, which appeared in "Occupational Medicine" in 1946, Vol. I, pages 1-47. Additional references are given in this article. All of this and more may be had from the U. S. Office of Vocational Rehabilitation, a division of the Federal Security Agency.

4. Obviously, second injuries may be far more incapacitating and expensive to all concerned than the first injuries. Since the cost of this second injury is legally impossible on the employer at the time, he is not eager to assume the risk. What about the job seeker signing a waiver?

That is legal in a few states but is generally held to be unfair to the employee since he cannot possibly know to what extent he may be incapacitated by a second injury and in signing a waiver may actually be "signing his life away" in every sense of the word.

5. What, if anything, is being done constructively to meet the problem of paying for second injuries if a once-injured man is lucky enough to be hired or if the employer is generous enough or socially minded enough to take on such a risk?

To meet such situations "second injury funds" have been set up in several states in recent years. Methods of financing differ in almost every case, but the authority comes from the Federal Longshoremen's Act. The Division of Labor Standards, Dept. of Labor, can furnish all details. Essentially, practically all of the state acts, or WCC rules, provide that the employer pays only for the last injury as such, whatever it is. Provision is made, however, for the injured employee to be compensated for this combined injury as such, the difference being paid from the fund.

6. As to hiring the blind, what about those who have monocular vision or a defect almost as great?

Their greatest problem is the perception of spatial relationships which is correctable only by time and experience. Directly after the loss of one of a good pair of eyes this becomes a most serious handicap.

As for the person "almost blind in one eye", it is now believed that binocular stereoscopic acuity is lost when one eye is reduced to 20/400 vision. Formerly 20/200 was regarded as the limit and it may still be regarded as such unless the condition is one of long standing which presumably has allowed the individual time to compensate.

Harvey and Luongo found that the productivity of monocular employees compared favorably with those who have the use of both eyes. The accident rate of the monocular, however, was much higher. These two observers, however, believe this is chargeable more directly to fatigue.

7. How far does the physical examination go toward determining the actual working capacities of the handicapped?

The examination of the human being to find the work for which he is fitted involves knowledge of a method not yet possessed by medical science: namely, a method of estimating reserve compensation. Again, there are a host of factors, personal and environmental, not necessarily related to physical conditions, which have a great bearing upon physiologic capacity. Fatigue itself will vary with the individual's attitude and this in turn is often influenced by incentive, the discovery of which is not possible with the X-ray, stereoscope, or blood pressure apparatus, or, in fact, any of the tools of our trade. Thus quantitative estimates of working capacity are well high impossible whether the job applicant is not healthy or even is subject to defect or disease. The procedures of physical examinations cannot be used for more than a temporary guide at best. Periodical physiologic and psychologic examinations of the worker and a periodic appraisal of his job is equally, or even more, important than the pre-placement examination. However, this may be and regardless of what system of job analysis and evaluation of working capacity are used, the most important factor in the problem is the industrial physician himself. It is his diagnostic acumen and his knowledge of working conditions in his plant which can possibly be the only valuable determining factors.

8. As to people with impaired hearing, what about those who wear hearing aids?

Even with the assumption that the hearing aid has aided in the correction of personal problems where such might exist, the hearing aid itself is by no means a full guarantee of satisfactory performance of work, even though it has been well fitted to meet the individual's ordinary needs. For example, some users of hearing aids, whose difficulty lies in the middle ear, may get along very well under noisy conditions, while others whose hearing defects arise from disease or impairment of the auditory nerve may be extremely sensitive to noise while wearing their hearing aids. For this reason, they will discard them altogether while working and thus become less productive for many obvious reasons. Almost needless to say, the person who is not sensitive to sound, that is, the individual who is usually called "deaf" may be highly valuable on noisy jobs, since they will not suffer the serious effects of noise induced exhaustion common among those of good hearing. From a medical standpoint, much depends upon the nature of their illness, since with a severe disease of the middle ear frequently report that they can hear "everything" in a noisy environment, thus are subject to constant irritation which may become intolerable. As for those who are totally deaf, their handicap may be considered severe as far as employment is concerned only when their work calls for a memory of sound patterns developed before losing their hearing. As is generally recognized, there does appear to be some compensation for this lost power and we find among totally deaf persons some highly skilled tradesmen, particularly printers, engravers, machinists and watchmakers, along with professional people and creative artists of the highest rank.

9. Other than technical publications and medical references are there any non-technical or non-professional pamphlets or other sources of information dealing with the placement of employees who are known to have a certain amount of a heart disease?

The American Heart Association has issued such a pamphlet. It is, of course, only a very simple and practical guide at best and should not be used to take the place of the services of an industrial physician. The same must be said, again, for the use of professional publications themselves. No family can take care of their illnesses with a "doctor book", although a number of people will try.

10. Too many unemployed, physically handicapped persons increase relief rolls and even become a contributing factor in the cause of crime. Too many handicapped and too many accidents among them increase compensation rates because too many WCC's are too prone to make too generous awards to the handicapped persons. Too many personnel managers and too many physicians just say, "Find a watchman's job." This is a broad statement of the situation. What is to be done about it?

Such a broadly stated problem can only be answered in broad terms such as saying that the socio-economic problems of the handicapped will be solved when

1. (When) each employer will actually take the trouble to segregate a few— or more than a few—carefully appraised jobs for physically handicapped persons who have been examined carefully.
2. (When) each handicapped person is given an opportunity to develop new skills and thus become more productive both to his employer and himself.
3. (When) compensation boards are a little less inclined to penalize the employer and/or the insurance carrier for disabilities arising from previous conditions; or better still when Second Injury Funds are properly worked into the picture.

4. (When) the state realize that much of the relief money now going to the unemployed, physically handicapped person could, admittedly, with only considerable study be channeled into insurance funds thus helping to equalize or balance the cost of all insured. Direct relief is no cure for unemployment.

BIOGRAPHICAL SKETCH - Hardy A. Kemp, M. D.

Director of Graduate Studies, College of Medicine, Graduate School Affiliated Hospitals, Professor of Preventive Medicine and Chairman, Department of Public Health and Preventive Medicine, Baylor University College of Medicine.

B. S. in Medicine, St. Louis University, 1923, M. D. 1926. Teaching fellow in bacteriology, St. Louis University, 1923-26; interne William Beaumont General Hospital, El Paso, Texas 1926-27; private practice of medicine and pathologist, Missouri State Hospital, 1927-28; associate professor bacteriology and hygiene, Baylor University, 1928-34; professor bacteriology and preventive medicine, 1934-39; dean College of Medicine and professor preventive medicine, University of Vermont, 1939-41; dean College of Medicine, Ohio State University, and director university Hospital, 1941-44; on mil. leave, 1942-45; dean College of Medicine and professor Preventive medicine, Wayne University, 1945-48; professor of preventive medicine, director of graduate studies, Baylor University College of Medicine, Graduate School Affiliated Hospitals and Chairman, Department of Public Health and preventive medicine since 1948.

Served as 1st lt., Med. Res., 1926; capt. Mo. Nat. Guard, 1927-32; maj., Med. Res., 1936; active duty with A.U.S., 1942-45; lt.col., Med. Corps, 1942; overseas, 1942-44, as asst. med. dir., Trinidad Engineer District, asst. theater surgeon U.S. Forces in Central Africa, asst., surgeon S.O.S. in China-Burma-India, became deputy theater surgeon; colonel, Medical Corps Reserve, 1946. Secretary, Army Med. School, Apr., 1944-Oct., 1945, exec. officer in tropical medicine, Oct. 1944-Oct., 1945.

Awarded 1st prize for meritorious research Tex. Path. Soc., 1933; 1st prize for sci. exhibit Southern Med. Assn., 1934. Fellow A.A.A.S., A.M.A., Royal Soc. Tropical Medicine, Texas State and Harris County med.socs., Soc. Exptl. Biology and Medicine, Am. Assn. Writer of a Syllabus of Public Health Law, 1936, 37, 38. Industrial Physicians and Surgeons; Am. Public Health Association.

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C. U. Dernehl, M.D.
Medical Director
Carbide and Carbon Chemicals Corporation
Texas City, Texas
October 13

1. Can all Industries share equally in the employment of disabled individuals?

I do not believe that it is possible for all industries to employ disabled individuals. It is my personal opinion that a great deal of the talk about the employment of the disabled has come from those areas where piece work or assembly line work comprises a large portion of industry. I believe that it is possible for such industries to employ disabled individuals to good advantage. I do not see how an industry largely engaged in heavy manufacturing operations can be as liberal in such a program. It is the general policy of heavy industries to save any light jobs which may be available for their own ageing and injured personnel. This is only proper and I believe it would be unfair to ask such industries to accept other handicapped individuals for employment.

2. Should we distinguish between traumatic and disease disability?

I believe that there should be a distinction made between these two categories. A traumatic disability usually presents the full degree of disability which can be expected at the time the individual presents himself for employment. In all probability any change will be toward improvement of the physical state. The same cannot be said of disease disabilities such as hypertension, heart disease, infectious processes, arthritis, and etc. In these instances experience has shown that one can generally expect an increase in disability as time wears on.

3. What about the problem of employment or re-employment of psychiatric problem individuals?

This is a serious problem that faces all people engaged in industrial medicine. Experience has shown that people with psychiatric problems, if they are of any severity whatsoever, are usually exceedingly poor employment risks and sooner or later create new Plant problems of one type or another. I believe that it is exceedingly poor policy to employ any of these individuals unless it becomes absolutely necessary due to severe man power shortage. Similarly our experience with the re-employment of psychiatric cases has been very discouraging. Almost invariably they become a difficult personnel problem within a year or less of their return to employment. I recognize the fact that these individuals should have some means of providing for themselves and their families and yet we cannot permit complete disruption of Plant moral due to the presence of a few of these psychiatric cases. There are very few industries so situated that they can segregate such individuals to jobs where they have little or not contact with other employees. Until more satisfactory methods of psychiatric treatment are developed, I would hesitate to employ any individual with such a disability.

4. What effect will the pension programs now being pushed by labor have upon the employment of a handicapped individual?

It is rapidly becoming clear that industry fears the ultimate costs of the employment of handicapped individuals in the face of pension programs. The industries

fear, and perhaps justly so, that they will become burdened with a large number of pension payments to individuals who have worked only a few years in the industry concerned. Obviously there are certain traumatic disabilities that will not be a problem in this regard. The same cannot be said of disability due to a disease process. Unless some different method can be devised to care for employees who become totally disabled before retirement age, I feel that industry will be reluctant to employ those individuals who may become financial liabilities following a short period of employment.

5. Should industries be held responsible for aggravation claims by handicapped employees?

I feel that as circumstances now exist it is not fair to expect industry to employ handicapped individuals and then face the prospect of having claims made against them for aggravation of a pre-existing disability. We have at present a second injury fund which protects the employer against certain unjust claims with regard to permanent disability. The employer has no such protection against claims of aggravation of pre-existing disabilities. If we are to ask industry to employ handicapped people, then I think we must also make provision to care for these individuals if any claims of aggravation are made.

6. If industry is to accept handicapped individuals who is going to determine ability to do the job?

In the instance of a large plant having a medical service with a physician in charge, this problem is relatively simple in that the medical department can provide this service. In the case of the smaller plants having no medical service or a medical service staffed only by a nurse, this problem must be relegated to an outside physician. If that physician is sufficiently acquainted with the manufacturing processes of the industry concerned, he can in all probability make an intelligent decision. If on the contrary he knows nothing other than what he has learned by hearsay and has not taken the pains to become acquainted with the working conditions in the plant under consideration he is at best making a guess which may be greatly in error. Lay personnel of the plant can hardly be expected to make such a decision since they cannot be familiar with the medical questions involved. They might be able to handle, without difficulty, the decision whether a one legged man would be able to hold down the job under consideration but the finer details involving things like muscular weakness and disease processes would be strictly out of their scope. If an industry is to employ handicapped individuals, it should have available a physician familiar with the job under consideration to pass intelligently upon the applicants' ability to do the job.

7. Who should bear the cost of determining continued fitness to work in the disabled employee?

Here again the industry having a full time physician has no problem in that this service can be readily performed by the Medical Department. Those industries relying upon outside medical help on a case to case basis might well object to being asked to pay for such determinations. However, if the industry wishes to protect itself, it would become necessary for arrangement of periodic health examinations probably at industry's expense. Only in this way can management be assured that such examinations would be carried out on schedule. The added cost of such examinations might well be another deterrent in the employment of handicapped individuals.

8. Who should determine the degree of disability of the injured employee?

It is common practice in many industries employing physicians to send to outside consultants all cases of serious injury requiring prolonged treatment or involving disability. In such instance the attending physician should determine the degree of disability with the plant physician rendering an opinion as to the justness of the evaluation. In case there is marked disagreement, the opinion of a third physician should be obtained. If the plant physician treats the injured employee through the whole of his course and some disability becomes evident, then I feel it would be wise for that physician to obtain impartial consultation in determination of the final disability. This would be especially true if there were any question as to the degree of disability.

9. What part would rehabilitation programs play in the future employability of disabled personnel?

Following war time experiences, it became very clear that badly handicapped individuals could be returned to a gainful occupation through active rehabilitation programs. Such activities are badly needed in the industrial field since actual accident experience has shown that each year there are almost as many workman injured as the casualty experienced by the Army in active service. I am sure that with a properly active rehabilitation program in effect, that many more men could be returned to some form of gainful occupation if they are given the opportunity to learn and develop new skills within their physical limitations. This would give industry the advantage of employing a handicapped man already skilled in a new job rather than trying to fit a totally untrained man into some providential gap, which happens to appear in the man power field.

10. What legislative steps are necessary to increase the employment of disabled persons?

Occasional individuals have stated it would be well to have a law requiring that each industry employ a said number of disabled individuals. This type of regimentation is to be deplored and it should be pointed out that it is totally unrealistic in that it disregards the fact that certain industries can use only very limited numbers of disabled people. The legislation which is now needed, and I might add urgently, is that which will give the employer some measure of protection against claims of aggravation of pre-existing handicaps. I feel very strongly that we cannot expect industry to offer employment to these individuals without that measure of protection.

BRIEF BIOGRAPHICAL SKETCH - C. U. Dernehl, M. D.

Born in Milwaukee, Wisconsin.

Graduated from the University of Wisconsin and University of Wisconsin School of Medicine; Internship and Post Graduate training at the Medical College of Virginia in Richmond, Virginia; Joined the staff of the Medical Branch of the University of Texas, Galveston, Texas, in 1940; Taught Industrial Medicine at the last named school from 1942 until April, 1947, at which time accepted a position as Medical Director of the Texas Plant of Carbide and Carbon Chemicals Division, Union Carbide and Carbon Corporation; Have teaching appointments in Industrial Medicine at the Medical Branch of the University of Texas in Galveston, and the Baylor School of Medicine in Houston.

The Air We Breathe

*Notes on an exhibit and demonstration
of air hygiene research developments*

at

THE HARVARD SCHOOL OF PUBLIC HEALTH

BOSTON — MASSACHUSETTS



Presented at

THE THIRD GULF COAST REGIONAL CONFERENCE

ON

INDUSTRIAL HEALTH

HOUSTON, TEXAS — OCTOBER 13, 1950

DUST INHALATION

Problems of "Loaded Air"

How to prevent the injurious and sometimes fatal effects of dust-laden air on industrial workers who breathe it has been studied intensively by the Department of Industrial Hygiene at The Harvard School of Public Health since its founding in 1921 as the first post-graduate health school in this country.

This research has developed and made available to other scientists and to industry and government a great amount of knowledge concerning the effects of dust inhalation on the human system, as well as equipment for measuring, analyzing and eliminating particles from air. Typical developments:

Equipment for finding out how much dust a normal workman retains in his system when he breathes a known amount. (It was found that the nose is a poor dust filter and that "mouth breathers" are not necessarily unhealthier or more likely to get silicosis than persons who breathe through their noses.)

Relationships between dust inhalation and clinical symptoms of metal fume fever. (This study revealed how resistance can be acquired and thus explained a phenomenon familiar to industry—the men are not apt to get metal fume fever on two successive days, but lose their resistance after a few days away from exposure.)

Proof that the smaller the dust particles, the greater the damage to living tissue by silicosis, lead poisoning or other diseases. (Examination of the livers of rabbits, 18 months after the animals had been injected with equal concentrations of quartz dust, in varying sizes, showed that the least-damaged livers were from rabbits injected with the coarsest dust.)

TO RECORD MAN'S BREATHING



THE PNEUMOTACHOGRAPH—Until a portable and accurate apparatus of this type was devised at The Harvard School of Public Health, man's breathing cycle could not easily be followed precisely. The instrument records instantaneously the actual rate of inhaling and exhaling by persons at rest or at work; it is used in determining air flow requirements for gas masks and oxygen supply equipment, and in other problems of great industrial and military importance. The pneumotachograph is also a valuable aid in diagnosing industrial lung diseases and other pathological respiratory conditions. The instrument was developed by Dr. Leslie Silverman, Associate Professor of Industrial Hygiene.

AIR AND GAS CLEANING

Problems of Ventilation

One of the first pieces of equipment made in The Harvard School of Public Health more than a quarter-century ago was a 1200-cubic foot dust cabinet in which to produce laboratory conditions found in industry—in factories, mines and quarries. It has served as a small granite cutting shed, a mine (for studying rock drilling), a paint shop (for studying paint spraying) and a welding shop (for studying the causes and control of metal fume fever.) This versatile servant of research has been copied by former students and colleagues of its designers.

Proceeding from its studies of the effects of dust inhalation on man, the school has developed ventilating, and air and gas cleaning methods and equipment for industrial workers' protection. Typical developments:

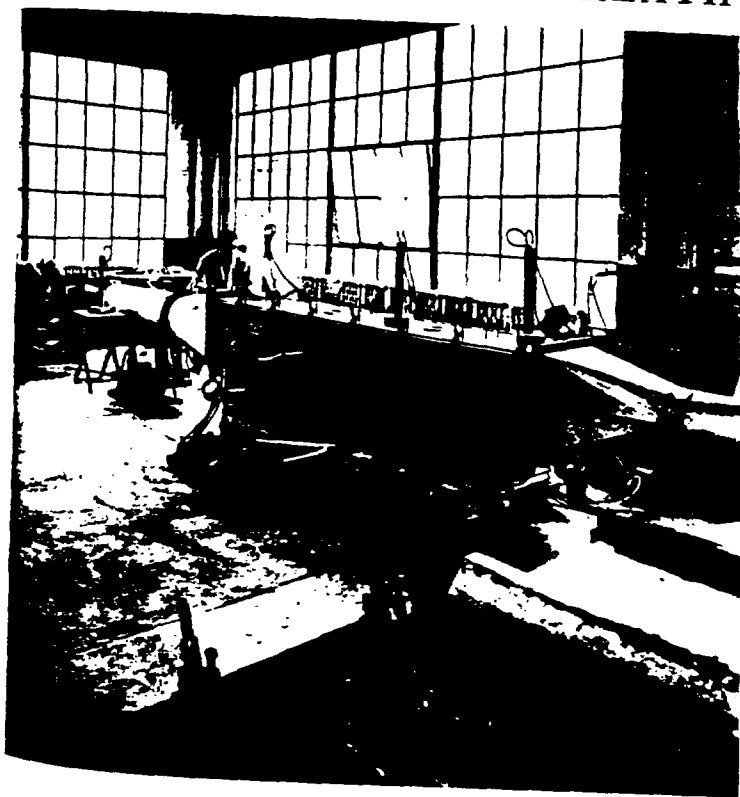
Specifications, generally adopted during World War II and now written into most state codes, for exhaust ventilation in welding operations.

Operating and ventilating requirements for industrial tanks and vats, including tanks used for impregnating and coating wire.

Specifications for the safe use of "metallizing," a metal spraying process in which metal fumes may poison the person doing the spraying.

Specifications for exhausts needed to prevent air contamination in various industrial operations. Contours of air flow into hoods of different design were developed and are now used routinely by engineers designing hoods for special jobs.

TO PURIFY THE AIR WE BREATHE



One of the major problems of certain industries today is to satisfy more rigid requirements for air and gas cleaning.

At the request of the Atomic Energy Commission, the School has set up a laboratory to study present equipment and methods. A major portion of the project is devoted to basic research on gas cleaning and industrial ventilation.

In the above photo, a wet cell air washer is undergoing test for efficiency of particle removal. Simulating actual factory conditions, a number of dusts and fumes are fed into the equipment and their selective elimination is measured by various tests.

ARTIFICIAL RESPIRATION

The "Iron Lung" and "EPR"

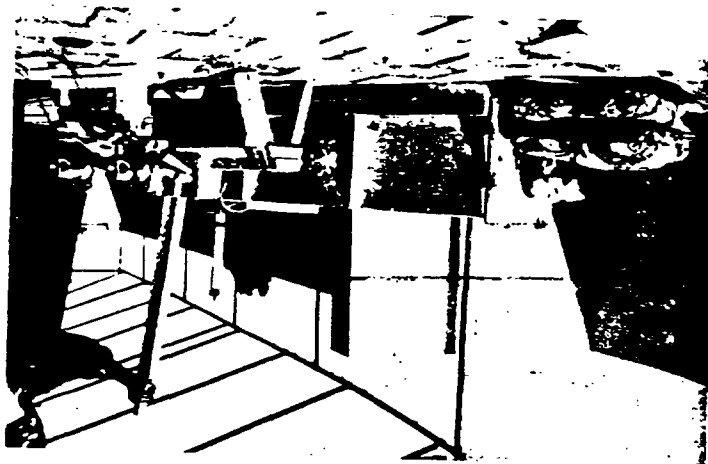
To breathe for man, when disease or injury has dangerously affected his natural respiratory powers, research has produced two machines of different types. Both were conceived and developed at The Harvard School of Public Health.

The Drinker Respirator, or "iron lung," was invented by Professor Philip Drinker of the Department of Industrial Hygiene at the Harvard school. Last year Dr. Stanley J. Sarnoff and colleagues of the Department of Physiology first demonstrated their invention, the Electrophrenic Respirator.

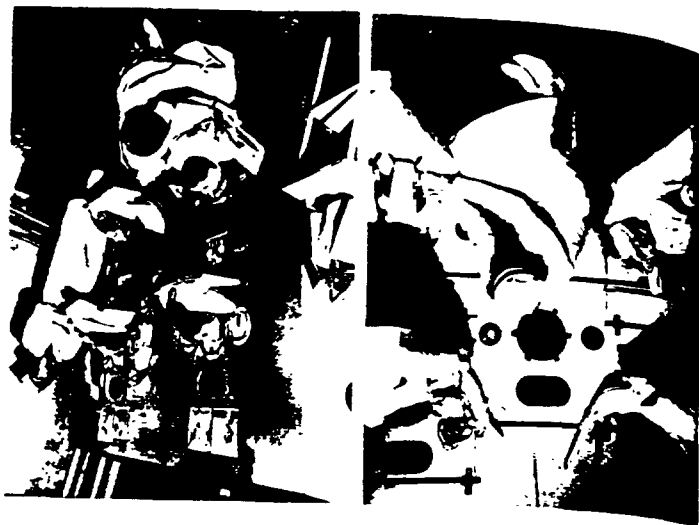
The first "iron lung," shown at the right, above, consisted of a rectangular metal tank and a bed made from a garage "creper," such as a mechanic uses for working under an automobile. An attendant swung a rocker-arm valve to admit alternate negative and positive pressure to the body of the machine from a household vacuum cleaner. A later model was the first respirator to be used successfully on an infantile paralysis patient in 1928. It was then placed in production with the machines mounted on wheels for convenience in moving.

Shown at the right, below, are LIFE magazine pictures of a modern development — a room-sized respirator at the Children's Hospital, Boston. This is a typical respirator scene in which children are being cared for while in the machine. Its advantage over the single unit is that nursing care is facilitated. Four patients may be accommodated at a time.

TO BREATHE FOR MAN



IRON LUNG—Above, the first one . . . Below, a modern version.



ELECTROPHRENIC RESPIRATOR

Dr. Stanley J. Sarnoff, co-inventor* of the Electrophrenic Respi-

rator, is shown below demonstrating the device that is helping to save the lives of bulbar polio victims. Through an electrode pressed against the neck, a carefully controlled electrical current is sent at intervals into the phrenic nerve, which leads from the brain to the diaphragm. Thus stimulated, the phrenic nerve makes the diaphragm contract, causing breathing, which closely resembles normal breathing.

Although it will not replace the "iron lung," the "EPR" has advantages of its own. In cases (especially bulbar polio) in which the patient's irregular breathing cannot be synchronized with the regular rhythm imposed by the "iron lung," the "EPR" is more effective because its impulses can suppress the patient's own breathing and thus resolve the conflict between the patient's efforts and the efforts of the respirator.

The "EPR" is small, compact and light enough to be carried to the scene of accidents to resuscitate victims of drowning, asphyxia and electrocution. It may be used to maintain breathing during brain surgery and may help newborn babies take their first breaths.

* With Dr. James L. Whittemberger and Esther Harlender of the Department of Physiology, Harvard School of Public Health.



Afternoon
Industrial Health Conference Panel

Frederick G. Sawyer, Ph. D., Moderator

"ATMOSPHERIC CONTAMINATION AND INDUSTRIAL WASTES SYMPOSIUM"

Joseph E. Flanagan
Senior Sanitary Engineer
Chief of the Cooperative Health Services Branch
Division of Industrial Hygiene
United States Public Health Service
Washington, D. C.
October 13

I have been asked to describe for you the government's attitude and plans in the field of air pollution.

I am sure that many of you are already aware of just how much the Public Health Service is interested in this problem of air pollution. Many of you, I am sure, attended the first U. S. Technical Conference on Air Pollution held in Washington last May. More than 800 people from industry, government, labor, and even private citizens attended this meeting. The Conference was divided into 7 panels considering different aspects of the problem such as agriculture, analytical methods and properties, equipment, health, instrumentation, legislation, and meteorology. There were 90-odd technical papers prepared for the meeting. The entire proceedings of the Conference are now being prepared for publication by the McGraw-Hill Publishing Company, and it is my understanding that the book will be available about the first of the year. That book should furnish the most complete and up-to-date piece of literature that we have in the broad field of air pollution.

The interest of the Public Health Service, however, is aimed mainly toward the future. Although we, along with others, have realized in a general way for many years that air contamination was a problem, it was the episode of Donora that made it so graphically plain for the first time that air pollution must now be regarded as a more urgent public health problem. In addition to the possibility that there may be future acute episodes like Donora, there is the more important probability that air pollution in lesser quantities may have chronic effects on citizens in a number of communities in this country. The obvious conclusion is that we need to begin long-range medical research as quickly as possible in addition to other fields of activity I will mention in a moment.

There is a considerable amount of research now going on to answer the most important questions in the field of air pollution. A great amount of this research is best done by industry and private enterprise, but there is also more in which the government should lead. President Truman, in his opening address to the air pollution conference in Washington last May said in part, and I quote "Since the problem of controlling atmospheric contaminants is primarily local in character, I believe that each locality should study its own situation and draft laws adapted to local conditions. Before this can be done, however, standards for evaluation and control of air pollutants need to be established. The Federal Government should take the leadership in doing this part of the over-all job, and I hope that Congress will see fit to appropriate the necessary funds for research".

Acting on this premise, the Public Health Service has mapped out a long-range research project, which will revolve about four points basic to the air pollution control program. First, we must identify in a more detailed fashion the various pollutants, their properties, and sources. Second, there is need to develop more effective methods of sampling and analysis. Third, as I have mentioned above, we must determine chronic effects of exposure to air pollution so that threshold values of contaminants may be developed. Finally, we must do research on control measures to arrive at methods that are more practical and economical than those currently available.

Some of the specific research problems with which we must concern ourselves include field studies to determine the types of contaminants, concentrations, diurnal variations, and dissemination of contaminants. Such studies would include meteorological measurements and would be sufficiently comprehensive so as to give basic information of broad application.

Also proposed are studies of available vital statistics to evaluate the possible association of atmospheric pollution with various common diseases.

Through laboratory studies with human subjects, we hope to determine variations in individual response to odors and irritants as well as possible effects of temperature, humidity, and age. Our proposed laboratory studies will also attempt to ascertain, through animal experimentation, the effect of low concentrations of contaminants for continuous exposure, the effect of mixtures of gases, the effect of mixtures of gases and particulate matter, and the effect of contaminated vegetation on animals.

Another phase of our proposed research program entails the modification of existing methods, or the development of new methods, including continuous recorders, to more precisely determine atmospheric contaminants. Such studies are fundamental to the whole atmospheric pollution problem, for from them will evolve a better standardization of methods, which, in turn, is essential in establishing standards.

I don't believe that I have to say that these problems are not academic or theoretical. They are only part of the host of unanswered questions to which the Donora smog investigation called new attention. We now know that this information is absolutely essential before we can proceed to the next step—the establishment of much-needed air pollution standards. At present we know the criteria and factors to be considered, but they cannot be evaluated adequately until the data that we are seeking are available.

The final point in our proposed research program calls for the improvement and development of control procedures, the natural concomitant to the establishment of standards. Although here, too, we know the fundamental principles on which to base controls, much work is needed to apply these principles in an efficient and economical way.

These projected activities form the crux of a comprehensive research program which we hope will shed light on many of today's puzzling questions on air pollution. This program will swing into action just as soon as the expected appropriations materialize. In the meantime, within our budgetary limitations, we have been giving consultant service to various States confronted with air pollution problems.

For instance, we are assisting a city in Maryland with a study of morbidity in relation to air pollution being made by the Maryland State Health Department on a special

grant from the State legislature. As an aid to researchers, we also did a lengthy review and abstract of all the literature on the biological aspects of air pollution, and this annotated bibliography has been published by the United Steel workers of America. CIO, as a public service.

Our major study at present involves air pollution over the international boundary between Windsor, Ontario, and Detroit, Michigan. The problem centers mainly around contamination from vessels plying the waterway and has been referred by the Governments of the United States and Canada to the International Joint Commission. Both governments are to provide the necessary services, and the groundwork has now been laid for active participation by the Division of Industrial Hygiene, Public Health Service, which will conduct the work of the American delegation.

And now let us turn to a look at the matter of legislation. It offers in many ways more obstacles than research. As technical people attacking a technical problem, we know that no matter how complex the problem and how far distant its apparent solution, we must first list and evaluate the questions to be answered and then set about answering them in methodical and orderly fashion.

As is often the case, however, scientific progress must often take place in an atmosphere of public demand for that progress and usually the public is not willing to wait as long as the scientists would like for the scientists to produce their answer. At the same time the scientists realize that public demand is often necessary to their work, so I do not mean to imply for a moment that public demand is always to be listed as a barrier to progress.

This has in general been the situation regarding air pollution. Some public demands have been good, some have been unwise. Adding to the confusion has been the fact that many cities have been concerned about smoke pollution through the years, and many more, still working on pure smoke control, have confused that with the overall problem of atmospheric contamination.

One type of legislation requested has been the establishing of air pollution control boards in each county of a State, authorized to employ their own experts and to operate individually with no tie-in or correlation of activities with the State Health Department. Such a measure was proposed, for example, in New Jersey, an industry felt compelled to fight its many restrictive provisions. The Federal government in good conscience could not support such legislation, if it was requested to do so. The Massachusetts legislature saw the introduction of another type of stringent regulation. A bill was offered that would require all commercial plants in the State, especially those concerned with commercial fertilizers, to eliminate odors detestable by the "average individual" beyond a radius of 300 feet. When one considers the heavy odors that come from, for instance, a candy factory, the enforcement of such a law offers quite a problem.

Kentucky, on the other hand, is considering the zoning approach to the problem. A bill has been introduced in the Kentucky legislature to prohibit the establishment, development, or operation of carbide, sulphur, and lime plants within ten miles of a city of the first class. There are other states which are proceeding toward what we feel to be a better solution. South Carolina, for instance, has authorized the creation of a committee to make a full and complete study of the needs and means for regulating and controlling smoke, soot, smog, and other similar public nuisances in the State and to report back to the legislature with recommendations within a specified period of time.

Last spring the governor of Maryland signed into law a bill providing a sum not to exceed \$100,000 but appropriated annually for the State health department for the study and control of air pollution in the State. I might add that the actual appropriation this year amounted to only \$10,000.

More states have had bills introduced than I have mentioned here, and probably even a greater number will see bills introduced in future sessions. I am sure you will agree with me that every effort should be made to guide the deliberations of State legislatures considering air pollution bills.

In this respect it must be borne in mind that often the type of legislation brought before the legislature of a State may be greatly influenced by the attitude of the health department of that State. In some states the health department, for reasons of its own, has not identified itself with air pollution work. In some cases the Director of the State industrial hygiene unit is not yet convinced that air pollution is a public health problem. In other cases the same officials, while convinced of the importance of air pollution as a health problem, have been so understaffed in their efforts toward solving the traditional problems of industrial hygiene that they have not felt justified in giving attention to seemingly fringe problem. Consequently, local communities in these states, unable to look to the State health department for technical leadership and assistance, are left to their own devices in an exceedingly complex field.

Needless to say, the Public Health Service is well aware of these problems of staffing and budgets, and the many pressures on a State health department. But we believe firmly that the State health department is the logical agency, from many points of view, to deal with this problem, and we hope that all State health departments will find it possible eventually to get into the field to the extent necessary in each State. The extent necessary may be inversely proportional to the efforts and accomplishments of industry.

While the states have been busy with legislation, there has also been considerable activity in the Congress in Washington. Up to now there have been proposed 7 bills. Four of them would authorize the Public Health Service to proceed immediately with research. Three of them reflect a different—and to our mind a rather limited—view of the over-all problem.

One of the three would authorize the Civil Aeronautics Board to study the need for smog control in the vicinities of airports in order to promote safety in air navigation. The bill would also give the Civil Aeronautics Board the power to determine the most practicable means by which the discharge of smoke contributing to the formation of smog could be controlled.

I believe that the objections to this bill are obvious. First of all, from the standpoint of health, the most dangerous smogs are not necessarily those which hamper visibility. Second, in some towns where the smog problem exists, there is no airport. Furthermore, we do not believe that Federal control of the smog problem is the solution. Air pollution is not necessarily even a State problem. It is primarily a local matter, since each locality has its own peculiar topography, industry, and meteorological conditions. We believe that the Federal Government should have authority to step into a local situation only when more than one political area is involved—as, for example, the Staten Island problem, involving the States of New York and New Jersey.

The second of the three bills would authorize the Bureau of Mines to engage in research and experimentation in the field of air pollution. The language of the bill is such that it would put the Bureau of Mines in the business of industrial hygiene in every State in the union and thereby result in a complete duplication of the work now being done by the State health departments and the Public Health Service.

The third bill would authorize the Secretary of the Interior to "conduct researches, studies, investigations, experiments, and demonstrations, including laboratory and development work, and to publish and disseminate information, for the prevention of atmospheric pollution from harmful solid, liquid, or gaseous substances from any source or causes, including all kinds of industrial operations." At the same time, it would authorize and direct the Surgeon General of the Public Health Service to "carry out a program of investigation and research into the health hazards of atmospheric pollution designed to determine the long range and chronic, as well as the acute, effects of atmospheric pollution on health."

As it stands, the bill would also create the same needless duplication of work between the two agencies, since the Public Health Service is already carrying out the atmospheric pollution functions that would be assigned to the Bureau of Mines.

In the midst of this problem we are conscious of the situation in which industry finds itself. Many industries are doing their own research and seeking by whatever means they can to cut down on industrial air contamination as a matter of public relations and also of economics. At the same time those industries often feel that they should not talk about what they are doing. There are indeed many management leaders, as well as leaders of other fields, who have refused to accept the importance of air pollution. But it is industry which will have to live with the problem and eventually help in the solution of it.

It seems to us, therefore, that the legislative problem is as important as the research problem. Wherever there is a public demand for legislation we should work to steer such demand into the proper channels rather than to kill it or rather than to denounce it. So you see it is a field in which there is plenty of work for everybody and it is certainly a problem that affects everyone of us, as well as every citizen.

oOo

BIOGRAPHICAL SKETCH - Joseph E. Flanagan, Jr.

Born - Worcester, Massachusetts.

Educated - Public Schools, and Worcester Polytechnic Institute

Received B.S. Degree in Chemical Engineering - 1935.

Experience - 1935-1940, Massachusetts Department of Public Health

1940 to Present - U. S. Public Health Service.

Assignments with Public Health Service

1940-1941 -- Stream pollution and industrial waste investigations - Cincinnati, Ohio

1941-1943 -- Industrial Hygiene Engineer engaged in investigations of arsenals producing munitions of war throughout the United States.

1943-1946 -- Assigned to Ohio Department of Health as Industrial Hygiene Engineer.

1946-1948 -- Industrial Hygiene District Consultant, District 3, Chicago, Illinois.

1948-1950 -- Chief, Cooperative Health Services Branch, Division of Industrial Hygiene, Washington, D.C.

"A PROGRAM FOR INTER-INDUSTRY COOPERATION"

A. J. Krell
Field Instructor
Texas Engineering Extension Service
of A & M College
College Station, Texas
October 13

The industries of America have long known that they have a waste problem. More recognition that the problem existed did not, and has not created a solution. There has been reams of publicity generated on the subject of water and air pollution, and more of the same is undoubtedly in an active state of preparation. In the last decade, a peculiar phase of American life has developed. It consists of the act of rushing into print with a press release, as if the well-springs of publicity had a magic elixir for the curtailment of a current ill. There is no question about the valid uses of publicity and both the lay and technical press have been used in promoting and indeed, even creating pressure if necessary, for the development of waste control programs. However, whether in the employ of government, business, or the publication field, let us avoid creation bitterness or the sharpening of antagonisms where they already exist.

Our world is more in need of large doses of cooperative effort, and this is one of the fields where industry can demonstrate its ability to work as solid citizen, each in his own community. No industry, or individual can live as an isolated entity in society. The geographical frontiers of the U. S. are limited now, until further advances in technology and basic science may make areas available not now considered possible investment developments. Essentially we have to stand where we are, develop, use, and conserve what we have. What promotes the life and progress in each community must help industry. They are inseparable and cannot live apart. Our theme is cooperation. The means and the methods of making working better now with what we already have. Can inter-industry cooperation on a regional basis provide clean water and clean air where we live and where we work? We must seek all methods of reaching this objective without dislocating the productive efforts of industry, or the creation of a possible marginal status. This is what I would like to discuss.

There are some interesting parallels between the early industrial development of the U. S. and our present Southwestern industrial concentration. I hesitate to use the word "empire". During the middle 19th century when the effective industrial development of this country began, it was able to accelerate its production efficiency and rate beyond the Old World's by taking advantage of the technically applicable discoveries of the 17th and 18th centuries, the then threshold of the new world of science. So here in the Texas Gulf Coast, we find ourselves on still another threshold. Fortune Magazine in a recent issue has called it the "Chemical Century". Our expanding industry brings to the fore new and revolutionary concepts in both technology and in industrial administrative practice. The increasing integration of industry both in the Gulf Coast and other sections of the nation make it difficult to tell what is a chemical industry per se, a packing house, cereal milling, wood pulp, or petroleum refining industry. All of these and many more industries have become so extensively organized that they are producing what were previously considered primarily the products of a chemical industry. They have created new chemical products that were not known as little as ten years ago. You can all think of plenty of them. In our re-

tion, the biggest development comes under the heading of the petro-chemical industry. It has been growing at a rate that keeps the statisticians slightly out of breath trying keep records of the progress made.

The significance and importance of the part that integration of chemical production plays in the control of waste can only be hinted at here. It is a complicated problem that deals with financing, marketing, anti-trust actions, fully as much as technology, and can not be explored here. However, the dynamic role of production change and development as one of the leading aspects of American chemical technology may be noted by observing a product that resulted from industrial integration. A far reaching innovation is the enormous increase in the production of synthetic detergents processed from petroleum derived hydrocarbons. In 1941, thirty million pounds of detergent were produced and in 1949 - 1950 we are crowding the billion mark. One producer expanded to such an extent that by-product hydrochloric acid resulting from halogenation of petroleum derived hydrocarbons had replaced all outside purchases, with still an excess in sight. Now attempts are being made to revise all plant processes of the company that utilize purchased sulphuric acid. Hydrochloric acid here is a waste until it can be successfully integrated into the companies own manufacturing operations, sold, or even donated to another producer.

New products bring new wastes and new problems; problems that all existed before. However, they have not previously developed at the rate and volume that we are now experiencing in the unprecedented expansion accelerated by integration of primary producers. The constantly changing panorama of process developments are being high-lighted by new competitive problems from compounds resulting from the Fischer-Tropsch process in petro-chemicals. Coal hydrogenation under high pressure may have a significant impact on our economy and restore some of the advantage to coal as a chemical raw material that had been lost to the petroleum hydrocarbons. A bright new comer still in the experimental stage is the recovery of chemicals from the distillation of shale oil. Its economic position improves as the price of crude petroleum edges higher and the mining and distillation of shale becomes more efficient.

These examples indicate the incredible speed with which the 20th century American Chemical industry changes. It is a prime characteristic of our technology. All modern technological developments are based on extensive and intensive research to obtain maximum yields. As a result of these two characteristics, a waste control program can be a piece meal affair delegated as a nuisance to some 'poor Joe', with whom everybody else in the company will sympathize with in a superior manner. It must be completely married to the research and development phases of every new product conception and part and parcel of the production process. The first attack on wastes, new or old, belongs at the process development level. And many industries are developing the kind of personnel that are ramrodding the job. I mean a new type of activity, a waste control coordinator, or conservation director. Call him what you will, but his prime responsibility is to see that management's program of waste control by pressing consideration of the problem in research, development, operation, and where necessary to obtain necessary treatment facilities.

Many management people, executive and technical have told me repeatedly that the position of industry in waste treatment and control is similar to the attitude that existed toward industrial hygiene and safety thirty or more years ago. Social acceptance of an industrial activity or benefit, like other phases of education are cumulative. Rational programs for the control of industrial pollutants will not have to be struggled for. We do not wish to gain the public indignation, and indeed hatred

that industry reaped from its early opposition to acceptable programs of hygiene and safety.

A basic resource necessary to the solution of any problem is the trained people to do it. The Texas Engineering Extension Service of A & M College is working cooperatively with industry to provide intensive short courses to accomplish this. A series of Waste Study Conferences have been held in the industrial concentrations of the state to obtain information concerning the local problem and what the need of the people in industry is to accomplish pollution control work. As a result of this primary activity, a base course, "The Effects of Industrial Waste on Aquatic Life" was prepared and presented in one locality already. Plans are now being made to complete the circuit of Gulf coast cities by January 1951. In addition to this, other courses on the treatment of air and water borne wastes are in preparation. Our is a practical program of working with industry to get something accomplished today.

Since the passage of the Water Pollution Control Act, Public Law 845, industry in concerted action and as individuals has been making aggressive attacks on many difficult phases connected with the control of water and air pollution. "Stream Pollution Control Activities of Industrial Associations", an article by W. H. Wisely, editor of Sewage Work Journal appeared in the January 1949 issue. To the associations listed, I sent a letter of inquiry requesting information on their industrial waste activity. Most of the associations have developed programs designed to be of some general benefit on an industry-wide basis without regard to specific regional aspects of the problem. The most extensive work has been accomplished by the groups of industries whose problems are the largest. Comparison of the accomplishments achieved by the various industrial groups would be beyond the scope of this discussion and certainly such a report would scarcely be accurate based on incomplete information and time limitations.

Another development in the field of inter-industry cooperation was the formation by 19 major industrial groups in May 1950 of the "National Technical Task Committee on Industrial Wastes". From all indications the work of this committee is still very much in the formative state and its future activities will be watched by all of us. Four major "task groups" have been established: Task Group I, Food Industries, II - Mineral Products, III - Chemical Processing, IV - General Industries. Purpose of the various groups has been stated by FSA Administrator Oscar Ewing as, ".....task committees will draw up a program to solve water pollution problems caused by industrial wastes for which no methods of treatment have been developed and to improve existing waste treatment methods where needed".

However, another development that brings together diverse industries, but of the same locality, has resulted from the work being done by some of the interstate compact commissions, and those designated as under the Water Pollution Control Act as water pollution control agencies on an interstate basis. These are divided into two groups: The compact agencies through the consent of Congress and by agreement of the cooperating state governments; and those organized by private industry and designated under P.L. 845 by the Public Health Service. The latter group of designated agencies is limited to the work of the marine fisheries industry and is composed of the Atlantic States, Gulf States and Pacific States Marine Fisheries Commissions. Presently active in this group in pollution control activity is the Atlantic States Marine Fisheries. With a grant-in-aid from the USFWS, it is conducting administrative operations on a study to determine the extent and effect of industrial and wastes of domestic origin on the economy of the marine fisheries industry of the Atlantic Coastal States. The technical direction of this survey is under the supervision of the U.S. Fish and Wild-

life Survey and is acting in its official capacity as the primary research agency for the Commission. Neither the Gulf or Pacific Marine Fisheries Commissions reports any activity as a pollution control agency in its own right, either technically or administratively.

All of the inter-state compact commissions report some activity with industry on pollution control.

They are either surveying the problem or have an industrial advisory committee working with them. The Interstate Commission on the Potomac River Basin delegates to its advisory Industrial Committee all problems connected with industrial waste with the request that they make recommendations to the Commission as to what action should be taken. The Commission reserves the right to its own discretion for final action on any recommendation.

The Ohio River Valley Water Sanitation Commission composed of eight signatory states has a special unit within its own staff to coordinate data and to otherwise develop and accelerate industrial waste control measures. It has received a grant from the USPHS under Public Law 845. One of the objectives is to bring up to date the primary record of data of the Ohio River Survey. All work will be on the coordination level with no direct research or laboratory work planned by the Commission itself.

The Interstate Sanitation Commission is presently planning a survey of industrial pollution and will not be in a position to provide information for a year or two. Its primary emphasis has been on the control of domestic sewage pollution from tributary cities into tidal waters of New York, New Jersey and Connecticut. It reports no specifically organized program of industrial cooperation, but has always worked in the spirit of mutual aid to carry out its objectives of improving the condition of tidal waters on the shores of the signatory states.

This brief account of one phase of the pollution control activities of the interstate agencies furnishes us with the basis of considering a program that may be more suitably organized to meet the requirements of the industries of the Texas Gulf Coast. The problem of organizing industry to work on its own pollution control problems is simpler in Texas than elsewhere because of the state's geographical continuity. Our major pollution problems originate in well defined industrial concentrations, all within the state. We are therefore not concerned with the problems of multiple political subdivisions with the exception of the county level. They can be readily handled and do not require any further discussion here. There is possible here a regional type of industrial organization to handle its waste problem because of the fairly sharp lines of demarcation of each industrial area in the state. While the waste control problems of different industries requires specialized knowledge within the specific industry and individual responsibility, the community receiving water and atmosphere is the common responsibility of all resident industries. Here in Texas we have an opportunity to demonstrate what the local level of industrial cooperation can accomplish by doing the job where it needs doing the most.

The advantages of regional industry organizations to cope with waste control and pollution problems may be divided into two aspects. The in-plant problems would deal with effluent quality control information, as may be accomplished by process modification, and to technical developments of the treatment of waste itself. There are many phases of cooperative effort between allied industries in the same area that are possible. While it is doubtful that companies will share information concerning their

process modifications to reduce pollution loads, there are many in-between areas for exchange of information where competitive interests do not clash. There is always the possibility of compromise under such circumstances to achieve progress for all concerned.

Two points of cooperative endeavor regional activity suggest themselves for in-plant studies: (1) the polluting effects of raw materials common to a given group of industries may be studied by them, so that better choice in production control may be accomplished in the transformation of such materials; (2) exchange and standardization of analytical methods. One of the fields of investigation is in toxicity testing. A division of labor in a group of local laboratories would certainly provide us with more accurate methods more quickly than is otherwise possible. This is the type of project that requires doing in the industrial laboratory because it should be correlated with design and operation of treatment plants.

The out-plant development of cooperative effort in the area would deal with the joint supervision of the common receiving water. There would be collaboration on sampling program and the information obtained by each company would be combined for the benefit of all. There are many companies now carrying out extensive sampling programs in their own receiving waters with considerable duplication by their neighbors. The value of this information could be increased enormously to all in the same area if it were traded and coordinated in a spirit of mutual trust and confidence. Costs of such programs would be materially reduced. And in all instances, a more comprehensive and accurate survey would result from such collaborative effort.

In the same manner on an in-plant and out-plant basis problems in air pollution could be thrown into the cooperative hopper. The lines of attack on both air and water borne pollution follow the same general application.

These few examples are just suggestions of what may be possible in an organized activity of this type. It by no means explores the possible combinations that may result from group action of able and intelligent men with backgrounds of solid industrial achievement behind them. First, it is necessary to overcome some of the fears and artificial restraints of some company policies. There are many examples in other fields, however, in the field of waste control such actions are still in their infancy. It is in the solid American tradition to be adventurous and experimental enough to form the kind of organization necessary to the thing that needs doing. Let's get away from that fatally digressive 'rat-hole' of, "...if we only had a law that would...etc." We need trained people, more information about our job, and coordination of existing facilities more than anything else.

The fate of industry in this field lies distinctly in its own able hands. Shifting responsibility to government agencies will not get the job done. Our problem has many technical solutions whose probable solution seems more reasonably to lay within the province of industry. Together with the technical phases, we have the financial and internal company organization aspects. All this requires time to work out. No amount of wish fulfillment will ever substitute anything in its place. If we don't begin aggressive programs to accomplish something, we have the alternate possibility, distinctly real, of more rigid enforcement developed by public demand through channels of self-generating government publicity. Then there is that sizzling type of public indignation stimulated by obvious nuisance or real danger to public health through water and air pollution, forced on some communities by industry. Our people no longer look upon dirty atmosphere or water with glances of gratitude that the plants in their

community are operating. He expects either a job or an income from the government, the continuance of dirty atmosphere or water as a result of an industrial activity where those same companies have already seemingly accomplished miracles of production, and are considered modern wizards, only convinces the average citizen that the big corporation is conniving at some way of avoiding and evading the job they can readily do. Intelligent, cooperative action in each community to work toward a solution of the problem, will bring us to the point of maximum use of natural resources without panic and dislocation of industry. Failure to act will be costly to all concerned.

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Industrial Wastes and Stream Pollution Symposium

David F. Smallhorst, Presiding

"GENERAL TRENDS REGARDING INDUSTRIAL WASTES AND STATE LEGISLATION IN THE NATION"

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Dallas, Texas
October 13

Public concern over the protection of the quality of our natural waters has been increasing steadily in recent years. The passage of Public Law 845 was but another indication of the rising demand that our water resources should be restored to and in a clean condition suitable for public water supply and many other important uses.

A clearly expressed desire that constructive steps be taken in removing from our watercourses those substances inimical to the general welfare is making itself increasingly apparent today. Municipalities are being called on to treat their domestic sewage. Industry is being asked to utilize or treat its wastes, and other private and public agencies are being approached to do their part in improving the quality of our water resources.

One can hardly pick up a professional magazine or trade journal without finding a reference to water pollution. The newspapers, the popular magazines, the radio and recently television, have taken a part in advancing the cause of clean streams. The American Federation of Women's Clubs, to name just one group, has set as one of their goals the restoration and preservation of pure water resources.

I am glad to say that industry has recognized this trend and is taking steps to abate industrial waste pollution. For many years, certain individual plants, and certain types of industry have been actively studying their waste disposal problems. To provide a broader base for these efforts, industry has established a National Technical Task Committee on Industrial Wastes. The first meeting of this group was held May 9-10 of this year. It is proposed that they define their problems on an industry wide basis and working with government on a mutual cooperative basis solve the waste problems confronting industry as a whole.

The functions of the National Technical Task Committee are:

1. To inventory, appraise, coordinate and promote research in developing methods of using, treating and controlling industrial wastes.
2. To facilitate the devising and adoption of uniform methods of measuring and evaluating trade wastes in water quality control.
3. To stimulate more effective working relations on technical phases of trade waste problems among industry and federal, state, and local agencies.

4. To employ the facilities of the Environmental Health Center of the Public Health Service in those areas of research and development wherein they would be the most valuable to the over-all program.
5. To aid in establishing those areas where major needs exist for financial assistance in obtaining basic information on industrial waste problems in water pollution control.
6. To stimulate further the adoption of practical methods—known or yet to be developed—for reclaiming, reducing and treating wastes impairing natural stream conditions.
7. To achieve wide dissemination of information on technical developments and accomplishments of industry; maintain suitable relations with technical societies, professional organizations, trade associations, and such other groups as issue publications reaching persons concerned with water pollution problems.
8. To aid in promoting training activities to increase the operating efficiency of waste recovery and treatment systems employed by industry.
9. To perform such other technical tasks relating to industrial wastes as necessary to stimulating improvement in the quality of the nation's water resources.

As presently contemplated, a large portion of the technical work of the Committee will be performed by work groups composed of the best technical talent from those industries sending representatives to the Committee. It is anticipated that by bringing together industries which have what might be termed a community of interest—in so far as wastes are concerned—duplication of effort and needless expense can be minimized. Likewise, those groups best equipped and staffed to conduct studies along certain lines could advantageously be assigned those tasks. The exchange of data and information of a fundamental nature—information which can be applied by the participating industries to their individual problems—will be encouraged.

It is not proposed that these activities will in any way conflict with or replace activities that already have been sponsored, organized and financed by various industries.

As a typical and fundamental problem, for which there is pressing need, there is the question of "yardsticks" of pollution for all water uses. This is a technical problem which in one way or another affects all industries discharging wastes into natural watercourses. It is an example of but one of the many technical tasks which require wide consultation and general agreement. The answer appears to lie in close working relations—in teamwork.

I understand that industry committees have been established in the automotive, beet sugar, canning, chemical manufacturing, coal, dairy, distilling, electric, electroplating, fermentation, gas manufacturing, iron and steel, meat, petroleum, pulp and paper, tanning, textile, non-ferrous metal and rubber fields. No doubt there are others.

I have here a copy of a Report by the Waste Disposal Task Committee of the Dairy Industry Committee. Quoting from the introduction of the Report: "The dairy industry has two important stakes in prevention of waste. The first is the direct savings

in dollars that too often go down the drain unless a complete system of waste prevention is adopted. The second is compliance with increasingly strict regulations, particularly in regard to stream pollution. There again, a complete system of waste prevention is a dollar saver." The Report goes on to cover the seven points where waste reduction can be made. These points are: (1) leakage (2) overflow (3) spillage (4) freezing on (5) willful waste (6) residual waste (7) carry over. Causes of waste are enumerated and remedies are prescribed. I am asked this morning to give general trends regarding industrial wastes. I think the most notable trend is not the building of treatment plants but rather the establishment of waste prevention practices within the plant itself—good housekeeping, if you please. In many cases good housekeeping measures are merely preventive maintenance which should be followed to keep the plant at peak operating efficiency. The cost of such simple measures is low and the results may show a saving. One of the reportedly unsolved industrial waste problems in this section of the country is that connected with the citrus canning industry. I have, however, seen crushed fruit from the unloading bins flushed to the sewer with water. If the industry wished, such wastes could be removed dry thus alleviating the load thrust upon our streams.

Let me enumerate a few developments in industrial waste treatment. An outstanding example of pollution control in the chemical industry is found at the Midland plant of the Dow Chemical Company where some 200,000,000 gallons of waste water must be disposed of daily. Brines are stored in huge ponds and released during periods of high flow. Clear waters are discharged direct to the river with careful control of evaporator losses. Special wastes, unfit for storage or biological treatment may be recirculated, treated with activated carbon, steam-distilled, and extracted or oxidized with chlorine; inorganic acid wastes are controlled to fit the alkalinity of the river. Phenolic wastes are treated by acidification, settling, equalization and biological oxidation after dilution. General organic wastes of 50 MGD are treated by screening and the activated sludge process. Truly this is a fabulous pollution control undertaking.

The treatment and disposal of waste soluble oils have been extensively studied at Michigan State College. They found that emulsions can be successfully broken with calcium chloride and the resulting water layer can be clarified by flotation and settling. BOD reductions from 98.3 to 98.8 per cent can be obtained. The treatment of waste soluble oil is desirable even though the quantity is small.

The canning industry is learning that their water consumption can be cut as much as 50% by re-use of clear waters. Screening of all wastes and the elimination of open drains reduce the "garbage" which adds to the pollution load. Lagoons for disposal of cannery wastes are being increasingly used. Sodium nitrate is applied to keep the lagoons from becoming septic.

The pulp and paper industry through their national council for stream improvement are vigorously attacking one of pollution abatement's most difficult problems. Screening is employed to remove fiber chips, etc., and is of substantial value to stream improvement. White water wastes from paper machines are being recycled with a substantial saving at an increasing number of mills. Sulphite waste liquors are being studied for methods of utilization and disposal. Utilization of the liquor as a road binder, as a briquet binder, as an adhesive and as a material for alcohol production has been studied. More recently, investigations have been made for biological utilization of carbonhydrates in reducing the oxygen demand. Fodder yeast can be grown using both fermentable and nonfermentable sugars for food. At Longview,

Washington, a mill scale study has been inaugurated on a process that uses magnesium rather than the usual calcium base of cooking liquor. A recovery system for magnesium has been provided in which the waste liquor is concentrated then burned for reclaiming the fuel value along with the base for making new cooking liquor. Results thus far are a cause for favorable comment. This week I learned that chemists at the University of Texas have found that sulphite wastes can be made to produce paracymene. This by-product can be converted to para alpha dimethyl styrene. It can replace styrene that combines with butadiene to make synthetic rubber. The paper pulp industry is expected to be willing to install necessary recovery equipment for the cymene by-product if it would be utilized in large amounts.

A report from the rayon industry indicates that acid wastes from viscose rayon and cellophane manufacturing plants are neutralized with lime, settled, treated chemically for the recovery of valuable constituents and discharged to the streams without nuisance. The sludge resulting from neutralization is very bulky as it comes from the clarifiers and its disposal is a costly item where large areas are not available near the plant site. One plant ships the sludge 6 miles by railroad and another is considering barging it to sea. In most cases the sludge is dewatered on vacuum filters to reduce the volume. Other wastes from these plants have a relatively high oxygen demand, because of organic and other materials, and are treated biochemically.

Wastes resulting from the manufacture of acetate rayon lend themselves to biological treatment and can be handled on trickling filters. The activated sludge process is too sensitive for these wastes because of fluctuating chemical composition.

I might go on the cite studies and developments in the utilization and treatment of tannery wastes; sugar manufacturing wastes; packing house wastes; distillery wastes, etc., but the technical periodicals and trade journals are replete with this type of information. I think you will agree from your personal knowledge and the foregoing examples that there is a definite move by industry to eliminate their industrial wastes or to render them inoffensive prior to discharge to our watercourses.

Before I leave this subject, may I point out another trend. I am referring to the employment by industry of technically trained chemists, biologist, and engineers for pollution abatement work. These people understand the importance of pollution abatement. They understand the difficulties inherent in treating a trade waste. They bring management closer to the regulatory bodies. And, finally, they spearhead the pollution abatement program for industry.

I have been asked to give the general trends regarding State pollution legislation. This is rather a large order as we are presently in a state of flux regarding State legislation. More than half the States have adopted new or strengthened existing State water pollution control legislation within the last decade.

State water pollution control legislation developed traditionally out of the authority of health departments to preserve public health. In conjunction with this there was piecemeal lodging of concurrent water pollution control authority in several other departments of State governments such as those dealing with agriculture, fish and wildlife, and mines and minerals which also had an interest in water pollution control. The modern approach to the problem is reflected in recent State statutes whose object is to preserve and improve water quality for all legitimate uses and do this through an agency that represents all affected interests in the State. Accompanying this has been a shifting emphasis from the mere abatement of existing pollution to the policy of preventing pollution in its incipency.

In the past, the administrative approach, which has set up a single administrative agency, has been largely negative in character. That is when a particular action has been found to cause pollution the administrative agency has taken steps to abate such pollution. With the development of comprehensive programs, classification of waters, and standards of water purity for water use, administrative programs for water pollution control can move toward a more positive phase. Not only can the present use of a particular portion of a stream be classified and maintained, but future water uses may be decided upon, after consultation with community and other interests, and a program instituted to bring the quality of the water up to meet the requirements of these new uses.

If you will examine the legal responsibility for stream pollution control today you will find that twenty-five States vest the State Department of Health with the major part of their program. Typical of these States are Texas and Oklahoma in the Southwest, Colorado in the Mountain States, Arizona in the West, Iowa in the Midwest and Massachusetts in the East. In various of these States other agencies are charged with specialized authority over water pollution.

Some other States have divided water pollution control authority among two or more State departments and in some cases have placed their major water pollution control activities in State agencies other than the State Health Departments. However, some residual authority is retained by the Health Departments and can be exercised where health is concerned. It is interesting to note that California recognizes pollution and contamination. Contamination in California means "injurious to health" and the responsibility for its abatement rests with the Health Department. Pollution on the other hand consists of trade waste and domestic sewage and its control is handled by 9 regional boards.

Twelve States have set up single State agencies for water pollution control in which the Health Department plays an important role. Some of these agencies are developed within the Health Department itself but having an advisory board of elected State officials and interested water users. In some, the State Health Officer or the State Sanitary Engineer is chairman or executive secretary of the agency. In most of this group the active work of the agency is carried on by State Health Department personnel. Typical of States having this type of organization are Minnesota, Illinois, Oregon, Tennessee, Alabama, Kentucky, and New York.

The method of developing the New York pollution control legislation is of interest as it was somewhat unique. A proposed law was drafted and placed on record by introducing it before the 1948 Legislature. In order to give full opportunity for cooperative study of the bill's provisions, it was not moved for passage at that time. The next twelve months were devoted to bringing the matter to the attention of municipal and industrial officials and other interested parties. After their comments were reviewed and weighed by a special sub-committee, the bill was redrafted to include those suggestions which were found to have merit. The law has as its purpose the safeguarding of New York's waters by preventing new pollution and abating existing pollution. Toward this end it requires the Board, after proper study and hearings, to establish water quality standards and classify the waters of the State in accordance with considerations of best usage in the interest of the public and with regard to recognized engineering and scientific factors. The law specifically recognizes that no single standard of purity is applicable to all waters; that waters will vary in quality depending upon the nature of the streams, the character of the area and the use to which the waters are or will be subjected. The law also recognizes that all

streams cannot be converted into trout waters or sparkling drinking water, but rather the waters of the State must be preserved for their most reasonable use in the interest of the public.

The New York pollution law not only gives the pollution control agency power to abate pollution but actually spells out many of the agency's specific duties and much of the procedure that must be followed in administering the law.

The California legislation, a series of 11 bills, was introduced in brief form by the Water Pollution Committee at the start of the session and developed to final form after lengthy hearings and meetings with representatives of all interests concerned in these problems. The new laws therefore were developed out of a sincere cooperative effort and the measures are designed to continue that cooperative action in the ultimate solution of this complex problem. In New York the pollution bill was introduced in full, laid aside for a year for study by all concerned and then revised. In California the bill was introduced in brief form and developed by the cooperative efforts of all interested parties.

The California law empowers State and local health officers to issue preematory orders for abatement of conditions of contamination. Contamination is defined to mean "... an impairment of the quality of the waters of the State by sewage or industrial waste to a degree which creates an actual hazard to the public health..." The term pollution and nuisance are defined in the Act to mean the adverse and unreasonable effects of disposal of sewage or industrial waste which are not actual hazards to health. Pollution and nuisance are subject to control by Regional Water Pollution Control Boards which are created for the 9 major drainage regions of the State. The regional boards are composed of five appointees representing the major interest involved. A State Water Pollution Control Board is created, consisting of the State Engineer, the Directors of the Department of Public Health, Agriculture, and Natural Resources, and 9 appointees representative of the regions of the State and of the various interests in these problems. The State Board has the duty to undertake State-wide planning for pollution control, acting in an advisory capacity to the regional boards. It will direct research programs in the technical phases of pollution control, and will administer the State Water Pollution Control fund. The State Board may act as an appeal board in any specific instance of pollution where it is found that a regional board has not taken proper action.

The Water Pollution Control Act (Public Law 845, 80th Congress) states: "The Surgeon General shall...encourage the enactment of uniform State laws relating to water pollution...." Accordingly the Public Health Service is recommending certain general considerations in the development of such State legislation. The Public Health Service clearly recognizes in making such recommendations that each State has different problems and different approaches to these problems and that each State should work out the details of its particular water pollution control program. The general considerations recommended are in part:

1. A single State pollution control agency
2. No exceptions from agency jurisdiction.
3. Agency to represent all water users.
4. Agency to develop comprehensive water pollution control program which would include setting standards for water purity.
5. Enforcement of agency rules, regulations, and decisions.

For those States who do not wish to prepare a new law from scratch, the Public Health

Service has developed a Suggested Water Pollution Control Act which will be suitable for introduction in State legislatures. A draft of this Suggested Act was submitted to States, industry, and numerous individuals for comment. After consideration of the comments received, the draft was revised and submitted to the Council of State Governments for consideration at its October meeting. As a result, the Council has endorsed the Suggested Act and recommends it to States for favorable consideration. Whereas in the past it has been the practice for one State to study the laws of other States in detail and combine those items considered good into a new law, a bill is now available which represents the collective thinking of a large group of experts in law and engineering.

It also might be well to point out the consideration being given by States to the matter of financing waste treatment facilities. One of the stumbling blocks in securing pollution abatement is the inability of political subdivisions to finance needed sewage treatment works. Many States have eliminated this difficulty by enacting legislation which permits adequate financing by revenue bonds. Such financing has received an increasingly broad reception in recent years. Some States also provide financial assistance to political subdivisions. California has a \$1,000,000 revolving fund for loans to municipalities for constructing sewage treatment works. New York has a legislative committee studying ways and means of State financing and New Mexico has a provision whereby the State will purchase municipal bonds that cannot be marketed elsewhere.

As I see the water pollution control picture today the trend line is sharply upward. Industry is making great forward strides, better laws are appearing, public sentiment is behind the movement—we are on our way.

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Industrial Wastes and Pollution Panel

"WHAT INDUSTRY EXPECTS FROM THE STATE REGULATORY BUREAU IN THE CONTROLLING OF INDUSTRIAL WASTES"

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In discussing the subject "What Industry Expects from the State Regulatory Bureau in the Controlling of Industrial Wastes," I feel compelled to preface all remarks by saying that the views expressed are not necessarily those of my clients, but on the contrary, represent the individual views of the speaker as formed by some experience and more observation. I should explain that I am engaged in the general practice of law and the fact that your program lists me as attorney for the two companies named comes as a result of a request from the program chairman that I be identified as representing the named clients in order that my remarks would have more authority than would be the case if I had no clients. However, I insist again that nothing I say, unless it should happen to be beneficial to their interests, should be imputed to them. Now that I have out of the way this protective disavowal of anything detrimental, which is done in accordance with all good editorial standards today, I feel free to proceed with my remarks on the subject assigned.

As a background to enable us to consider logically any matter concerning waste disposal, it is necessary that I briefly refer to the present laws of the State of Texas which concern pollution. We have two anti-pollution statutes. One is a criminal statute, Article 698b of the Texas Penal Code, and the other is a civil statute which allows the state regulatory authorities to prevent pollution by injunction, this being Article 4444 of the Texas Civil Statutes. Under these laws, the Texas State Health Department is the state enforcement agency except where fish and marine life are affected, in which event enforcement is vested in the Texas Game, Fish and Oyster Commission. Other state agencies are in minor degree concerned with various aspects of pollution, but for all practical purposes, the Health Department and the Game, Fish and Oyster Commission are the two regulatory agencies dealing with pollution matters, and in speaking of the state regulatory agencies with which we are here concerned, I refer to those.

The two statutes mentioned are very brief and the essence of each is simply that there shall be no pollution of any public waters by any person, firm, corporation, association, town, city or other political subdivision of the state. As an example of the type of injunction that can be rendered under Article 4444, I refer to the language used by the court in the injunction issued in the case of Magnolia Petroleum Company v. State, 218 S.W. (2d) 855, where the defendants were enjoined from "throwing, casting, discharging, or depositing, directly or indirectly, salt water or other polluting substances . . . in the San Marcos or Guadalupe Rivers." You will note that no reference is made to any permissible quantity or degree of salt water allowed to be discharged into the rivers mentioned, but on the contrary, the decree literally prevented the discharge of any salt water into these streams, regardless of quantity. It might be said that our statutes constitute a simple commandment that there shall be no pollution.

It would not be possible for any regulatory agencies to enforce any pollution statutes with greater efficiency, understanding and result than have the Texas State Board of Health and the Texas Game, Fish and Oyster Commission in their administration of our present statutes. Under the leadership of Dr. Cox and his associates in the Board of Health and of Mr. Dodgen and his associates in the Game, Fish and Oyster Commission, Texas has come to rank high in the Nation in pollution control. These agencies have consistently gone more than half way in meeting municipal and industrial needs, where the opportunity was afforded them to do so, and have evidenced the broadest possible comprehension of problems of waste disposal confronting both municipalities and industries. They have not been extremists. Rather, they have encouraged civic and industrial development while at the same time demanding that our public waters, in so far as possible, be maintained in Class A condition.

In this connection, I should also like to commend the Office of the Attorney General of Texas in its participation toward enforcement of our anti-pollution statutes when called upon by the regulatory agencies to do so. I have developed a particularly high regard for Mr. Waldrep, the Assistant Attorney General who for the past few years has been charged primarily with the representation of the regulatory agencies in these matters, and it is my feeling that he has been and is a valuable member of the regulatory team which has achieved such splendid results in Texas pollution control.

In some specific instances, of course, as a result of factors beyond their control, the regulatory agencies have not been able to accomplish all that they would have desired in obtaining stream purity. An outstanding and ever present handicap confronting them is the financial inability of various municipalities to make adequate provision for the treatment of municipal sewerage. Naturally, the state regulatory agencies, as a practical matter, cannot compel a municipality to construct necessary treatment works when the municipality has no money with which to do it.

The existence of such problems has brought into being a necessity that the regulatory agencies not look upon our statutes literally in order that they make allowances for situations affecting certain streams which do not presently carry water of the type and purity on which the regulatory agencies strive to insist. The Trinity River in the Fort Worth-Dallas vicinity is no doubt the worst pollution condition existing in the state today, but as a result of constant encouragement by our regulatory agencies, there presently are plans for additional sewerage facilities at all towns discharging sewerage into this river which, when carried out, will have a tremendous effect toward improving, and possibly, eliminating this condition. By a process of applying a practical program of encouragement, rather than an impractical attempt at force, the regulatory agencies will achieve an end that could never be achieved by literal application of the statutes. True wisdom has been shown in the administration of our anti-pollution laws.

In the same manner, our state regulatory agencies have exercised the same wisdom in applying Texas anti-pollution laws to industrial development. By taking into consideration the benefits derived from permissive use of certain water courses for industrial waste disposal, the regulatory agencies have again looked to the practical, as distinguished from the literal, administration of our present pollution laws. At the same time the regulatory agencies have continued to encourage more efficient treatment of the wastes discharged into such streams. The result has been of great benefit to our budding industrial development, which in turn has been of such great benefit to the people of Texas generally.

I do not believe that any industry can sincerely maintain that it has been treated unfairly by our state regulatory officials who administer our present anti-pollution laws. Rather, I submit on the contrary that any industry which desires to partake in any cooperative effort toward efficient disposal of its industrial wastes will find ready and willing assistance when it approaches the Health Department or the Game, Fish and Oyster Commission. For some reason, however, it has been, and is still true, that for the most part industry is reluctant to attempt cooperative solution of its waste disposal problems with the regulatory agencies and the result of this failure is often misunderstanding, which leads to further intensification of existing problems. I think it possible that one reason for industry's reluctance to approach the regulatory agencies is the fact that no authority is given these agencies under our present law to approve any plan for waste disposal that does not call for complete purification of such waste, regardless of dilution in the stream into which it is discharged, with the resultant feeling on the part of industry that a change in attitude on the part of regulatory officials might render useless efforts to dispose of waste in a manner previously acceptable. In spite of this, however, I strongly urge that industrial officials take up with the regulatory agencies their plans for industrial waste disposal prior to placing such plans into operation, for I know of no instance where prosecution has resulted from pollution caused by discharges made as the result of disposal plans previously submitted in good faith to the regulatory agencies and accepted by them as satisfactory, even though in actual operation the installed system proved unsatisfactory. In each such instance, remedial revision of the disposal system is required but prosecution is avoided.

To industry generally, there are two notable omissions in our Texas laws today. The first is the failure to provide permissive legal authority to the regulatory agencies to allow streams to be used for municipal and industrial waste disposal where the public benefit outweighs detriment, even though pollution occurs. As mentioned previously, in actual practice this is being done today but is the result of sanction and policy, rather than law.

The second omission in our Texas law is its failure to require the submission of plans for waste disposal systems to our regulatory agencies with corresponding authority given to the agencies to approve such plans and permit disposal in the manner thereby provided. In actual practice, this, too, is done today as a matter of policy but it has been my observation that industry inclines toward legal, rather than administrative, approval of such practices.

In this connection, I believe that the Model Water Pollution Control Law discussed by Mr. Poston, which has been submitted by the United States Public Health Service to the regulatory agencies of the various states deserves some discussion from the standpoint of industry. This law was prepared and has been proposed as a result of the fact that three years ago Congress passed the Federal Water Pollution Control Act, among other things, directed the Surgeon General of the United States to encourage the enactment of uniform state laws relating to water pollution. The Model Water Pollution Control Law, which is lengthy and detailed, provides for the two situations mentioned previously as lacking in our Texas laws which are of primary concern to industry. It requires the state regulatory agencies to group the designated waters of the state into classifications in accordance with considerations of best usage in the interest of the public. Such standards may, from time to time, be altered or modified by the regulatory agencies but the purpose of such a provision is explained in a commentary prepared by the Public Health Service which accompanies the proposed law, in the following language:

"Classification of waters and the setting of standards are to be accomplished only after public hearings are held. This will allow the representation of all views before any classification of standards is promulgated. The industries and municipalities in any particular locality will be able to determine the quality of effluent they must discharge into the streams in accordance with such standards. This will create a definiteness of criteria for water pollution which has often been lacking in the state statutes."

The proposed Model Law also requires that plans and specifications be submitted to the state regulatory agency for its approval or disapproval of proposed waste disposal and sewerage treatment works. If such approval is given, a permit is issued to the applicant to discharge waste in accordance with the conditions of the permit. So long as this is done, there is no wilful violation of the statute, and although the plans and specifications may in practice after installation prove unworkable to such an extent that their use must be halted until modifications are made which will comply with required standards, still the industry concerned is not in the position of having undertaken wilful pollution after having secured state approval of its disposal facility.

It is not my purpose to plug for the adoption of the Model Water Pollution Control Law in Texas but I mention it here as being an authoritative proposal of considerable current interest which finds acceptance on the part of industry generally as to the two features discussed. I do think that it gives legal approval of the policies now being followed to some degree by our own regulatory agencies with signal success.

However, objections have been raised to the adoption of the Model Law in Texas. Our state regulatory officials feel, and justifiably so, that the results achieved by them in their administration of our present laws have been outstandingly successful. Another argument in opposition is based upon the mandatory burden of additional work that it would impose upon the already limited facilities of the state agencies. Still another argument which has been expressed against it is that the use of a stream pursuant to a lower classification than Class A might prevent future industrial development upon and use of that same stream by new industries. However, in answer to these arguments, it has been said that legal policy is preferable to administrative policy, that such a program is necessarily long-range, that complete classification of all streams would necessarily occur only over a period of years and that anticipation of future needs for the waters of any particular stream would be a cardinal factor in determining the class of use into which that stream should fall. Finally, the thought necessarily occurs that Texas is only now arriving at a point in its industrial development which requires a more comprehensive pollution statute than those presently in existence in our state.

I think it can be said that Texas industry generally expects these things in state regulatory control of industrial wastes:

First, industry expects to receive the same relative treatment accorded other entities who find the use of our public waters necessary to their survival.

Second, industry expects to be given, in so far as is possible, the definiteness of criteria recommended by the Public Health Service in its commentary accompanying the proposed Model Water Pollution Control Act. Whether this definiteness of criteria be gained by the adoption of standards of classification and by the issuance of permits after the submission of plans for waste disposal systems, or whether it be

gained by some other means, is immaterial to me personally but I believe that industry generally expects a definiteness of criteria that is presently unobtainable in the absence of permissive legislation.

Third, industry expects the same attitude of enforcement toward any pollution control that has been displayed so admirably by the personnel who presently constitute our state regulatory bureaus concerned with pollution matters. If industry could be assured that Dr. Cox, Mr. Herzik, Mr. Ehlers, Mr. Smallhorst and their associates in the Health Department, and Mr. Dodgen, Mr. Faubion and their associates in the Game, Fish and Oyster Commission would be with us forever to administer our present pollution laws, I doubt that industry would ever feel that it might be necessary to provide by laws the same policies that have been established by them over the years. Certainly, no law could accomplish more than these departments have accomplished under our presently existing laws.

The keystone of any successful program in waste disposal is cooperation between industry and the state regulatory agencies. To my certain knowledge, industries facing what appeared to be almost hopeless and insoluble problems of waste disposal have found solution to such problems in the assistance given by our regulatory agencies. I feel that this same attitude of helpfulness would be met by any industry which approached these departments with a genuine attitude of cooperation and that industry would be amazed to find in the state regulatory agencies such broad understanding of the problems which confront it in waste disposal, for our agencies encompass a concentration of knowledge and information which exists nowhere else in the state. The help thus given and the understanding gained is invaluable.

In conclusion, I should like to say that my subject today is by its very nature somewhat intangible but I have endeavored to treat it with the gravity which it deserves. It would have been relatively easy to answer the question "What Industry Expects of the State Regulatory Bureau in the Controlling of Industrial Wastes" by answering rather briefly "Industry expects to be let alone," but since this is only a false hope, as distinguished from an unjustified expectation, I have not so answered.

Thank you.

**"WHAT INDUSTRY EXPECTS FROM THE STATE REGULATORY BUREAU
IN THE CONTROLLING OF INDUSTRIAL WASTES"**

H. E. Faubion
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Austin, Texas

We appreciate the reference made to the Game, Fish and Oyster Commission in the paper just read by Mr. Head. Coming, as it does, from a representative of industry, we feel deeply grateful.

As early as 1860, the Legislature of Texas, in keeping with the spirit of that section of the Constitution, which designates all rivers and streams natural resources, enacted a law which made it a penal offense for any citizen to pollute or obstruct any water course, lake, pond, marsh or common sewer to a degree that the water would be rendered "unwholesome or offensive" to the inhabitants. The penalty for a violation of this Act is a fine in any sum not exceeding \$500.00.

Industrial development in Texas in recent years brought with it pollution hazards which caused the Legislature to enact a more drastic anti-pollution statute in 1925. This law made it a penal offense to pollute any water course or public body of water by the introduction of crude petroleum, oil or other like substances; or to introduce directly or indirectly any sewage or unclean water, or unclean or polluting matter or thing into a stream or public body of water used for farm livestock, drinking or domestic purposes. A violation of this Act was punishable by a fine in any sum not less than \$100.00 and not more than \$1,000.00.

Six years later, the Legislature, keeping in mind that provision of the Constitution which declares the "preservation and conservation of all natural resources to be public rights and duties", enacted a third anti-pollution law to protect the public rights to the use of public property. By this time, industrial development had made strides unparalleled by any state in the Union and pollution hazards had increased by at least tenfold. New oil fields had been discovered in North, East, West and South Texas. Ninety thousand oil wells (we now have about 125,000 wells) were in production and fifty per cent were producing salt water. More than six hundred cities, towns and communities were burdening the public waterways with 200,000,000 gallons of untreated or partially treated waste. Industry was contributing liquid waste in vast quantities possibly equaling that contributed by municipalities.

This law was Article 698-a and was cumulative of the law enacted in 1925. It made it a penal offense to pollute a water course or other public body of water by the introduction of crude petroleum, oil, acid, sulphur, salt water, oil refinery waste or oil refinery waste or oil well waste, and fixed the penalty for a violation of the Act at not less than \$200.00 nor more than \$1,000.00.

It also provided that the introduction of salt water into a stream in excess of 2,000 P.p.m. would constitute a violation of the Act. These statutes were being equitably enforced by the Game, Fish and Oyster Commission. But the tragedy of the story is that because of a conflict in the penalty clauses of the two statutes, both laws were held to be inoperative by the Court of Criminal Appeals on January 27, 1943, when a case went up on appeal from a county where a conviction had been on a complaint

charging a violation of Article 698-a.

After the opinion was handed down by the Court of Criminal Appeals on January 27th, nullifying the laws, the Game, Fish and Oyster Commission was powerless to aid other State agencies in the prevention of pollution.

Early in January of 1943, after the 48th Legislature had convened, with the sanction of the Governor, a meeting of representatives of the Health Department, Railroad Commission, Attorney General, Board of Water Engineers and the Game, Fish and Oyster Commission was called to draft a bill to be presented to the legislature for enactment to control pollution in Texas. The bill was amended several times after the first draft, at the suggestion of representatives of some of the larger cities and some industrialists. The bill in its final draft was passed and signed by the Governor on May 8, 1943.

This law makes it unlawful for any person, firm, corporation, association, town, city or other political subdivision of the State, or any agent, officer, employee or representative of any person, firm, corporation, association, town, city or other political subdivision of the State to pollute any public body of surface water.

The Act defines "pollute" as the throwing, discharging or otherwise permitting to reach or to be introduced into any public body of surface water, any substance, material or thing in such quantity that the water into which it is introduced will be rendered unfit for one or more of the beneficial uses for which it was fit or suitable prior to the introduction or that is rendered harmful to public health, game birds or game animals, fish or other edible aquatic animals, or that endangers any wharf, hinders operation of any boat, or renders any bathing beach unclean or insanitary.

The term "public body of surface water" as defined by the law, includes all surface creeks, rivers, streams, bayous, lagoons, lakes and bodies of surface waters fed by a stream or that are subject to overflow from or into a stream which are the property of the State or a subdivision thereof; also all portions of the Gulf of Mexico within the gulfward boundary of the State and all inland waters in which the tide ebbs and flows.

Texas today has an oil field on the watershed of all the major waterways of the State, and industrial plants are located on the lower reaches of most of these streams. A high salinity in the streams would be as hazardous to the operation of these plants and the production of war materials as a strike in the coal mines would be to the production of steel by the steel mills. We must not permit the introduction of any substance or thing into our streams that will retard development or interfere with the growth of our great Commonwealth.

The enforcement of that section of the pollution law which has to do with the protection of game and fish is the responsibility of the Game, Fish and Oyster Commission. When a health problem is involved, the enforcement becomes the responsibility of the State Health Department. In extreme cases, injunctive relief may be had under Article 4444 of the Civil Code if the criminal statute does not afford immediate permanent relief. These two departments act jointly with the Attorney General when a suit is filed seeking injunctive relief. It is our candid opinion that the above statute delegates ample authority to the State agencies charged with its enforcement to safeguard all of the interests of the citizens of the State. Our pollution problems in Texas are so varied that a uniform law for all the States would not be adequate in

Texas and it would be difficult to enforce because of certain features of the proposed law.

Over a long period of time, the State Health Department and the Game, Fish and Oyster Commission have been closely associated in the enforcement of the pollution laws, exchanging from time to time technical information and advice between the regularly employed specialists of the Health Department and men trained in the technique of anti-pollution work and law enforcement in the Game, Fish and Oyster Department without any additional cost to the State. By our combined efforts, we have kept the public waters of the State fit for the many uses for which they are intended.

The public generally, including municipalities and industries, has been apathetic toward the appeal of sportsmen's organizations, nature lovers and other unselfish organizations leading the campaign in Texas for clean water and the conservation of our natural resources. Opposing these efforts, some have said: "What are a few fish worth compared with our industries?" Fishing and hunting is big business in Texas, too. More than 320,000 resident citizens of the State buy hunting licenses each year and 315,000 citizens purchase fishing licenses. This does not take into account those who hunt on the land on which they reside or fish in the county of their residence without licenses. These same hunters and fishermen spend annually in Texas \$200,000,000.00 for fishing tackle, guns, ammunition, food, gas, hunting leases, clothing, etc.

The commercial fishing interests on the Texas Coast have investments in fishing gear and equipment running well into the millions of dollars and the annual catch of edible fish and shrimp is worth well over \$25,000,000.00. The landing of fish, shrimp, crabs, and oysters on the Texas Coast last year including menhaden totaled 85,233,237 pounds. These compilations do not take into account the recreational and aesthetic value of clean water to the thousands of our citizens who neither hunt nor fish. If municipalities and industrialists of Texas could come to a realization of the value of clean water not alone because of those who hunt and fish and enjoy the outdoors but as pollution affects their own public relations, we think the problem could be solved more easily and more economically.

Cities, towns and communities must provide pure water for their citizens. Industries require clean water for the operations of their plants. Rice growers, stock raisers and other interests must have clean water or retire from business. This being true, we feel that it is the duty as well as a privilege for industry to join with our law enforcement agencies in a campaign to abate pollution and keep the public waters clean. Certain plants in the Houston area have already spent approximately a million dollars this year on waste purification systems. Large appropriations, we understand, to make additional improvements in 1951 have been authorized.

In the past, the Game Department has enjoyed the confidence and had the cooperation of a very large per cent of the industrialists of the State and to this relationship we attribute much of our success in the enforcement of the pollution laws. But until those who violate the law with impunity amend their attitude toward the enforcement of the pollution laws, our efforts to keep the public waters of this State clean will not be fully appreciated.

Oil field brine, domestic sewage and industrial waste are all problems separate and apart from each other. With the proper approach, expenditure of the necessary funds and the aid of competent sanitary engineers, chemists, efficient game wardens and

other experts in the field of research, these problems can and will be solved. If you have a pollution problem, it is your responsibility. Don't wait until the Game Department or Health Department representatives start an investigation to do something about it.

The Game, Fish and Oyster Commission is concerned primarily with that section of the law which concerns the protection of fish and other edible aquatic animals in the streams, lakes, ponds, bays and the Gulf of Mexico, co-extensive with State jurisdiction (3 marine leagues or 10½ miles). However, it is not difficult for the average layman to understand that water polluted to such a degree that it will not sustain fish life is definitely unfit for human consumption and for all other purposes including industry

We trust that the fair and impartial manner in which the pollution laws have been administered by the Game Department and the Health Department merits the approval of you who represent industry. We invite your cooperation in our efforts as servants of all the people to render the most efficient and the most helpful service possible.

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"WHAT INDUSTRY EXPECTS FROM THE STATE REGULATORY BUREAU
IN THE CONTROLLING OF INDUSTRIAL WASTES"

G. R. Herzik, Jr., C.E.
Bureau of Sanitary Engineering
Texas State Department of Health
Austin, Texas

It certainly takes a brave soul to follow speakers of the caliber of Mr. Head and Mr. Faubion. Mr. Faubion was silver-tongued enough to be elected to the State Legislature at one time; and Mr. Head is a pillar in a profession that has as a primary prerequisite, the ability to sway a jury to his way of thinking. And here am I — a poor but honest engineer, who frequently can add 2 and 2 and get 4, but can't tell you why. But I think I can gather together enough words and arrange them in proper sequence, to express to Mr. Head my appreciation for his kind words regarding our administration of existing anti-stream pollution laws.

For many years we have realized that in the enforcement of a law -- any law -- its popularity will determine, to a great extent, the degree of success with which it can be enforced. It follows, then, that the mere passage of a law by the State Legislature, or the National Congress, does not necessarily solve the problem forever after. You may recall our experience with National prohibition, and even with our own Sunday Blue Laws. Frequently, failure of a law to receive popular support is due to lack of knowledge regarding its need or desirability, and the problem of the enforcing agency then becomes, to a large extent, public education. This has been true, in a large measure, with regard to anti-pollution activity in Texas. The demand for anti-pollution activity now is certainly greater than it was when I started with the Health Department 13 years ago. No doubt the demand 13 years ago was much greater than it was in 1915, when the first State Sanitary Engineer became associated with the Texas State Department of Health. Although some of this demand can be attributed to deterioration of stream conditions, I am of the opinion that by far, the greatest impetus has been produced by the present wide-spread public knowledge of those things involved in keeping our streams clean.

Probably not all of you realize that the State Health Department and the Game, Fish and Oyster Commission have been engaged in water pollution control activities since 1915, and with these 35 years of experience behind them, they feel that their pollution control programs have been developed along sound and practical lines. In this connection, however, we are sometimes mildly astonished to note that there are occasionally individuals, organizations, and even industries in Texas, who are not aware that these agencies are responsible for the enforcement of the State's anti-pollution statutes. For many years it has been our policy to encourage municipalities and industries in providing proper treatment facilities by means of an intensive educational program. In carrying out this program, we have worked very closely with a number of advisory committees composed of persons actually engaged or interested in sewage treatment, water conservation, the development of Texas industrially, or similar groups. These committees have been helpful in establishing standards and setting policies and procedures over the past years. In this regard also, we have adhered to the policy that prior to any legal action being initiated, a formal hearing is held, wherein the evidence involved is presented, and a period of time is granted to allow the offenders to demonstrate their intentions regarding corrective procedure.

The public's extreme interest in stream pollution abatement, was probably responsible for the passage of Public Law 845 by the 80th Congress, which recognizes the stream pollution problem on a nation-wide basis. Following the enactment of this law, many states initiated action to secure new state legislation in an effort to satisfy various groups. Consequently, there have been a number of articles published in newspapers and national magazines concerning this "new" trend. We have observed these activities in other states rather closely, and we have yet to be convinced that our present statutes, together with our long established policies and procedures, should be radically revised; although they might be improved in certain respect. We justify this line of reasoning by the fact that in our State there is at this time no extensive gross pollution creating a hazardous condition along any appreciable distance of any of our major streams. We frankly admit that there are a few "hot spots" in the State, but these areas are, in almost every case, being improved upon, and should within the next few years be practically eliminated.

The State Department of Health, therefore, feels that, considering the overall picture our water pollution control activities over the past years have clearly resulted in the maintenance of good quality water in our streams. The fact that other states have not previously participated in such an effective program is now evident by the activity being carried on by many of them, attempting to "clean up" their stream which have practically degenerated to open sewers. We maintain that our future pollution control program should not require extensive surveys, personnel, conferences, legislation, etc., but instead should continue along the lines we have followed in the past. In other words, our activities should not be considered "clean up campaign" but rather intense maintenance and educational activities.

We will, of course, continue to give the educational phases of our program much time, on the theory that an enlightened populace will, except for a few recalcitrants, police themselves and thereby reduce the need for extensive police agencies. But for the few recalcitrants, there will always be necessary, a police agency, not so much to bring them into line for anti-pollution's sake, since they, as individuals are generally minor contributors to pollution -- but principally for morale purposes of those who take their civic responsibilities seriously, and do what is necessary because of a sincere desire to live by the Golden Rule.

It is only human nature, and I know from personal experience, that a deep sense of frustration is realized when you attempt to be a law abiding citizen, and then observe on all sides of you, individuals of a different outlook, who apparently, or let us say temporarily, appear to be immune to the requirements of the law. As a matter of fact, there have been several instances where industry itself has suggested to us that legal procedures be undertaken, in order that each unit of an industrial group could be assured that they all would be required to undertake the same corrective action; as compared, for instance, to a case where most of the polluters would make necessary corrections on a voluntary basis, which, in itself, would be adequate for the correction of the condition under complaint, only to have one or more minor individuals in the group then ride the gravy train without any corrective effort at all.

While our educational program has been accepted rather enthusiastically by those concerned with municipal sewage treatment, it has been our experience that industry, in general, has not clasped us to its bosom with the same fervor. The reasons for this I shall not attempt to explain or understand, but it appears some of the reasons are implied in Mr. Head's paper. But I feel that these industrial health conferences, of which this is the third one, are certainly a good sign that progress in this direction is being made.

Unfortunately, in the enforcement of anti-stream pollution laws, we are faced with three conflicting philosophies. On the one hand, we have those who want complete treatment in all cases, principally the fishermen and the farmers. On the other hand, we have those who argue for the least degree of treatment possible, into which category fall principally the municipalities and many industries. Their primary interest is to save as much money as possible. Finally, we have ourselves, who represent a law enforcing agency who has given to it a law to enforce, established by someone else.

It is difficult to justify to a fisherman or a farmer, any leniency in behalf of a municipality or an industry, and certainly it is tedious, and frequently unpleasant, to argue with a municipality or an industry about the need for complete treatment in all cases. Consequently, the literal interpretation of a law, which appears to be as clear-cut as ours, is frequently fraught with misunderstanding.

This, of course, brings us to the principle of classifying streams, and using dilutions as a means of waste disposals, which principle, we understand, is favored to a large extent by industry. This principle of sewage treatment lends itself to scientific analysis, but the political, social, and economical concepts involved do not. If an industry wants a river full of pure water, they will certainly be opposed to a brother or sister industry upstream using dilution as a means of sewage disposal.

We are likewise concerned with the alarming depletion of our ground water supplies throughout the state, which is placing more and more demand upon our surface water supplies. It certainly is good sense to maintain good water quality in our streams, so that they will be available for more important purposes, than waste disposal.

The classification of streams to allow a certain amount of pollution results in the quality of the water in that stream being fixed, and such classification will tend to retard further development on that stream where higher water quality than that set by the classification might be required. While it is true that classification of stream can be altered, from what we have learned of this procedure, re-classification is an extremely long, complicated procedure. Established industries along a stream considered for reclassification would probably be required to install more efficient treatment works, and would logically oppose any move for upward re-classification.

The State of Texas is still primarily an agricultural state, and consequently, the demands for our surface waters and the thinking of our population, in general, indicate that our surface waters should be maintained in such condition as to be readily usable, first for municipal and domestic water supplies, and second for agricultural uses. An individual owning property along a stream which was classified to carry a relatively heavy load of industrial and domestic wastes would hardly appreciate the depreciation of property value, as well as the possible elimination of this source of water supply for agricultural uses.

While the courts will award to Farmer Jones a sufficient sum of money to enable him to move to a new location, I wonder how many of you can evaluate, in dollars and cents, the sentimental value of the old homestead. Apparently the due process of law does just this things; but I know of at least one case where we continue to get letters ten years later, because the "due process of law" built a sewage plant adjoining the old family farm. While I am well aware that our lawyers talk about balancing equities, it has been my experience this type of jargon seldom satisfies the farmer or fisherman. I personally, do not find it easy to evaluate in my own mind the principle of public benefit versus the harm done, with relation to any source of pollution.

The need for a definiteness of criteria has been advanced, and we might point out that the desirability of this approach to anti-pollution activity was foreseen by us on several occasions, the latest of which was ten years ago.

There was agitation then, as there always is, to change the existing anti-pollution laws, and we lent our efforts to an attempt to have passed, a bill more clearly defining pollution in terms of scientific limits. A number of legislative committee meetings were held, and if I recall correctly, the most impassioned plea against the passage of the bill was made by an individual purporting to represent industry, on the basis that the bill did not provide enough latitude and allow independent judgment on the part of those concerned with the enforcement of the law.

So then through the years we have been caught between the rock and the hard place. Sometimes the wind blows hot, and sometimes it blows cold; and in an attempt to be judicious in our enforcement efforts, we must continue to keep a thermometer out to determine which way the wind is blowing.

Frequently the suggestion is made that water pollution control activities be vested in one state agency. I might point out that the present arrangement is, in effect, the equivalent of one agency. Mr. Faubion, of the Game, Fish, and Oyster Commission, will probably agree that his organization, through the local game wardens, has for many years enforced only that portion of the law concerning aquatic life. Under the existing laws, all other pollution matters are specified to be under the jurisdiction of the Health Department. Legal action initiated by game wardens is under the provision of 698b of the Penal Code, and is referred to a local court. The State Department of Health and the Game, Fish, and Oyster Commission cooperate when injunction proceedings are initiated under the Civil Statutes. In addition to this, the State Health Department has for many years been engaged in establishing water quality standards for municipal, swimming pool, ice manufacturing, food processing, interstate carrier water supplies, etc. Having established an organization and field personnel qualified by education, training, and experience to efficiently perform these duties, it would appear to be poor economy to establish still another agency whose achievements could not be expected to be superior to those now being realized. Frankly, I think we are very fortunate that with all the unguided efforts that has been expended in trying to improve our anti-pollution laws, we still have one as workable as it is. It certainly is far from ambiguous, and it has been declared constitutional in our courts.

We are genuinely grateful to receive from industry, expressions of their thinking in matters concerning industrial waste control. As we brought out in our meeting here last year, as well as in our meeting in March of this year at A. & M. College, the state agencies are willing and anxious to work with industry towards a better understanding of our problems and the ultimate development of a fair, effective, comprehensive pollution control program. Actually, Mr. Head's comments have been the first quasi official remarks we have received from industry along these lines, and we find them most helpful. On this basis, we would like to suggest that the industries represented here as members of the Houston Chamber of Commerce, or as members of the Texas Manufacturers' Association, consider the advisability of appointing an advisory committee to meet with us from time to time in order to foster proper understanding and possibly bring forth a real program. I personally assure you of our cooperation in such a development, and I sincerely trust some plan may be developed along these lines.

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1950 THIRD GULF COAST REGIONAL CONFERENCE

Q M INDUSTRIAL HEALTH

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Adamson, E. H.
Agapetus, N. A.
Alicker, Leslie E.
Alfano, Sam
Allinson, R. L.
Arterbury, C. B.
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Averyt, William E.
Axelrad, B. A.

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Barker, David E.
Barron, Miss Ruby
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Bartholf, Marjorie
Bashor, Harvey
Bass, R.N., Mrs. Martha
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Beikert, Miss Mary
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Blakeslee, Doris
Blackwell, Belle
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The Dow Chemical Company
Houston Lighting & Power Co.
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Medical Arts Building
Brasoria Co. Health Unit
Phillips Petroleum Company
United Gas Corporation
Eastern States Petroleum Co. Inc.
Tin Processing Corporation
Saks Fifth Avenue
Lamar High School

Humble Oil & Refining Co.
Dow Chemical Company
Dow Chemical Company

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Little Rock, Ark.
Port Neches, Texas
Freeport, Texas
Houston, Texas
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Houston, Texas
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Houston, Texas
Houston, Texas
Pasadena, Texas
Austin, Texas
Houston, Texas
Houston, Texas
Port Neches, Texas
Galveston, Texas
Texas City, Texas
Houston, Texas
Pasadena, Texas
Lone Star, Texas
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Houston, Texas
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 Batman, P. W.
 Bice, Grover K.
 Biers, C.E., V.M.
 Louis Emden
 Irvin, Mrs. Antoinette
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 Arrey, M. E.
 Balda, Theo. H.
 Baily, Joe D.
 Betser, Dr. Louis W.
 Flanagan, J.C.
 Florence, A. G.
 Folkland, Miss Audrey
 Felle, P. C.
 Foxville, Jean
 Foster, H. D.
 Fox, E. J.
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 Farley, W. E.

Gandy, M. D., J. R.

Gieckler, Miss Jacqueline (Jackie)
 Gordy, Carl
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 Gray, Fred E.
 Grossheim, L.
 Golden, Jr., R. J.
 Gulley, R. P.

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Hammond, J. W.

Harick, M. D., W. H.

Hansen, R.N., Eva C.

Hanson, Jr., Irven E.

Hardy, R.N., Ruth

Harrison, C. G.

Harvill, Clyde R.

Head, Hayden W.

Heiniger, G. D.

Helmer, Arthur J.

Henrich, V.C.

Herndon, E. T.

Hewlett, Mrs. Ella

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Hopkins, M.C.

Holt, M.D., Milton O.

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Hasmer, R.N., Miss Mary E.

Johnson, Mildred

Johnson, Tom

Jones, Mrs. M. G.

Lahle, Warren

Larney, Marie F.

Lasch, J. E.

Lassell, Dorothea

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Kennedy, Willis G.

Harris County Health Unit

Rohm & Haas Company

Allied Safety Equipment, Inc.

Armour and Company

613 S.W. Life Building

United Gas Corporation

Celanese Corporation of America

Magnolia Petroleum Co.

Magnolia Petroleum Co.

Sheffield Steel Corporation

E. I. Du Pont De Nemours & Co.

Union Carbide & Carbon Corporation

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Wyatt Metal & Boiler Works

Hospital Ass'n. of the S.P. Lines

Health Edu. Dept., Y.W.C.A.

American Associated Ins. Companies

Humble Oil & Refining Co.

Diamond Alkali Company

Shell Oil Company

Travelers Insurance Co.

Gulf Oil Corporation

Natural Gas Odorizing Co., Inc.

Humble Oil & Refining Co.

Harris County Medical Society

E. I. Du Pont De Nemours & Co.

1010 West 4th Street

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Chambers Co. WC & ID #1

City Water Department

Attorney at Law

Dow Chemical Co.

J. Weingarten, Inc.

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Texas Employers Ins. Association

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Ethyl Corporation

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Eastern States Petroleum Co. Inc.

Shell Chemical Corporation

Pan American Refining Corp.

Sheffield Steel Corp.

Baylor University College of Medicine

Diamond Alkali Company

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Pasadena, Texas

Houston, Texas

Houston, Texas

Dallas, Texas

Houston, Texas

Bishop, Texas

Beaumont, Texas

Beaumont, Texas

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Baton Rouge, La.

Texas City, Texas

Baton Rouge, La.

Corpus Christi, Texas

San Antonio, Texas

Houston, Texas

Houston, Texas

Houston, Texas

Houston, Texas

Deer Park, Texas

Texas City, Texas

Houston, Texas

Houston, Texas

Pasadena, Texas

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Meas, Sam
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 Moore, R. B.
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 Morgan, J.R.
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 Texas State Health Department
 The American Brass Co.
 E.I. Du Pont De Nemours & Co.
 Drs. Rollins and Liles Clinic
 United Gas Corporation
 Jefferson Chemical Co.
 Natural Gas Odorizing Co. Inc.
 Gulf Oil Corporation
 Edgar Tobin Aerial Surveys
 Hartfield Accident & Indemnity Co.
 Royal Insurance Companies
 The Ohio Rubber Co.
 Engineering Extension Service A & M

Carbide & Carbon Chemicals Corp.
 American Medical Association
 Schering Corporation
 Drs. Rollins and Liles Clinic
 Esso Standard Oil Co. of N.J.
 Dow Chemical Co.

Pan American Refining Corp.
 E. I. Du Pont De Nemours & Co.
 Texas State Health Department
 United Gas Corporation
 Texas Engineering Experiment Station
 Ethyl Corporation
 Todd Shipyards Corp.
 Standard Oil Co. of N.J.
 Pan American Refining Corp.
 Houston Anti-Tuberculosis League
 City Health Department
 821 Medical Arts Bldg.
 West Disinfecting Co.
 Texas State Department of Health
 Tin Processing Corp.
 15 Bartlett Avenue
 Carbisulphoil Company
 E.I. Du Pont De Nemours & Co.

American Associated Ins. Companies
 Houston Lighting & Power Co.
 University of Texas-Medical Branch
 University of Texas-Medical Branch
 Carbide and Carbon Chemicals Corp.

Houston, Texas
 Beaumont, Texas
 Houston, Texas
 Houston, Texas
 Pasadena, Texas
 College Sta., Texas

Paulsboro, N.J.
 Houston, Texas
 La Marque, Texas
 Detroit, Mich.
 Orange, Texas
 Houston, Texas
 Houston, Texas
 Port Neches, Texas
 Houston, Texas
 Houston, Texas
 San Antonio, Texas
 Houston, Texas
 Houston, Texas
 Willoughby, Ohio
 College Sta. Texas

Texas City, Texas
 Chicago, Illinois
 Bloomfield, N.J.
 Houston, Texas
 Baton Rouge, La.
 Freeport, Texas

Texas City, Texas
 Wilmington, Delaware
 Tyler, Texas
 Houston, Texas
 College Sta. Texas
 Baton Rouge, La.
 Houston, Texas
 Baton Rouge, La.
 Texas City, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Austin, Texas
 Texas City, Texas
 Highland Park 3, Mi.
 Dallas, Texas
 La Porte, Texas

Houston, Texas
 Houston, Texas
 Galveston, Texas
 Galveston, Texas
 Texas City, Texas

Barwood, B. E.
 Buler, Richard F.
 Bittall, M. D.
 O'Connor, M. D., R. B.
 Pace, Ed H.
 Passler, Miss Mabel-
 Paganini, Otto
 Painter, Harry
 Pais, M. D., Wm. M.
 Parker, Nurse, Miss A. V.
 Payne, Brothy B.
 Payton, Chester F.
 Pederson, Evelyn May
 Pendery, Roger
 Peters, Ola
 Pipkin, M. D., R. W.
 Peth, Edward W.
 Potter, A. D.
 Powell, A. M.
 Powell, G. B.
 Preston, A. H.
 Prince, Nurse, Mrs. Hazel
 Prior, A. H.
 Proctor, Vera E.
 Rabbitt, Agnes
 Ragan, J. L.
 Randall, Fred A.
 Ramussen, Mrs. Florence
 Reece, M.D., Chas. D.
 Reiss, Miss Emeline J.
 Richey, Alvan
 Richeker, Charles
 Reper, R. B.
 Robinson, R.N., Elizabeth
 Robinson, F.R.
 Roderick, D.H.
 Rollins, M.D., W. J.
 Roemel, A. Ross
 Rose, Edith H.
 Ruckdashel, R. W.
 Ryan, Christine
 Saladino, R.N., Iris
 Sanders, C. A.
 Saunders, John W.
 Sawyer, Dr. Frederick
 Schnitzer, Jr., George
 Schmur, Phy., Sidney
 Scott, Jr., M.D., J. T.
 Scott, Ned V.
 Shaffer, Dr. S.S.

Shell Oil Company
 M. N. Dannenbaum Co.
 Box 448

Liberty Mutual Insurance Co.

Emsco Derrick & Equipment Co.
 Texas State Health Department
 Texas State Department of Health
 Painter & Painter
 The Houston Clinic
 Houston Lighting & Power Co.
 Sheffield Steel Corporation
 Texas State Department of Health
 University of Houston
 Shell Oil Company
 A. O. Smith Corporation
 Humble Oil & Refining Co.
 San Antonio Air Material Area, Kelly AFB, San Ant., Texas
 Texas State Health Department
 Stauffer Chemical Co. of Texas
 Mosher Steel Company
 Houston Laboratories
 Houston Lighting & Power Co.
 Emsco Derrick & Equipment Co.
 Sheffield Steel Corporation

Anheuser Busch, Inc.
 Celanese Corporation of America
 Carbide & Carbon Chemicals Corp.
 Gulf Oil Corporation
 Lummis, Reece, Burrows & Arnold
 Houston Anti-Tuberculosis League
 Industrial Scientific, Inc.
 The Texas Company
 Humble Oil & Refining Co.
 Owens Illinois Glass Co.
 Emsco Derrick & Equipment Co.
 Jefferson Chemical Co.
 Drs. Rollins & Liles
 Humble Oil & Refining Co.
 A. O. Smith Corporation
 Diamond Alkali Company
 Hughes Tool Company

San Antonio Garment Workers
 Texas A & M College
 Humble Oil & Refining Co.
 Stanford Research Institute
 Shell Chemical Corporation
 411 Medical Arts Bldg.
 Scott Industrial Clinic
 Water & Fuel Service, T & M.O.R.R.
 Humble Oil & Refining Co.

Houston, Texas
 Houston, Texas
 Baytown, Texas

Boston, Mass.

Houston, Texas
 Austin, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Baytown, Texas
 AFB, San Ant., Texas
 Austin, Texas
 Freeport, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas

St. Louis, Mo.
 Bishop, Texas
 Texas City, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Port Arthur, Texas
 Houston, Texas
 Fairmont, W.V.
 Houston, Texas
 Port Neches, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Pasadena, Texas
 Houston, Texas

San Antonio, Texas
 College Sta. Texas
 Baytown, Texas
 Stanford, California
 Houston, Texas
 Houston, Texas
 New Orleans, La.
 Houston, Texas
 Baytown, Texas

Shannon, G. T.
 Shearon, Jr., W. H.
 Shigley, C. M.
 Sims, Reeves
 Slataper, Miss Louise Leah —
 Smallhorst, D. F.
 Smeltzer, Jr., Edgar G.
 Spurlock, S. V.
 Stalnaker, M.D., Paul R.
 Stinson, B. W.
 Stoltz, Louis
 Stone, Lloyd
 Strong, E. R.
 Sualtenfuss
 Sutter, M.D., Richard A.

Taylor, George
 Teeple, C. S.
 Tiwrell, Rex L.
 Tingley, E. F.
 Tomek, John A.
 Traverse, R.N., Miss Sally M.

Trey, S. Scott

Venable, Fred S.
 Verret, Pearl M.
 Viles, P.S.
 Vincent, D.M.

Vagers, Otto
 Wagner, R.N., Sara P.
 Vallentine, Ervin W.
 Wallis, Dr. W. M.
 Ward, R.N., Beryl
 Waring, R. P.
 Varrington, Sam L.
 Weaver, Jane M.
 Weatherford, Joe A.
 Weller, L. J.
 Westerman, Henry E.
 Whalley, Anne M.
 Whitty, T. P.
 Wier, C. H.
 Wild, Mrs. Beulah Temple
 Willett, Miss Kathryn
 Williams, Ed
 Williams, Jo. —
 Williams, John K.
 Wilson, Mrs. Billie
 Wilson, J. W.
 Wilson, P. V.
 Wood, David M.
 Woodley, James W.
 Wright, E. R.

Humble Oil & Refining Co.
 Chem. & Engr. News
 Dow Chemical Company
 Stockham Valves & Fittings
 Dow Chemical Company
 State Health Department
 Bexar Co. Tuberculosis Association
 Humble Oil & Refining Co.
 4715 Fannin St.
 A. O. Smith Corporation
 Wright Manufacturing Co.
 Stockham Valves & Fittings
 Southwest Research Institute
 City Health Department
 Sutter Industrial Surgical Clinic

Humble Oil & Refining Co.
 Safety Casualty Co.
 Blue Cross
 United Gas Pipe Line Co.
 Texas Employers' Insurance
 E. I. Du Pont De Nemours & Co.

E. I. Du Pont de Nemours & Co.

Texas State Health Department
 Gulf Oil Corporation
 Humble Oil & Refining Co.
 Phillips Chemical Co.

Champion Paper & Fibre Co.
 Standard Oil Co. (N.J.)
 The Texas Company
 918 Union National Bank Bldg.
 National Lead Company
 Houston Lighting & Power Co.
 Hidalgo County Health Unit
 Liberty Mutual Ins. Company
 West Disinfecting Co.
 Humble Oil & Refining Co.
 Gulf Oil Corporation
 Sheffield Steel Corporation
 West Disinfecting Co.
 Royal Insurance Company
 Community Council
 Gulf Oil Corporation
 Champion Paper Fibre Co.
 Champion Paper & Fibre Co.
 The Industrial Health Council
 Houston Lighting & Power Co.
 Texas State Health Department
 Humble Oil & Refining Co.
 Liberty Mutual Insurance Co.
 Liberty Mutual Insurance Co.
 The Dow Chemical Co.

Baytown, Texas
 Houston, Texas
 Freeport, Texas
 Birmingham, Ala.
 Freeport, Texas
 Austin, Texas
 San Antonio, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Birmingham, Ala.
 San Antonio, Texas
 San Antonio, Texas
 St. Louis, Mo.

Baytown, Texas
 Dallas, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 La Porte, Texas

Victoria, Texas

Fort Worth, Texas
 Port Arthur, Texas
 Baytown, Texas
 Pasadena, Texas

Pasadena, Texas
 New York, N.Y.
 Port Arthur, Texas
 Houston, Texas
 St. Louis, Mo.
 Houston, Texas
 Edinburg, Texas
 Dallas, Texas
 Houston, Texas
 Baytown, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Pasadena, Texas
 Pasadena, Texas
 Birmingham, Ala.
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Houston, Texas
 Freeport, Texas

Wright, I. J.
Wright, S. R.
Winksch, Martin C.
Wynn, James D.

Soylot, Edward
Acchary, R.W., Mabel
Leatman, Angelika

Crown Central Petroleum Corporation
Texas A & M College
Texas State Department of Health
Liberty Mutual Insurance Companies

Houston, Texas
College Sta. Texas
Austin, Texas
Dallas, Texas

Liberty Mutual Insurance Company
Chesapeake & Potomac Telephone Co.
Real Estate

Houston, Texas
Washington, D.C.
Houston, Texas

11-3-50