AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

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1014 Broadway
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June 1961

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AWARD OF MERIT

Hervey B. Elkins, Ph.D., Director of the Division of Occupational Hygiene, Massachusetts Department of Labor and Industries, was the recipient of the 1961 Award of Merit of the American Conference of Governmental Industrial Hygienists.

The ACGIH award was made to Dr. Elkins for his outstanding and sustained contributions to industrial hygiene and governmental industrial hygiene in particular. Especially noteworthy has been (1) his work in validating and establishing threshold limit values through careful analytical chemical examinations and observations of the response of workers at specific levels of exposure; (2) his correlation of atmospheric exposure levels with corresponding levels of the chemical or its metabolite in the blood or urine of the exposed worker; (3) his publication of an extremely useful and authoritative reference book which has made his studies available to others; (4) his long time efforts in the development and adoption of effective labelling regulations for hazardous chemicals used in our nation's workplaces; (5) and finally for his development of procedures for the effective operation of an industrial hygiene program in an official governmental agency.

* * * * * *

The presentation of the award was made at the annual dinner by the Chairman of the Awards Committee, Dr. William G. Fredrick. Other members of the Committee were Dr. W. Clark Cooper, Mr. Warren H. Reinhart, Mr. Jack Baliff, and Dr. Irma West.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

TWENTY-THIRD ANNUAL MEETING

April 9-12, 1961

Detroit, Michigan

April 9, 1961: Meeting of Standing Committees
Meeting of Executive Committee

April 10, 1961: Two general sessions, one business session, and meeting of directors of State and local industrial hygiene programs only, with staff members of Division of Occupational Health, Public Health Service

April 11, 1961: Roundtable discussions, one business session, and joint session with American Industrial Hygiene Association
A.C.G.I.H. 23rd Annual Dinner

ANNUAL MEETINGS AND OFFICERS

Annual Meetings			Chairman	Secretary-Treasurer
No.	Date	Place		
1	June 27-28,1938	Washington, D.C.	A. S. Gray, M.D.	J.J.Bloomfield
2	Apr. 26-28,1939	Washington, D.C.	W. S. Johnson	J.J.Bloomfield
3	Apr. 30-May 2,1940	Bethesda, Md.	M. H. Kronenberg,M.D.	J.J.Bloomfield
4	Feb. 17-18,1941	Washington, D.C.	C. L. Pool	J.J.Bloomfield
5	Apr. 9-10, 1942	Washington, D.C.	C. A. Nau, M.D.	J.J.Bloomfield
6	May 24, 1943	Rochester, N.Y.	M. F. Trice	J.J.Bloomfield
7	May 9, 1944	St. Louis, Mo.	P. A. Brehm, M.D.	J.J.Bloomfield
8	Apr. 7-13, 1946	Chicago, Ill.	P. A. Brehm, M.D.	J.J.Bloomfield
9	Apr. 26-29, 1947	Buffalo, N.Y.	K. M. Morse	J.J.Bloomfield
10	Mar. 27-30,1948	Boston, Mass.	L. W. Spolyar, M.D.	J.J.Bloomfield
11	Apr. 2-5, 1949	Detroit, Mich.	H. G. Dyktor	J.J.Bloomfield
12	Apr. 22-25,1950	Chicago, Ill.	K. E. Markuson,M.D.	L.J.Cralley
13	Apr. 21-25,1951	Atlantic City, N.J.	J. J. Bloomfield	J.E.Flanagan,Jr.
14	Apr. 19-22,1952	Cincinnati, Ohio	L. M. Petrie, M.D.	J.E.Flanagan,Jr.
15	Apr. 18-21,1953	Los Angeles, Cal.	J. C. Soet	J.E.Flanagan,Jr.
16	Apr. 24-27,1954	Chicago, Ill.	J. Shilen, M.D.	J.E.Flanagan,Jr.
17	Apr. 23-26,1955	Buffalo, N.Y.	H. B. Ashe	J.E.Flanagan,Jr.
18	Apr. 21-24,1956	Philadelphia,Pa.	R. R. Sullivan, M.D.	C.D.Yaffe
19	Apr. 20-23,1957	St. Louis, Mo.	W. G. Fredrick,D.Sc.	C.D.Yaffe
20	Apr. 19-22,1958	Atlantic City,N.J.	T. F. Mancuso, M.D.	C.D.Yaffe
21	Apr. 25-28,1959	Chicago, Ill.	C. E. Couchman	C.D.Yaffe
22	Apr. 23-26,1960	Rochester,N.Y.	A. L. Coleman	C.D.Yaffe
23	Apr. 9-12,1961	Detroit, Mich.	A. L. Coleman	C.D.Yaffe

OFFICERS AND MEMBERS OF COMMITTEES FOR 1960-61

Chairman: Mr. Allan L. Coleman, Conn. Dept. of Health
Secretary-Treasurer: Mr. Charles D. Yaffe, U.S.P.H.S.

EXECUTIVE COMMITTEE

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Dr. Irma West, Calif. Dept. of Public Health
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Dr. J. Wister Meigs, Yale University

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Mr. Julian Olishifski, Ill. Dept. of Labor
Lt. Col. Maxwell Dauer, Army Environ. Health Lab.
Mr. Charles L. Cheever, Argonne Nat'l Lab.

Industrial Hygiene Codes & Regulations

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Mr. Martin Wukasch, Texas Dept. of Health

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Mr. Robert G. Keenan, U.S.P.H.S., Chairman
Mr. Leonard Pagnotto, Mass. Dept. of Labor & Industries
Mr. Harry E. Jaworski, Detroit Health Dept.
Mr. Martin W. Jeremias, N.Y. Dept. of Labor
Mr. John L. Monkman, Dept. of Nat'l Health & Welfare, Ontario

Industrial Hygiene Records & Reports

Miss Victoria M. Trasko, U.S.P.H.S., Chairman
Dr. Robert H. Duguid, Army Chemical Center, Md.
Miss Edna May Klutas, University of Washington
Dr. Ralph R. Sullivan, Oregon Board of Health
Mrs. Beth Berkov, Calif. Dept. of Public Health

Standard Labeling Procedures

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Dr. Hervey B. Elkins, Mass. Dept. of Labor & Industries
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Dr. Kingsley Kay, Occupational Health Lab, Ontario
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Industrial Ventilation

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Dr. Herbert E. Stokinger, U.S.P.H.S.

Worker Health Information

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of Public Health, Chairman
Dr. E. R. Aston, Pa. Dept. of Health
Mrs. Alice Devers, St. Louis City
Health Division
Mrs. Tula Brocard, U.S.P.H.S.

GENERAL SESSION

April 10, 1961 - 9:00 A.M.

Allan L. Coleman, Chairman, Presiding

Don't Sit Back and Count the Cases:

OCCUPATIONAL HEALTH NEEDS TODAY

Albert E. Heustis, M.D., M.P.H.
Michigan State Health Commissioner

I would begin by sharing with you the story of an incident reported from Italy in July of 1956. You may remember it. For some time, Clare Boothe Luce, our ambassador to Italy at that time, had been troubled by a lingering illness. In 1954, she had returned to New York for extensive medical examinations, and the doctors found anemia and extreme fatigue. She went back to Rome, but the old symptoms came back again, and some new ones developed -- brittle fingernails, loss of hair; her teeth began to loosen; and she spent more and more time confined to bed. She had noticed too, for a long time, that the coffee she drank in her bedroom had a metallic taste, but had decided that Italians simply couldn't make American coffee. To get to the point, Mrs. Luce was living in the spacious, 17th century "Villa Taverna," and the heavy beams of her bedroom were in terra cotta green, decorated with roses and rosettes. Many coats of paint had been brushed on the roses to make them stand out against the background, and as folks walked about on the floor above, bits of dust fell from the ceiling. The diagnosis: Mrs. Luce had been breathing, eating, and drinking arsenic.

Arsenical Wallpapers

This story was of special interest to Michigan because one of the early achievements of our State Board of Health was a study of arsenical wallpapers dramatically called, "Shadows from the Walls of Death." This study was done, not ten years ago or twenty, but in 1874 by Robert C. Kedzie of Lansing, one of the first members of the Michigan Board of Health which later became Michigan Department of Health. To translate into modern terms, this was a case of fall-out from wallpaper blooms, rather than from H-bombs. This study states: "Perhaps we could not devise a more effectual way to contaminate the air of our homes with a small amount of arsenical dust, than by the use of wallpaper colored with arsenical preparations .... That the air of every inhabited room is filled with finely divided particles of matter is clearly seen when a ray of sunshine is admitted into a darkened room. That this dust contains arsenic when the walls are covered with arsenical paper has been demonstrated by analysis of the dust which had settled on furniture....Dyspepsia, neuralgia, pains in the bones and joints stimulating chronic rheumatism, headache, general debility, etc., are symptoms which often attend this form of chronic arsenical poisoning.... Retail dealers, for the most part, are innocent in this matter, for most of them are ignorant of the composition of the coloring matter, and are not aware of the danger of its use.... But the manufacturers cannot enter a plea of ignorance, for they know the materials employed and the danger

"of their use.... A paper printer cannot work more than two or three weeks at a time with arsenical pigments; he must then change his work to enable him to sufficiently recover his health to again begin printing in arsenical colors."

Important Mission

I use this early work as a reminder that occupational diseases have been with us for a long, long time, and while many current problems may be more subtle than those of earlier days, we seldom, if ever, are completely rid of even the oldest hazards. In this illustration, we go from the problems of midwest farm families in the late 19th century to those of a U. S. Ambassador of the mid-20th -- a different era and place, different social position, but the same basic problem. This illustration also indicates the exceedingly important place of occupational health in the whole field of public health. This is not a case of public health leading to the establishment of occupational health, but the other way around. The Kedzie study was instrumental in the development of our health department nearly 90 years ago, and with the growth in population, the growth in industry, and the growth of technology, the mission of occupational health can only increase in importance.

Coming back to a more direct assault on my assignment, I've listed five specific things I would hope to have you seriously consider:

1. Increased Effort

First, if we are going to practice 1961 public health, and not 1921 or 1931 public health, there is a real need to tackle occupational disease problems vigorously and in every state. As suggested in my comments on the arsenic study, in Michigan, we look at occupational health as a basic, front-line, and increasingly important function of public health, and we think it is going to get more important if we do our part of the job as it should be done, side by side with doctors and employees, unions and management, and all the others concerned.

Certainly we can look around and see a great deal of progress, and it's very heartening. For example: In Michigan, our occupational health staff now numbers 28 working from eight district offices. In the last ten years, the number of plants served and the number of workers involved are both up by one-quarter. The requests from industries are up 60%. And over the past ten years, too, our annual ventilation conference has brought together nearly 2,000 people. We now make over 4,500 industrial health consultations every year. Our occupational health and education staffs have combined their talents to produce a quarterly bulletin "Michigan's Occupational Health" which has a circulation of about 4,000. And we've made a start on some of the newer things such as air pollution and radiation.

This is progress and this is good, and yet we still see much unfinished business and a whole flock of new problems brought on by this age of plastics and pushbuttons. We see that the image of what public health actually is in this year 1961 has not caught up with the reality of the situation. There are still many who equate public health with communicable diseases and dead horses in the river and with nothing else. There are

still some in responsible positions who continue to think of public health operating in the comfortable rut of the twenties. As a result, those of us truly interested in modern public health feel we have a real job to do to demonstrate the importance of occupational health and to sell it and project it to those in responsible positions in all 50 states. We must sell it in a way that might well be patterned after the experience of a man who had been blind all his life. One day, he suddenly gained his sight, and he saw what you and I see every day -- trees, flowers, blue sky and sleek new cars. To him, this, the commonplace to us, was exciting and beautiful. It's our job, collectively, to present the commonplace in occupational health in such a way that it will be exciting, create understanding, and stimulate support. It's our job to tackle occupational disease problems vigorously and in every state.

2. Wise Use of Law

Second thing I see as a State Health Commissioner, is the need to make realistic and constructive use of regulatory powers in occupational health in conjunction with the educational process. A lawyer friend of mine came up not long ago and said: "The trouble with you folks in public health is that you're afraid to use the law even when it's on your side. You wait around looking for somebody else to do your dirty work." He bluntly added that he didn't think working people should end up in a hospital or some place worse while we wait with bated breath for the long range results of education. Our basic philosophy is that the educational approach is fine, and praiseworthy, and constructive, and has its place, and should be used. But there are instances when we have the authority in public health and face a critical problem in which there comes a time when we must stop saying, "Please" and go in and say, "Now do this or shut down."

This is, of course, the same approach we have used in many other places. In working with hospitals in Michigan, for example, we first came up with a book of about 200 rules, but if we had made every hospital meet every rule six months or a year after this book was issued, a great part of the state would have been without hospital beds. Instead, we gradually applied the rules, over a period of time, and the goal was progressive improvement, rather than to see how many hospitals we could close. Yet, at the same time, we did not hesitate to stand our ground and enforce the rules when this was necessary for the public health. The result has been a good hospital program and improvement in hospitals and in hospital care. We have used education. We have used law and authority, but neither indiscriminately nor unreasonably.

Let me illustrate with a hypothetical example in industry. Take a foundry where two or three thousand are employed, and we see some practices which we believe will lead to silicosis in ten or twenty years in some workers, but the evidence is not of the kind that would stand up well in court. Here, we have to decide whether we make the greatest gain for public health by trying to close the plant down or by going on working with management to overcome the problems. If we attempt to close down an operation and lose, then we set the program back for a good many years. So, in this case, the thing to do if we are not sure is to work along with management, even with some potential risk, let the workers keep eating, and go for the long run program.

This is obvious, but it is just as obvious that in another situation putting all of our faith in the long-run program would be less than responsible. For example, a few years ago, there was an operation melting down old lead batteries. Two men were already in the hospital with proven lead poisoning, and blood levels in others were high. This was not the place or time for pussyfooting around. The plant was closed the day we had the evidence and told to clean up. We worked with them over a weekend and over a holiday, and now one of the finest letters in our files is from this concern.

Constructive use of regulatory powers means we must be as quick to approve and commend, to stick our necks out positively, as we are to disapprove and criticize. We must be willing to tell industry under what conditions an operation will be approved and then show how these conditions can be met. We must play fair, and we must even weigh the economic hardships along with other social consequences. And having weighed these, we must do today that which will be best for public health ten years from today. In our Michigan program, we have seen the educational approach, coupled with firm and correct use of the law, save time, money and harassment, give our staff needed support, earn the respect of industry and labor, and make the difference between health protection and the lack of it for many working people. The second point, then, is to make realistic and constructive use of regulatory powers in occupational health in conjunction with the educational process.

3. Continuous Consultation

Third, I see a need to get into industry, not only on their call, but on a routine basis. Medically, I would compare this approach to having a physical check up when you are in apparently good health, over going to the doctor only when something hurts real bad. We must get into industries frequently enough to know the processes and to look for those things which we, and not industry necessarily, are trained to recognize as potentially harmful.

Only by getting out and into industries on a routine basis are we going to keep our fingers on older problems such as lead poisoning, mercury poisoning, silicosis and all the others, which continually turn up in both old and new settings. In 1959, we had nearly 150 Michigan workers getting compensation on silicosis claims. Aside from the loss of health involved, I'm told that the average cost runs about $10,000, so these 150 represent something like $1,500,000. We couldn't expect to do much about this from behind a desk in a central office, other than sit back and count the cases.

Only by getting out into industries on a routine basis are we going to find out about new hazards before serious harm has been done. As an example, on a routine call made last year, our staff found a double-barreled problem in a concern making bowling pins. These pins were being coated with a resiliant plastic material by several dips in a toluene-based solution of the plastic. The plastic was being applied so the pins can take the drubbing they get from automatic pin-setting machines, which bounce the pins together. Here was both a hazard from fumes and the potential for a real explosion. At first, management said: "Go ahead and recommend what you want so long as you don't get in our way." This is about like the diet prescription which says, "Eat all you want so long as you don't swallow."

So there were some very plain words, and management was told that if they wanted to continue to operate they would have to take necessary protective measures. Once this understanding was developed, the needed work was done. A year later, the plant management actually appreciates and respects our decisions and realizes what a real headache they were saved. This is preventive medicine. It is getting out to do the job in occupational health. It is getting into industry on a routine basis.

4. Full Use of Competencies

Fourth, I see a real need to break some traditional boundary lines of occupational health if we are going to use our training, knowledge and skills most effectively and use the taxpayer's dollars most economically. You remember the problem last year with Thurm heaters. These heaters were responsible for more than a dozen carbon monoxide deaths, but if you and your associates had not gone to work to check out some 2,000 of these units spread all over the country, the death toll could have been in the hundreds. In Michigan, we got into this not on somebody's request, but because an alert staff member of our division of occupational health while home for lunch heard on his radio that three women had been found dead in a trailer, and the cause of death was listed as lack of oxygen. We could have sat on our hands and said, "Strictly speaking, this is not occupational health and not our business." Instead, we ran tests on the blood of the victims and found carbon monoxide. We tested the trailer and its heater and found a nice mobile gas chamber. We then went on to work with the trailer and heater manufacturers, with the fire marshal, the public health service and all others concerned.

The point of this example is that when we have the knowledge, and the equipment, and the trained personnel to deal with a problem, then it's our job in public health to use these resources wherever and however they are needed to protect people. This applies to problems such as explosive hazards, where we should not hesitate to blanket safety in with health when the occasion demands it. Another example is air pollution where what we have learned about stopping contamination of the air inside the factory should be used to keep this same kind of industrial sewage from polluting our open skies. We also must not forget the use of household poisons such as carbon tetrachloride. It's our job to be alert to use the special knowledge of occupational health whether in the traditional industrial setting or not.

5. Field Research

Fifth, I see a need for "field research" to complement basic laboratory research. Under this heading, I would lump several things. There is need for continued engineering research on air flow and ventilation, some of the things our Michigan ventilation conference has been concerned with. There is need for epidemiological studies of various kinds, and one of the most recent in Michigan found that pink rot infection in celery is responsible for celery dermatitis among field workers. This one started when a dermatologist called to ask if we had ever heard of any skin trouble caused by celery. We said we hadn't, but we would have some of our folks look into this. We checked with some celery growers and found about six out of ten workers had trouble with an itchy, sore and often blistered skin

condition, most common on their hands and arms. Then, with the Public Health Service, we ran some patch tests, and extracts from celery plants also were studied. The outcome of all this showed the dermatitis is associated with pink rot, a fungus disease in celery. This is epidemiology, going from effect to cause. A third type of field research is the survey, often the only way we have to determine the hazard potential of a new product or new processes. Here, for example, our staff folks tell me they have recently studied a number of establishments using gas-fired, radiant heat panels. Contrary to claims made by manufacturers and others, they have found gas and fumes not exhausted to the outside, and persistent, low level concentrations of carbon monoxide. So, we need field research using epidemiologic methods and using survey techniques.

Summary

To sum up, as a medical health officer, these are the five things I would emphasize in the modern occupational health program:

1) The need for more vigorous programs in all states.
2) The need to make realistic and constructive use of both regulatory powers and educational techniques.
3) The need to get into industry routinely.
4) The need to break traditional boundaries within occupational health.
5) The need for field research.

Of these, I would place the most emphasis on need to get into industry routinely, because to keep pace with industry, to make full use of competencies, to give the "best for less", we must go to industry, and not hang around like a bridegroom at the altar waiting for industry to come to us.

I suggest we might compare the situation in occupational health with the factors an engineer must take into account in building a bridge. The engineer considers a "dead load", the weight of the bridge; a "wind load", the pressures from the wind; and "the live load", the traffic over the bridge. Likewise, in occupational health, we have a dead load, the weight of old traditions; a wind load, set up by critics and opponents; and a live load, of progressive programs, moving ahead with developments in industrial technology. It's our job, yours and mine, working together, to make sure the "live load" is the predominating feature, because this means health protection for people.

GOVERNMENTAL OCCUPATIONAL HEALTH AS VIEWED BY THE MEDICAL PROFESSION

C. Joseph Stetler, Director
Legal & Socio-economic Division
American Medical Association

Mr. Chairman, Ladies and Gentlemen: I appreciate very much the opportunity to appear on your program this morning and would like to congratulate you on what appears to be a very successful conference. Quite frankly, however, I feel very much out of place speaking to you people who are the experts in the field of industrial hygiene. All I know is that my old friend -- your chairman-elect, "Blackie" Wilson -- sent me a couple of letters and before I realized what had happened, I agreed to speak on this program. Let me repeat that I appreciate the invitation; however, I am not sure of my ability to handle the assignment.

To set the record straight, I want to say that I am not a physician, a chemist, a toxicologist, or an industrial hygiene engineer. I am an attorney and am presently the General Counsel for the American Medical Association. To further document my lack of qualifications as an expert let me say that the AMA's Department of Occupational Health, which works in the area of industrial hygiene, is not a part of my Division.

So primarily, I am appearing here today as"Blakie's friend." And I hope I can still enjoy that status after my presentation is completed.

In one of his persuasive letters to me, Dr. Wilson suggested that I give you my impressions and recommendations as to some feasible major objectives which the American Conference of Governmental Industrial Hygienists might seek to attain and to tell you about the real attitude of organized medicine toward your efforts and activities.

My comments will naturally reflect the policies and outlook of the American Medical Association, which I am happy to say parallel my own. I can also assure you that these views and policies are based on the realization that in a society like ours the issues covered by this broad subject can be properly resolved only on the basis of sound information, careful study, free discussion and a willing recognition that we live in a changing world.

I noticed in reading a copy of your objectives that the purpose of this conference is "to promote industrial hygiene in all its aspects and phases; to coordinate industrial agency activities in all their aspects and phases by official federal, state, local and territorial industrial hygiene agencies; to encourage the interchange of experience among industrial agency personnel in such official organizations; to collect and make accessible to all governmental industrial hygienists such information and data as may be of assistance to them in the proper fulfillment of their duties; and to hold annual and such other meetings as may be necessary to effectuate the purpose of this organization."

Now it seems to me that it would be rather difficult to quarrel with these objectives, assuming of course some general agreement in basic philosophy as to the proper responsibility of the various echelons of government in connection with industrial hygiene.

Inasmuch as the AMA's Legislative Department is in the Legal and Socio-Economic Division, and since this work is demanding an inordinate amount of our time currently, I am familiar with the increasing role the Federal government is playing in the health care field. I feel very strongly that American medicine, under the free enterprise system, has brought the best health care in the world to our country. However, there is increasing pressure from some quarters today to attempt to establish a "Utopian program" run by the Federal government.

I further believe these attempts -- if successful -- would lead to poorer, not better, medical care.

Just a casual look at the Federal medical care picture reveals that today approximately one-fifth of the U.S. population is eligible for some sort of medical or hospital care from the Federal government. Over 50 per cent of the money spent on medical research comes from the Federal government. About one-seventh of the medical school graduates taking residency training are in Federal hospitals.

There are some thirty different health programs operated by twenty-two separate agencies and departments of the Federal government. The total Federal budget for health and medical activities has been increasing constantly over the past thirty years--and at an especially rapid rate during the past ten years. For the fiscal year 1961, it has reached approximately $4 billion - $3.8 billion to be exact.

I think, in view of these facts, it is imperative that a determination be made as to how far the Federal government should go into health matters and to define the limits of Federal activities and responsibilities in relation to those of states, communities, and individuals.

At the same time, I want to emphasize that, contrary to popular misconception, it is the opinion of organized medicine that many of the Federal government's health and medical activities are clearly a national responsibility and duty. For example, there is little or no argument over the basic objective of the public health program, under which most of the governmental industrial hygiene programs are carried out; hospital and medical care for veterans with service-connected disabilities and for members of the Armed Forces; the regulatory activities of the Food and Drug Administration, and similar services which are beyond the scope of states, communities, or individuals.

The AMA has also recognized that there are certain areas of occupational health where government agencies can and should carry on "pilot projects" to solve problems that non-governmental agencies are not in a position to handle. However, it believes that once the research work is completed and leads to the development of a service which a non-governmental agency can provide, the government should encourage private parties to step in and take over. In this way, the government will be able to turn to a new problem requiring its attention.

Today, there are many broad and important national problems in your field -- air pollution, water pollution, and radiation dangers -- which are causing increasing concern. These problems require governmental attention. I would assume that a concentration of your efforts on the occupational health aspects of these problems is a major part of your program. Certainly your expertness is needed in connection with these problems and it is here that your efforts would seem to be most appreciated.

The American Medical Association has clearly stated its position on various occasions with respect to Federal responsibility in these unique areas. For example, during the 86th Congress, the Association testified before the Interstate and Foreign Commerce Committee of the House of Representatives in favor of the extension of the Air Pollution Control Act. In presenting its views, the Association stated, in part:

"It is apparent that future research on the subject of air pollution and its relation to health is highly desirable. We believe that the Air Pollution Act which was enacted in 1955 represents a proper approach to the problem. The philosophy of the Act recognizes the primary responsibility of state and local governments in controlling air pollution. Within the framework of a coordinated national program, established under the direction of the Surgeon-General of the United States Public Health Service, we believe there is sufficient flexibility to stimulate the initiative of local agencies and to permit states and communities to deal with the phases of the air pollution problem most important to them. Although the interest of the Federal government in the subject of air pollution may not be a permanent one, we feel that sufficient federal responsibility can still be demonstrated to justify the appropriation of limited Federal funds in support of research activities in this field for an additional period of time."

As you are also probably aware, the American Medical Association is in full accord with the Federal government's operating an occupational health program for its own employees. The AMA's testimony helped in passing Public Law 79-658, which permits governmental agencies to establish occupational health programs.

It is recognized that where governmental agencies operate occupational health programs for their employees, the relationship of the program with organized medicine is very similar to the relation between organized medicine and the occupational health programs operated by private industry. Last year, the AMA's Council on Occupational Health revised a document entitled the "Scope, Objective and Functions of Occupational Health Programs." This document has drawn a rather sharp line between occupational health services, which the employer should provide, and non-occupational or personal health services for which other provisions should be made.

Briefly the Council on Occupational Health has stated that the proper objectives of an occupational health program are:

(1) To protect employees against health hazards in their work environment;

(2) To facilitate the placement and insure the suitability of individuals according to their physical capacities, mental abilities, and emotional make-up in work which they can perform with an acceptable degree of efficiency and without endangering their own health and safety or that of their fellow employees;

(3) To assure adequate medical care and rehabilitation of the occupationally ill and injured; and

(4) To encourage personal health maintenance.

Although there have been no really major conflicts between private medical practitioners and physicians and allied health personnel engaged in occupational health programs, there are undoubtedly a number of minor areas of irritation which should be openly and frankly explored. Persons in industrial medical practice should be conversant with and should respect the proper lines of demarcation between occupational health services and personal health services. On the other hand, physicians in private practice should develop a more intelligent awareness of the actual, not the assumed, social and economic impacts of a proper occupational health program. Such an intelligent awareness would reveal that these programs do not result in economic loss to the private practitioner but that they actually put dollars in his pocket. It would also develop an awareness of the inability on the part of the average physician in private practice to cope with some of the highly specialized problems of industrial medicine.

The private practitioner and the industrial physician both have important positions in the community and both deserve the cooperation, support, and respect of the other.

Last Tuesday, I was in Wichita, Kansas, to speak to the Sedgwick County Medical Society. I was privileged, while there, to be the guest of Dr. Solomon, the Medical Director of the Boeing Airplane Factory on a two-and-one-half-hour tour of the plant where the B52 Air Force Bomber is constructed. I was truly amazed at the product of this Firm. I was equally impressed, however, by the variety, complexity, and importance of the duties and responsibilities of the personnel working on industrial health problems. In-plant accidents and other ailments, allergies, and health hazards incident to the various occupations of some 30,000 employees plus pre-employment and regular physical examinations obviously required the full-time activities of several physicians plus the whole-hearted cooperation of the medical community and the services of a large number of competent allied medical associates.

It was obvious to me that afternoon and at the medical society meeting that evening that the physicians in private practice in Wichita were cooperating with and had respect for this industrial physician, his assistants, and their work. I am sure the importance of his duties contributed to this happy relationship; however, I am also sure that his willing recognition of the differences between occupational and personal health services and the role and responsibility of the private medical practitioner were equally important factors.

In conclusion, I would like to point out again that the American Medical Association has supported appropriate actions in the field of occupational health on the part of government. Our policy continues to favor governmental agencies operating occupational health programs for their employees. We believe that there are certain occupational health problems which properly should be solved by governmental agencies.

It seems to me that within these objectives and activities there is a tremendous area in which governmental industrial hygienists can do a maximum amount of good. Today, the government plays a dominant role in science and technology, especially in nuclear and space developments. These necessarily pose special problems, the solution of which is of great importance and will contribute largely to improving the occupational health programs of private industry in the future.

I am convinced that occupational health services, properly operated by private industry and by the government, actually stand as a bulwark against those forces which seek to scrap the traditional American way of doing things. Workers served by adequate occupational health programs will enjoy better health and consequently be more resistent to Utopian promises.

MANAGEMENT: COMMUNITY EFFORT AND BENEFITS

Fred D. Henderson*
Assistant Vice President
Western Electric Company
Winston-Salem, N.C.

Ladies and gentlemen. As you know, I have been asked to represent management in this discussion of industrial hygiene. I shall use the Western Electric Company to illustrate some of the important considerations and action taken by industry to meet industrial health needs. I shall then relate this information to the broader picture as it applies to the State of North Carolina, which has been quite active in providing occupational health assistance to industry.

No successful industry functions for the sake of charity or philanthropy. In our increasingly complex society a product or service must be produced at a competitive price. Therefore, a health program for industry must be a worthwhile investment. Employers who have studied available data and who have established their own occupational health programs have found that inevitably GOOD HEALTH IS GOOD BUSINESS.

There are many tangible benefits to be derived from a sound industrial health program. Such a program means reduction in absenteeism; in job related accident frequency and severity rates; in labor turnover; in manhours required for employees to seek medical care in emergency cases; in time lost due to non-occupational diseases and injuries; and in insurance costs, compensation costs and employer-paid medical costs. Also tangible are improvements in general health and a sense of well-being of employees, in the volume and quality of work performed and in employer-employee relations.

These benefits result in greater profit to the employer, reduction of insurance costs, greater employee income and job satisfaction, more consistent economic growth and stability for the community and state.

Illness and accidents resulting in lost time cost our nation's industry about $10 billion annually. The Western Electric Company is, of course, concerned because it pays annually about $16 million of these costs in sickness and accident benefits to employees under the Company Benefit Plan. This reflects our experience with an employment level of well over 100,000 people. Obviously, Western Electric management is interested in the total health problem, and especially in the occupational health aspects which we can attack directly.

In this connection, an area of occupational health in which diligent effort yields measurable benefits is accident prevention. Our Company has demonstrated this quite well in its safety program over the years and has a safety record of which we are proud. At this point, permit me please to boast of the achievement of Western Electric Company's Greensboro, North Carolina Plant, which has had in excess of 25 million man-hours of work exposure without a lost time accident. This is a national record in the electrical manufacturing industry and has been widely recognized by the

*Presented by Mr. C. W. Reynolds

National Safety Council, by the Governor of North Carolina, our Commissioner of Labor, and, of course, our own Company management and others. Such recognition has been inspirational to our employees and has helped to stimulate within them a strong sense of safety consciousness which, after all, is the most effective bulwark against accidents.

To meet the needs of its safety and health program Western Electric employs at each of its main plants an occupational health team which usually consists of a Medical Director, staff physicians, nurses, industrial hygienists and safety advisors. This team gives physical examinations, maintains necessary medical and accident records, furnishes appropriate medical care on the job, provides health education and counseling and supervises the work environment in conjunction with industrial health experts of State and other agencies.

Western Electric medical organizations give pre-employment physical examinations, special examinations for employees whose work assignments expose them to potentially toxic materials or hazards, post-illness return-to-work examinations and other periodic examinations.

Medical care is provided on the job for all employees whose injuries or illnesses are of occupational origin. Diagnosis and treatment of non-occupational injuries or illness are, of course, always the personal responsibility of the worker and his own physician. In cases of minor disorders or emergencies which occur during working hours, we render first aid in our dispensaries and advise the employee to consult his own doctor for treatment.

Particularly important among the various medical services provided by Western Electric is supervision of the work environment by industrial hygienists. This consists of periodic inspections of the premises from a health standpoint and special inspections and studies when atmospheric pollution, radiation, ventilation problems, noise problems and safety hazards may or do exist.

In North Carolina there are several State governmental agencies which render assistance to industry in health matters. One of these agencies is the Industrial Commission which administers the Workmen's Compensation Act, offers courses in accident and fire prevention and compiles and publishes statistical data concerning occupational accidents and diseases.

Another is the Department of Labor whose inspectors check industrial plants regularly for safe, healthful and sanitary working conditions and for possible occupational disease hazards. The Department's inspectors, working cooperatively with the State Board of Health industrial hygiene engineers, assist employers with studies, advice and recommendations to eliminate or control the causes of occupational diseases. Appropriate tests and laboratory analyses are available on request and supplement the studies and observations.

The third governmental agency from which industry may seek help in North Carolina is the State Board of Health. Its Occupational Health Section investigates and studies occupational health problems, provides counseling and makes recommendations as to methods for correcting deficiencies or

hazardous conditions. It also establishes standards of industrial sanitation and hygiene, provides information about materials, methods and processes which will protect workers' health; provides training for local personnel and gives advice in complex problems or unusual circumstances.

There are now some 3,000 diagnosable occupational diseases, and about 200 new ones are recognized annually. Because of the attention paid to occupational health by governmental units such as those mentioned and by the groups they serve, the American industrial worker can now expect to live as long as the rest of the population. Fifty years ago his life expectancy was six years less than that of the population as a whole.

To bring together the various governmental health agencies and the groups they serve in order to effect better use of existing facilities in North Carolina, the Governor's Council on Occupational Health was established. The Council grew out of an increasing community of interests of physicians and business and industrial leaders in occupational health. It originated in 1954 when the School of Medicine of the University of North Carolina and the Occupational Health Committee of the State Medical Society joined to sponsor for physicians the first seminar on industrial health. It was later expanded to include subjects of interest to representatives of business and industry and officials of State agencies having responsibilities related to industrial health and safety, as well as to physicians.

Out of these expanded seminars grew the idea of a State conference on occupational health to bring together any who might have interest or responsibilities in the field: physicians, nurses, engineers, public health workers, officials, legislators and as wide a representation as possible from business and industry in North Carolina. The first Governor's Conference on Occupational Health was held in 1957, and those attending approved a strong recommendation for a permanent council on which all the interested professions and groups would be represented. As a result of this recommendation and of the Governor's interest and support, a steering group was formed to lay the ground work. This group was composed of the Committee on Occupational Health of the State Medical Society, representatives of the State Board of Health, the State Department of Labor, and Industrial Commission, the Vocational Rehabilitation Division of the Department of Public Instruction, the University of North Carolina Schools of Medicine and Public Health and two invited representatives from industry. The Governor chose 42 people from the interested professions and groups to serve on the Council, and in July, 1958, an organizational meeting was held. Fred E. Henderson, Assistant Vice President, Western Electric Company, whom I am representing today, was appointed the first Chairman of the Council and is still serving in that capacity.

The objectives of the Council as stated in the bylaws are:

1. To promote interest in all phases of employee and worker health in North Carolina.

2. To provide an effective means for cooperation and interchange of information among all the agencies and groups interested in the problems.

3. To promote study of special hazards to employee health which may exist in North Carolina.

4. To promote the development of practical programs by which small business and industrial establishments and agricultural employers may provide health services for their employees.

5. To interpret to the officials and citizens of the state the needs and accomplishments in the occupational health field in North Carolina.

6. To sponsor an annual Governor's conference on occupational health.

Perhaps the most significant function of the Council as distinguished from its over-all objective of promoting the health of workers is indicated by the second objective, that of providing an effective means for cooperation and interchange of information among all who have a concern for the protection and promotion of worker health. Physicians and nurses, of course, have a tradition of working together, but, heretofore, there has been little or no opportunity to develop mutual understanding between business and industrial managements and the health professions; between physicians and safety engineers; or between all of these groups and the several official agencies concerned with industrial health and safety. The Council provides a community medium through which these groups are brought together to become familiar with each other's points of view and problems and to direct their efforts toward the development of more effective cooperation in promoting the health of the working population.

The establishment of such a forum for communication and exchange of ideas is, in itself, a significant development. As society becomes more complex, the problem of communication between interested groups becomes increasingly difficult. The Council, with its broad representation, provides a forum where thoughtful consideration can be given to the problems and ideas of each group and mutual understanding achieved.

I have been impressed with the voluntary participation on the Council of so many of North Carolina's leading citizens. I think this proves their inherent belief in, and concern for, the all-important health needs of their fellow citizens. Such concern for health matters by business and professional leaders is good for our society and for each of us individually.

This increasing interest in occupational health on the part of community leaders and the demands of business and industry for the services of industrial hygienists are strong evidence of the value of your work. It is only as it provides an occupational environment which protects the health of its employees that an industry can achieve its highest aims, measured by either moral or financial standards. Your work is important to America's business. It is important to America's people. I congratulate you for being engaged in it.

AS OTHERS SEE US: RESPONSIBILITIES AND PRIVILEGES

George T. Brown, Executive Secretary
Standing Committee on Safety & Occupational Health
AFL-CIO, Washington, D.C.

While the topic assigned to me concerns the responsibilities and privileges of Governmental Industrial Hygienists, I should appreciate your extending to me the courtesty of not speaking directly on the point. For your principal problem is not being made aware of your duties but rather to find ways and means by which you can function as industrial hygienists employed by Governments.

Moreover, I would deem it rather an insult for the trade union movement to blame you people for what might be raised as shortcomings in the services you provide to workers in the field of occupational health. The facts are that the trade union movement is not in a position to blame any group or groups who are now striving to improve occupational health conditions related to employment.

Rather, the trade union movement can better spend its time determining its own shortcomings in the field of occupational health and devoting its energies toward reducing its own defects. Perhaps, if and when we have eliminated some of the glaring shortcomings of our own efforts to improve occupational health for all wage earners, then we might focus our attention on whatever imperfections there still may be.

By way of illustration, one of the major problems that face governmental industrial hygienists is the lack of sufficient funds to perform their growing duties. I know your wage rates and I know some of the hardships under which you labor. Concretely, there is a national industrial situation in America where the chief hygienists does not posses even laboratory facilities with which to carry out his duties.

Now, certainly as governmental employees you have the right to propose an adequate budget; yet it is the State legislature which disposes. What is really needed is a group of public-minded citizens and taxpayers who are ready and willing to appear before proper committees of the legislatures and insist upon realistic appropriations which will enable industrial hygienists to meet their responsibilities.

As a consequence, therefore, fault-finding is ridiculous when a prime factor is a deficiency in appropriations which is not corrected by public action. Concretely, therefore, if the trade union movement in any particular State or in the United States is dissatisfied with conditions as they are, then the trade union movement should positively act to increase the financial resources of those persons who have dedicated themselves to public service in the field of occupational health. Let the trade union movement include in its legislative program adequate appropriations for governmental bureaus created to prevent occupational diseases and unhealthy conditions.

Incidentally, at this very time, management groups who are genuinely convinced that industrial hygiene is no mere passing fancy should also appear before proper committees of the State legislatures and either alone or - preferably - in a united effort with the labor movement support adequate appropriations to protect working people from the hazards associated with their occupations.

In short, let all groups who benefit from the service of industrial hygienists; who are ready at any time to assert to all public forums the necessity for promoting occupational health; "let them put their tax money where their mouth is."

Unfortunately, this practical approach toward occupational health has been neglected far too long. Instead, taxpayers will ignore their responsibilities until some hazard of epidemic proportions occurs. Then in keeping with the classic tradition of America in both occupational health and occupational safety, there will be a public outburst of condemnation, lamentation and protestation; we make progress through tragedy.

In conclusion therefore, it should be crystal clear why there is no time for this movement to review the responsibilities and so-called privileges of governmentally employed industrial hygienists. But it is time for so-called pressure groups to earn that title by interesting themselves in occupational health to the point where at least adequate finances will enable you people to do your job.

GENERAL SESSION

April 10, 1961 - 2:00 P.M.

Allan L. Coleman, Chairman, Presiding

STATE-AEC RELATIONS PROGRAM

G. W. Morgan, Chief
State-AEC Relations Branch
U. S. Atomic Energy Commission
Washington 25, D. C.

Introduction

It seems particularly important at this time to discuss the Commissions's State Relations Program since it is so vitally related to your State industrial hygiene programs.

Since time does not permit a discussion of the broad phases of the State-AEC Relations Program, I will confine my remarks to activities relating to Section 274 of the Atomic Energy Act, which provides for States to assume a part of the Commission's regulatory responsibilities through an agreement between the State and the Commission.

State-AEC Agreements

As you know, Section 274 was enacted in September 1959, as an amendment to the Atomic Energy Act of 1954. It provides a legal framework whereby the AEC may relinquish to the States the regulation of (1) by-product materials, (2) source materials, and (3) special nuclear materials in quantities less than a critical mass. The Amendment reserves to the Commission the regulation of reactors and other nuclear facilities, exports and imports and ocean disposal. It also reserves to the AEC the right to issue rules and regulations with respect to other waste disposal and the transfer of devices and other products containing materials subject to an agreement.

The Amendment provides that the Commission shall enter into an agreement with any State covering the defined radioactive materials provided (1) the Governor of that State certifies that the State has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by the proposed agreement and that the State desires to assume regulatory responsibility for such materials; and (2) the Commission finds that the State program is compatible with the Commission's program for the regulation of such materials, and that the State program is adequate to protect the public health and safety with respect to the materials covered by the proposed agreement.

In establishing guidelines for State-AEC agreements, the Commission examined its current regulatory program and established the basic features of this program as proposed criteria. It has also developed a program for advising and assisting the States in developing regulatory programs for assumption of regulatory responsibilities.

The proposed criteria were sent to the Governors of the States, the District of Columbia and principal U. S. Possessions and Territories on April 12, 1960.

Prior to that, President Eisenhower sent a letter to the Governors of the 50 States pointing out that the Amendment was enacted in response to recommendations by the Joint Federal-State Action Committee and that he considered it a constructive step toward a better distribution of the functions between the Federal Government and the States.

The Commission made considerable effort to secure the reaction of the States and other interested groups and organizations to the proposed criteria in order to adopt guides which are the most useful and equitable to it and the States.

To provide detailed explanation of the proposed criteria, four regional meetings were held in different parts of the country which were attended by approximately 150 persons representing 37 States. Also conferences were held with representatives of industry, labor, and other interested groups.

The Commission's staff also discussed the proposed criteria before the Committee on Atomic Energy of the National Association of Attorneys General, the Conference of State Sanitary Engineers, the Middle States Public Health Association, the Atomic Energy Committee of the National Conference of Commissioners of Uniform State Laws and the National Legislative Conference, as well as at a hearing before a committee of the California Legislature.

Prior to the drafting of the proposed criteria, informal discussions were held with State health officials in meetings sponsored by the U. S. Public Health Service at Las Vegas, Nevada, on December 5, 1959, and Montgomery, Alabama, on February 12, 1960.

In addition to having the benefit of these meetings and conferences, numerous comments on the proposed cirteria were received from the various State and Federal agencies and from industry, labor and interested private organizations and groups.

At the request of State coordinators, advisory commissions, committees, and officials, one or more separate meetings were held to discuss the proposed criteria and other phases of the Commission's program with representatives of 18 States, 14 of which were held in the States and the others at AEC Headquarters.

The Commission's Advisory Committee of State Officials met on August 22 and 23, 1960, to present their views on the proposed criteria and to evaluate the comments which had been received. As a result, the criteria were modified, in part, and have been given wide public distribution for use as guidance to the States, as well as the Commission in working out agreements.

On March 17, 1961, Commissioner John S. Graham, speaking for Chairman Seaborg, sent the modified criteria to the Governors. In his covering letter, Mr. Graham stated that: "The Commission is prepared to undertake negotiations with you or your representative in the expectation that an agreement could be reached whereby the legally permitted regulatory functions could be turned over to, and administered by, your State." Mr. Graham also suggested that

many States may need to amend their statutes preliminary to such negotiations and reiterated the Commission's wishes to continue its cooperative efforts with the States so that there can be an orderly transition of the specific regulatory program to the States.

Criteria

The criteria cover many points, but I would like to refer to three of them which I am sure will be of interest to you. These criteria deal with (1) uniformity of radiation protection standards, (2) a licensing system to insure evaluation from the standpoint of health and safety, prior to receipt of the materials by an applicant and (3) the qualifications of regulatory personnel.

Suggested Radiation Protection Regulations

With respect to uniformity, we believe that you will all agree that it is desirable to have the highest degree of uniformity of regulations that is practicable. The criteria stress the importance of striving for a high degree of uniformity in radiation protection standards. They require uniformity in maximum permissible doses, levels of radiation and concentrations of radioactivity as fixed by 10 CFR Part 20 of the AEC Regulations based on officially-approved radiation protection guides. Part 20 Regulations are based upon recommendations of the National Committee on Radiation Protection and Measurements and will reflect the recommendations of the Federal Radiation Council, as approved by the President.

In an effort to achieve uniformity of radiation protection standards, the AEC has worked with the Council of State Governments and the U. S. Public Health Service, representatives of States and other interested groups in developing suggested State regulations on "Standards for Protection Against Radiation". These suggested regulations are being widely circulated to the States, Federal Agencies, and other interested groups for comment.

Pre-Evaluation - Licensing

The criteria require a system of pre-evaluation of the applicant's capabilities for handling radioactive materials covered by the proposed license. In making application the prospective user will be required to submit such information as (1) types, quantities and uses of radioactive materials desired, (2) the qualifications of technical personnel who will control their use, (3) specialized facilities and equipment available and (4) other information which may be pertinent to evaluate any specific potential hazards in the proposed use.

Suggested Licensing Regulation

As in the development of suggested State regulations for protection against radiation, the Council of State Governments in collaboration with the U. S. Public Health Service and the AEC is drafting a suggested State Licensing Regulation. This suggested Regulation will be ready for circulation and review within the near future.

Your comments and suggestions on this Regulation as well as on that suggested for radiation protection will be welcomed.

Qualifications of Personnel

The criteria stress the need for adequately trained personnel to execute the State regulatory program. Licensing and inspection functions should be conducted by persons possessing training and experience relevant to the type, level and use of the material in question.

To perform these functions, personnel should have training in the physical and/or life sciences, including biology, chemistry, physics, and engineering, and in addition, training and experience in radiation protection. For example, the person who will be responsible for the actual evaluations and inspections of all of the various uses of byproduct, source and special nuclear material within the jurisdiction of the regulatory body should have substantial training and extensive experience in the field of radiation protection. It is desirable that such a person have a bachelor's degree or equivalent in the physical or life sciences and specific training in radiation protection.

It is recognized that there will also be persons in the program performing a more limited function and that they, therefore, will not have to have the breadth of training and experience that is required for senior personnel.

In measuring the equivalence of educational requirements, proper consideration will be given to suitable experience.

It is also recognized that radioactive materials and their uses are so varied that the evaluation and inspection functions will require skills and experience in the different disciplines which will not always reside in one person. The regulatory authority should have the composite of such skills either in its employ or at its command, not only for routine functions, but also for emergency cases. In some cases specialized skills, of course, could be provided through the use of qualified consultants.

AEC Training Program

The Commission has developed a training program to assist States in the training of these personnel. Three types of training were formulated: (1) a long-term academic course in health physics supplemented by practical experience in an AEC installation; (2) a short-term intensive health physics course, and (3) on-the-job orientation and work experience in the AEC licensing and inspection programs.

Each health physics course is designed for a specific type of personnel need. The long-term course consists of nine months of formal presentation in the broad phases of health physics plus three months of practical experience at an AEC installation. This course is designed to provide participants with a broad background in radiation protection. The short-term course consisting of 10-weeks training stresses basic health physics and practical experience and prepares attendees for a more limited role in a regulatory program.

The academic phase of the long term course is given at the University of Michigan or at Harvard University. The first 10 week course was given at Oak Ridge National Laboratory in January of 1960. A similar course was

given at the Commission's Health and Safety Laboratory of its New York Operations Office in October and November of 1960. Another 10-week course is in progress at Oak Ridge at present. Similar courses will be held in other centers in the future when there is sufficient number of applicants.

On-the-job orientation in the AEC licensing and inspection programs is offered for a period of up to two or three weeks for key administrative personnel of State regulatory agencies in AEC licensing, inspection and compliance functions at AEC Headquarters at Germantown, Maryland, and in inspection programs at an AEC Operations Office. Four to eight week programs providing for on-the-job work experience for technically qualified personnel in licensing functions are offered at AEC Headquarters and in inspection functions at an AEC Operations Office.

Suggested State Radiation Control Act

To provide assistance to the States in preparing to enter into the regulatory process with the necessary enabling legislation, a suggested State Radiation Control Act was prepared through a cooperative effort between the staffs of the Commission and the Council of State Governments. This suggested Act was reviewed by, and discussed with representatives of the U. S. Public Health Service, U. S. Department of Labor, State and Territorial Health Officers and the American Public Health Association. In addition, it was reviewed and discussed with representatives of the Atomic Industrial Forum, National Association of Attorneys General and the AFL-CIO.

This Act, which was also evaluated by the Advisory Committee of State Officials at its meeting on August 22, has been included in the Council of State Governments' Program on Suggested State Legislation for 1961.

This suggested legislation provides guidance to the States in drafting legislation which will enable them to enter into agreements with the AEC. The Act gives the Governor authority to enter into an agreement with the AEC and authority for programs of licensing, rule-making, inspection, record-keeping, etc. It contains three alternative administrative arrangements, one of which should meet the needs, legal requirements, and organizational pattern of any State. These approaches are (1) coordination of State agencies, (2) State radiation control agency, (3) Commission on Radiation Protection. In many instances, States are choosing to function on an "as-is" basis without changes in agency responsibilities. But in most all cases special legislation is needed in order to provide the Governor with authority to sign an agreement and ensure that the regulatory agency or agencies have appropriate licensing authority.

Over-all Programs

Although the Commission has no authority over sources of ionizing radiation not regulated by it, in discussions with States on their proposed programs, emphasis is placed on the desirability of a complete regulatory program over all sources of ionizing radiation, and we have been impressed with the interest shown by States in intensifying their efforts to develop comprehensive programs.

State Activities

The response of the States to the 1959 Amendment with respect to State cooperation and to our implementing efforts has been gratifying. Seven States have enacted enabling legislation. Three States have indicated that their statutes enable them to enter into an agreement without further legislation.

Enabling legislation has been introduced in the present sessions of legislatures in at least six other States. A number of additional States are either planning or are drafting such legislation.

We have been working out the details of agreements with the States of Kentucky and New York for the past several months. Informal discussions have been held with New Jersey, Maryland and a few other States for the same purpose.

Need for State Action

At this time, I would like to urge that all States which have not done so, examine their programs immediately to determine the need for the enactment of legislation. If legislation is required in order to enter into an agreement, it is very important that the legislation be enacted in the 1961 session of the legislature. Even if your State is not prepared to enter into an agreement at present, the legislation will be on the books so that you can more effectively plan your program and move toward an agreement later, at your convenience.

Cooperation and Assistance

The State-AEC Relations Branch which serves as a focal point within the Commission will be pleased to assist the States in any way it can in preparing to enter into an agreement with the Commission. This includes the review and discussing of proposed legislation and regulations and meeting with States to discuss and assist in the establishment of a complete regulatory program, the providing of training to State personnel and consultation and assistance on special problems.

We urge States to discuss their programs, plans and problems with us so that we can be of most assistance and can best plan our program to meet the needs of the States.

PHS PATHWAYS IN RADIOLOGICAL HEALTH

Francis J. Weber, M.D.
Chief, Division of Radiological Health
Public Health Service

I am very happy to be here since I find myself learning much. At the opening of this morning's session I was intrigued by Dr. Heustis comparing our public health work to design of a bridge. If I recall correctly, his description of its planning stage, he described three things that engineers take into consideration - three things that can with only a little imagination resemble aspects of our own setting. These are:

1. The dead load - representing the weight of the bridge per se. This, he said, might be our dead weight of tradition.

2. The wind load - and this one he equated with the voices of opponents and critics.

3. The live load - or the traffic that goes across it.

Now, I feel all three can be made to apply to the field of radiological health.

To begin with, it is a new field for health workers. Although the health professions were the first to use any man-made source of radiation, the X-ray, discovered in 1895, and the first to discover its deleterious, as well as beneficial effects, these professions, among others in society, found themselves unprepared for the swift entry into the atomic age in 1945.

Of course, physicists had been busy since Roentgen's discovery, but few knew what they were doing. They are still busy improving their understanding of the atom, with results of vital importance to issues of war and peace. Indeed, their progress has been so great that their present model of the atom makes Bohr's original concept, until a few years ago regarded as too radical a departure from traditional physical thought, appear overly-simple. At last count, over 30 sub-atomic particles or radiations had been described as belonging to the structure of the atom in addition to the original proton-electron postulate. One of these particles, as I remember, has been calculated to have the ability to penetrate billions of light-years of lead. This gives some idea of the world we are in.

Therefore, how appropriate the title "Quo Vadis," which, I believe, means where are you going? Frankly, I would not know how to answer that, since it depends on how comprehensive we consider that question. Naturally, we must narrow it down for public health purposes and try to stay within that limit.

Therefore, let us look at the nature of our responsibilities. Full appreciation of these depends on an understanding of the unique nature of ionizing radiation. Exploration of the mysteries of radiation's effects on living organisms is one of the most complex and challenging missions ever to confront the public health profession, because radiation differs radically from other phenomena with which we are familiar.

Whereas occupational diseases caused by chemical toxicants, physiological disturbances, and psychological stresses are, in general, restricted to particular industrial operations, ionizing radiations elude any such isolation. These sub-atomic particles and electromagnetic waves - which cannot be seen, heard, smelled or felt - impinge on man via every possible body route, from both natural and man-made sources.

The effects of radioactive elements on biological systems are far different from the effects of stable elements. In ordinary chemistry, where we are concerned primarily with changes in the forms of matter, there is less need to emphasize energy exchanges. This is especially true in biological organisms where ionic rearrangements involve comparatively little energy transfer, whether it be in normal functioning or in the malfunctioning of disease. On the other hand, when a biological system is exposed to sub-atomic particles like alpha, beta or neutron emanations, or to high-energy gamma or X-radiations, we witness an interaction between a high-energy physical system and a low-energy biological system with completely different consequences. Although ordinary ionic exchanges in living matter involve, on the average, only 5 to 10 electron volts of energy, an alpha particle ejected from a disintegrating radium nucleus will deliver 5 to 10 million electron volts.

Now, ionizing radiations are sometimes referred to as toxicants, but they differ radically from ordinary chemical poisons. Abel Wolman, of Johns Hopkins University, has illuminated the extreme degree of this divergence, noting that, "The toxicity of ionizing substances is anywhere from one million to 10 million times greater than any familiar, orthodox chemical toxic material so far used in trade."[1] In other words the mere weight of such matter is infinitesimal even when compared to that needed to produce death by stable, highly toxic chemicals.

The factors peculiar to ionizing radiation generate two practical problems: First, the need to rely on special instrumentation and analytic procedures to estimate the degree of exposure to a population, or to special groups within it; secondly, the need to secure a good understanding of the health effects of radiation over the whole range of possible exposure down to the lowest levels - technically a very difficult task.

Our present leading concern is with the range of lower doses, delivered over extended periods of time, doses usually much below 25 R.

As you know, within a short time after the discovery of X-rays in 1895, the first clinical effects of chronic radiation exposure were observed in physicians and other people using X-rays. They were found to produce skin burns, and, in a number of cases, cancer began to appear at the sites of such burns. This was followed by the appearance of other radiation-induced afflictions such as bone tumors in the early radium watch-dial painters, leukemia in physicians and in the Japanese survivors of the two atomic bombs, as well as reported increases in leukemia in patients under therapeutic radiation, developmental defects in children of irradiated parents, in childhood cancer in children of mothers who received X-rays of the pelvic area during pregnancy, and a number of other effects in which radiation may have been a direct or contributory cause. Such conditions are ordinarily classified under somatic effects because of induction of damage sometime during the life of the organism.

The second major category of radiation damage encompasses genetic disorders. Much of our knowledge of the genetic effects of low doses is based on data extrapolated by geneticists from work with animals. These data indicate that the response to radiation exposure (in terms of new mutations produced) is directly proportional to dose. Therefore, any radiation exposure to the gonads is viewed with concern by geneticists because of the belief that the number of mutants in the genetic pool is increased to that extent, with the expectation that they will exert their effects on future generations.

I would like to spend the remaining few minutes in setting forth some of the Public Health Service activities involved in the current attempt to enlarge the scope and effect of our program. The Division of Radiological Health was established on July 1, 1958 to develop a comprehensive program in the field. The funds for that year were a mere $634,000. However, certain responsibilities were assigned to it at that time. These responsibilities can be grouped as follows:

1. Research on the effects of radiation on living matter, including man;

2. Development of methods, facilities, and programs for collecting, collating, analyzing and interpreting data on all forms of radiation exposure in the United States;

3. Training of the scientific, professional, and technical workers needed in the rapidly expanding radiological health programs of Federal, State, and local agencies;

4. Technical assistance to Federal, State, and local agencies as needed;

5. Development of recommendations for acceptable levels of radiation exposure from air, water, milk, medical procedures, and the general environment; and

6. Public information and health education activities related to radiological health.

For fiscal year 1961, the Division's budget is now $6,719,000 for the support of these things.

This has enabled the Division to expand environmental monitoring, training, and programming; to initiate new projects in radioepidemiological research; and at the same time plan for future expansion.

The Radiological Intelligence Network: We now have in operation three regional radiological health laboratories which, together with the Sanitary Engineering Center in Cincinnati, constitute the backbone of our nationwide monitoring program. One of these was opened a little over a year ago at Las Vegas; another in February 1960 at Montgomery, Alabama; and a third which recently began operations at Rockville, Maryland. These are the first-generation members of an intelligence network which maintains, in cooperation with State health departments, a watchful eye on the levels of radioactivity, nationwide, in air, water, food, and milk, and on the safety

of X-ray equipment and procedures. The Nevada and Alabama facilities analyze and test environmental and biological samples collected by Federal, State, and local health authorities. The Maryland installation emphasizes, among other things, the health problems arising out of the use of X-rays and the ways methods may be developed for X-ray dose reduction. This trio serves all fifty States.

Research Program: The Division's total research program - fundamental and developmental, intramural and extramural - is being augmented and accelerated to fill the gaps in our knowledge of ionizing radiation, particularly the somatic and genetic effects of low levels of radiation on the human. In this massive quest for the missing pieces of an intricate puzzle, the coordinated work of many disciplines and the support of many agencies and organizations are essential.

I would like to call your attention to a few of the significant projects now in progress:

1. Work in medical epidemiology which comprises an investigation of health status in the offspring of 30,000 mothers who received X-ray pelvimetry during pregnancy;

2. A national collaborative study among medical centers throughout the country to investigate the late effects of radio-iodine treatment of hyperthyroidism;

3. A tri-state study of the relationship between malformations and natural environmental radiation. In this project vital records, hospital records, and special hospitals are providing data. The study also includes extensive measurements of levels of internal and external sources of radiation exposure. The plan also calls for interviews of sample cases and control families to determine the possible influence of such other etiologic factors as the occurrence of disease in pregnancy, family history of malformation, etc.

4. The human population in communities receiving water from the Animas River in the southwestern U. S. is also under intensive study because of the detection of higher-than-normal levels of radium in the drinking water from this river. Radioactivity in typical diets, excreta, and bone samples from autopsies and surgical procedures is being measured in an attempt to determine body burdens of internally deposited radio-nuclides.

5. Demographic and epidemiologic data are being obtained to determine if there has occurred any increase in leukemia, bone sarcoma, or other diseases in which radiation may have been a factor.

6. A pilot study in Michigan has been carried out in cooperation with the National Office of Vital Statistics in an attempt to determine the history of medical and dental X-ray exposures to women during the year immediately preceding the birth of a child. Five hundred birth certificates were selected on a systematic random basis. A preliminary analysis has disclosed that about 7 percent of the mothers had received X-ray pelvimetry.

7. A different type of survey in a large metropolitan area is under way to ascertain the frequency and type of exposure to medical sources of radiation. This is being correlated with other work to determine the

absorbed dose from various roentgenographic and fluoroscopic procedures to certain critical organs such as the gonads and the bone marrow.

8. Physicians in selected areas are collecting and forwarding bone samples from autopsies of infants (including stillborn), children, and adults to be analyzed for strontium 90, and, in some cases, radium.

Controlling Unnecessary Radiation Exposure: In the area of control, the primary responsibility devolves upon those who are using radiation. For example, in such programs as those developed in close cooperation with the Atomic Energy Commission, radiation safety programs are carefully built into the operations of the plant activities. Furthermore, our Division of Radiological Health is engaged in an expanding cooperative effort with the Nation's physicians, dentists, and health officers to reduce unnecessary medical exposure from X-ray and fluoroscopic equipment. In addition, many health departments are requiring registration of all X-ray machines in the areas under their jurisdiction.

A most productive project has been our development and employment of a new method for evaluating dental X-ray machines used in private offices and clinics. It is a big stride forward, for it enables us to make an entire State-wide survey entirely through the mails. In fact, it is sometimes referred to as the "Mail Order Survey." I shall give you a brief description of the essential steps involved. The Division sends a sensitive sheet of film to each dentist or organization in the area surveyed. After the film has been exposed under the usual conditions of operation of the device, it is returned to us at headquarters. After development, the findings are noted and interpreted. We then advise as to what, if any, corrective measures need be taken. By the end of the year, we expect the project will have covered 6,000 dental X-ray units in this way.

Training: The National Advisory Committee on Radiation has estimated that by 1970 approximately 5,200 more specialists and technicians trained in radiological procedures will be needed in health agencies, hospitals, universities, and industry.[2] To meet this need, the Division is expanding its intramural training program, principally that in the short-term intensive course area conducted at the Sanitary Engineering Center in Cincinnati and supplemented by our three regional field facilities. In addition, we have been able this year to increase our support of radiological health training outside the Public Health Service by the utilization of $500,000 appropriated by the Congress for long-term academic support, by means of grants to universities and other institutions. This is enabling us to increase the number of formally trained radiological health specialists.

Blueprint of Future Goals: It is obvious from this brief review of the Division's programs that long-range planning needs to be an integral part of our current day-to-day activities. If we are to deal successfully with radiological health, we cannot wait to see if morbidity and mortality should rise before deciding to take corrective action. Clinical evidence of radiation damage accumulates too slowly, while at the same time radiation sources in the environment increase.

A few figures recently developed by the National Advisory Committee on Radiation convey some impression of the rate at which these man-made sources of radiation are increasing. In the three decades between 1925 and

1955, the estimated annual gonadal dose (X-ray) received by the average individual rose from 15 to 133 millirems per year. In the six year period, 1952-1958, the number of medical users of radioisotopes in the U. S. increased from 445 to nearly 2,000. And, as a forecast of things to come in the field of nuclear power, it has been estimated that the accumulated volume of radioactive wastes from nuclear installations, including high- and intermediate-level wastes, will increase from about 1.5 million gallons, the estimated 1965 volume, to 2 billion gallons in 1995.

Therefore, in conclusion, I believe it safe to say that the problem of ionizing radiation is here with us from now on; it is complex; it will get bigger; and large-scale public health efforts are required to deal adequately with its potential for adverse health effects.

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1. Report on Environmental Health Problems. Hearings before the Subcommittee of the Committee on Appropriations, U. S. House of Representatives, 86th Congress, 2nd Session, March 1960.

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RADIOLOGICAL HYGIENE PROGRAM OF THE U. S. ARMY

Colonel Adam J. Rapalski, MC,[1] USA
and
Lt. Colonel Maxwell Dauer, MSC, USA (Ret.)[2]

The widespread and increasing utilization of a great number and variety of radioactive materials and other sources of ionizing radiations used in medicine, for scientific and technological purposes, in industrial processes and equipment, and to serve the military requirements within the U. S. Army has necessitated an expansion of the Army program in radiological hygiene.

The program, briefly reviewed here, is under the technical supervision and guidance of The Surgeon General of the Department of the Army. It is designed to assure that adequate safeguards are provided to control and minimize potential radiation health hazards to those occupationally exposed, as well as to others in the immediate environment who could inadvertently be exposed. The occupational group in 1960 was approximately 15,000 persons. This number is increasing monthly as newer technology introduces radioactive materials and ionizing radiation sources into the day-to-day routines as well as into many research and unique activities of the Army.

At all Army installations, camps, posts, and stations, the Post Surgeon, together with the Preventive Medicine Officer, or other personnel qualified in health physics, integrate the requirements for radiological hygiene into the existing Occupational Health Program(1). Basically therefore the program is a component of the broad Army Preventive Medicine Program.

Within the Army, there are many sources of radiation to which personnel may be exposed on an occupational basis. Table I is a tabulation of the radiation devices and sources in the U. S. Army. The number, type and complexity of radiation sources are constantly changing. Each year, the number in use increases. The trend is towards increased utilization of various radioisotopes for many purposes, of high voltage generating equipment such as accelerators, of nuclear reactors for research and as a source of power. By 31 December 1960 a total of 98 licenses had been issued by the U. S. Atomic Energy Commission authorizing the procurement and use of radioisotopes within the Continental U. S. Army. The quantity of byproduct radioactive material in use was approximately 25,000 curies.

The Surgeon General has the responsibility within the Army(2,3) to review and approve all applications for U. S. Atomic Energy Commission byproduct material (radioisotope) licenses and license amendments. Before recommending approval of the U. S. Atomic Energy Commission (AEC) of an application of a particular installation, The Surgeon General has it

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1 Commanding Officer, U.S. Army Environmental Hygiene Agency
2 Recently Chief, Radiological Hygiene Division of the U. S. Army Environmental Hygiene Agency

reviewed to assure that adequate facilities, appropriate instruments and equipment, and adequate procedures are available and that the individuals who will handle the requested types and quantities of byproduct material are so qualified that there will be no undue hazard to themselves, to others engaged in the work or to persons in adjacent areas. In this manner definite controls are exercised to minimize radiation health hazards. Periodic visits to this installation by representatives of The Surgeon General and/or AEC personnel are made to insure that all the provisions of the licenses are being carried out. It should be emphasized that the decision whether or not to use radioisotopes in a project or research activity in a command responsibility and that approval by The Surgeon General of an application for a byproduct license does not constitute approval of any specific project for the use of radioactive materials. The approval serves as advice to the AEC that in the opinion of The Surgeon General the proposed use will not create uncontrolled radiation health hazards and that precautionary measures meet the requirements of the AEC as well as the best current concepts and recommendations of other competent agencies and scientific bodies.

Within the Army, the Chemical Corps has the technical responsibility[4] for the off-site disposal of radioactive wastes.. At present, no permanent radioactive waste burial sites are maintained by the Army. Byproduct wastes are usually disposed of by an installation by shipping the material to designated radiological waste disposal facilities maintained by the Chemical Corps. The Chemical Corps prepares these materials for shipment to selected burial sites operated by the Atomic Energy Commission. Local disposal of radioactive wastes in excess of levels recommended by the National Committee on Radiation Protection[5] is not permitted unless specifically authorized by The Surgeon General. It is the policy of The Surgeon General to keep the local health authorities fully informed on any such matters. In this way, local health officials are provided with accurate and timely data and are prepared to answer any questions which may be raised by the public in these areas. This is an important factor in maintaining good public relations and to dispel any fears which people near an installation may have. Accurate information in the hands of these officials is of considerable assistance in preventing public objection to the use of radioactive materials at a particular installation.

For many years, radium and its daughter products have been incorporated in various items of military equipment. During World War II, extensive use was made of radium in luminous markers, compasses, metascopes, electron tubes, and other items. Manufacturing such items, if no adequate controls are in being, certainly involve significant risks - no better example exists than the epidemiology of occupational disease in the radium dial workers. Used alone, these items usually do not present a significant hazard. However, in situations where large numbers are used or handled in a localized area or within a storage area, there is the danger of external overexposure, the danger of internal contamination from leaking sources and the danger of inhaling excessive quantities of gaseous radon, one of the daughter products of radium. The inhalation problem of radon becomes serious when the items are stored in an improperly ventilated room. Wherever possible, attempts have been made and are being made to replace radium with less hazardous materials throughout the Army. Obsolete or defective items containing radium have been disposed of by the Army by dumping it in the ocean at specifically designated locations in special containers.

Within recent years, a number of kilocurie radioisotope sources have been procured for use within the Army. These sources are usually cobalt-60 and are used in industrial radiography and medical radiation therapy or for research and development purposes. One of the largest radiation sources will be the one million curie cobalt-60 source to be used by the Quartermaster Corps in connection with its research and development program for preservation of food by radiation. The medical aspects of which are being very closely coordinated with the Army Medical Research and Development Command.

The magnitude and scope of the radiological health program in the Army can be further visualized by the realization of the fact that the sources of ionizing radiation are located at more than 255 installations and activities within the continental United States. Some concept of the protection problem can be gained by a knowledge of the number of film badges processed by the Signal Corps. Each month approximately 30,000 film badges are processed. Dependent upon local requirements, film badges may be processed weekly, monthly or at other intervals.

The initiation of policy, the preparation of directives, and the provision of technical and professional advice on all matters relating to health, including the hazards of radiation, as they pertain to the military and civilian personnel of the Army is a statutory responsibility of The Surgeon General. The U.S. Army Environmental Hygiene Agency of the Army Medical Service[6] is maintained and staffed by The Surgeon General as an operational facility whose principal mission is to support the Army's broad preventive medicine program by providing consultative services in the many disciplines needed in a comprehensive program. It is therefore an organization which can provide specialized levels of scientific and professional competence to supplement and support those that may be available at local (posts) and regional (Army) levels. The Staff includes personnel with high levels of competence in radiological hygiene problems. The Agency makes radiological hygiene field surveys at installations possessing sources of ionizing radiation. These surveys insure that the Post Surgeon at the installation and others responsible for the local program are given technical guidance on various aspects of acceptable radiological hygiene practices and procedures. These surveys, prepared as a report, provide the installation with a complete inventory of all the sources of ionizing radiation in use. The report is an evaluation of the existing radiation protection program at the installation and contains recommendations designed to insure conformity to Army regulations[2,7,8], U.S. Atomic Energy Commission requirements[9] and other applicable radiation standards or guides formulated by the National Committee on Radiation Protection and the Federal Radiation Council[10]. These survey reports also serve as the basis for making determinations regarding the adequacy of the facilities and the qualifications of designated individuals to be licensed by the AEC by byproduct radioisotopes. The services of the U. S. Army Environmental Hygiene Agency are also available to provide assistance on radiation shielding and design of facilities or equipment. The Agency is developing the capability to perform radiological analyses of body fluids and tissues of personnel[11] who may accidentally have been internally contaminated by radionuclides, or where there is a question as to whether internal contamination has occurred.

At the individual Army installations, it is the function of the Post Surgeon, or physician, if an Army officer is not available, to supervise and direct the local radiological hygiene program as a part of his existing responsibility for the control and regulation of other occupational and environmental health hazards. In this capacity, the Post Surgeon maintains a current inventory of sources of ionizing radiation. He advises commands on the adequacy of the precautions taken in all operations and facilities so that personnel are not unnecessarily exposed to radiation(12). An important part of this program is the preplacement medical examination and the special followup examinations. It is essential that personnel who have a previous history of excessive exposure to radiation, who show clinical evidence of radiation exposure, or who have disease that may be adversely affected by radiation should not be given occupational duties involving this type of hazard. In cases where there has been an overexposure to radiation, it is the Post Surgeon who takes the necessary action to provide the necessary medical treatment and care and to recommend the precautionary or corrective measures which may be indicated. The Post Surgeon is also expected to provide information on radiation health protection and to insure that adequate health procedures are followed with regard to disposal of radioactive wastes.

At certain Army installations where a large number and types of ionizing radiation sources are in use, health physicists and qualified industrial hygienists or sanitary engineers are assigned the responsibility for the accomplishing of much of the detailed requirements of the program. The Post Surgeon with the assistance of the Preventive Medicine Officer, if one is assigned, is still responsible for the operation of the specific program so that it functions smoothly as a part of the existing overall installation occupational program.

The radiation standards or guides which are used for occupational exposure in the U. S. Army are listed in Table II and Table III. These radiation exposure levels are based upon the recommendations of the National Committee on Radiation Protection and the Federal Radiation Council.

A great number of x-ray machines are in use within the Army for diagnostic and therapeutic purposes. These exposures are kept to a minimum consistent with the medical requirements of the patient as determined by the physician. Continuing efforts are made to insure that radiographic techniques and procedures(13) are used which expose the patient to the minimal amount of radiation needed to obtain the required diagnostic information. During 1960, approximately 10,000,000 x-ray films were used in the Army for various medical and dental purposes. Because of the large volume of exposures to this segment of the population, it can be seen that measures to minimize exposure without restricting the medical benefits or hampering the physician in obtaining the necessary diagnostic films are a worthwhile effort. Procedures and techniques to minimize patient exposure require a program of continuing education and understanding, and over the years will justify all the work which is put in to support such a program.

The nuclear reactor program of the Department of the Army, whether for research or for power sources, has in itself placed additional heavy responsibility on the Army Medical Service. The control of health hazards associated with this program involves not only the application of the classical engineering and monitoring approaches used in controlling environmental and occupational health hazards, but also, because of the nature and magnitude of the

potential hazards, it requires the application of new approaches and techniques as yet perhaps not fully developed, if maximum control is to be achieved and all eventualities are to be adequately handled. The program is a dynamic one that benefits from accumulating experience and evolving concepts. This phase of the radiological hygiene program of the Army will undoubtedly be of value to other Government and civilian programs of this nature.

Summary

A brief review is made of the radiological hygiene program of the U. S. Army, and how it fits into the broader comprehensive preventive medicine and specific occupational health programs of the Army Medical Service.

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2. AR No. 40-580, Medical Service, "Control of Hazards to Health from Radioactive Materials".

3. Department of the Army Circular No. 40-17, Medical Service, "Applications for Atomic Energy Commission Byproduct Material Licenses and License Amendments", 10 January 1961.

4. AR No. 755-380, Disposal of Supplies and Equipment, "Disposal of Radioactive Material" and Changes No. 1.

5. National Bureau of Standards Handbook No. 69, (Recommendations of NCRP), "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and Water for Occupational Exposure".

6. AR No. 40-25, Medical Service, "U. S. Army Environmental Hygiene Agency".

7. AR No. 40-414, Medical Service, "Noncombat Personnel Dosimetry".

8. AR No. 40-431, Medical Service, "Record of Exposure to Ionizing Radiation".

9. Federal Register, Title 10, Chapter 1, Part 30, AEC Regulations for Licensing Byproduct Material, as amended, U. S. Government Printing Office.

10. Federal Register, Title 10, Chapter 1, Part 20, Standards for Protection Against Radiation, as amended, U.S. Government Printing Office.

11. AR No. 40-582, Medical Service, "Evaluating and Reporting Internal Exposure to Radioactive Materials".

12. TB MED No. 254, "Permissible Dose from External Sources of Radiation".

13. TB MED (Department of the Army Technical Bulletin, Medical) No. 62, "Medical X-Ray Protection".

TABLE I

IONIZING RADIATION SOURCES IN THE U.S. ARMY AS OF 31 DECEMBER 1960

Distribution by Army Areas

	1	2	3	4	5	6	MDW	Other*	Total
Medical X-Ray(a)	104	112	99	148	148	129	55	4	799
Non-Medical X-Ray(a)	56	45	15	7	21	5	11	0	160
Accelerator	5	1	2	0	2	2	1	0	13
Nuclear Reactor(b)	1	0	0	0	0	0	1	2	4
Other Radiation Equipment(c)	0	4	2	0	3	1	12	0	22
Isotopes (AEC)(d)	137	282	100	75	57	37	96	0	784
Radium(d)	3	4	0	3	2	3	3	0	18
Kilocurie Sources (Co 60)(e)	2	2	0	0	2	0	1	0	6
AEC Licenses	13	21	9	10	16	20	9	0	98

* Does not include sources deployed with overseas commands, except as indicated. AEC licenses are not required for byproducts with such forces.

(a) Includes all x-ray units up to 2 million volts, but does not include such equipment deployed with overseas commands as in Europe, Korea, Japan, etc.

(b) Nuclear reactor in operation at Ft. Belvoir, Va.; Ft. Greely, Alaska; Greenland and Watertown Arsenal, Mass.; Under construction - Walter Reed Army Medical Center (WRAMC) (1); Planned - Aberdeen Proving Ground, Md., (1), Picatinny Arsenal, N.J. (1), Forest Glenn, Md., (1), White Sands, New Mexico, (1).

(c) Includes: Radioactive Static Eliminators, Beta-Ray Gauges, and Electron Microscopes.

(d) For the isotopes listed, each installation may have many individual sealed or unsealed sources in the solid or liquid state.

(e) Dugway Proving Ground, Utah - 3100 curies, Rock Island Arsenal, Ill. - 6500 curies, Frankford Arsenal - 3200 curies, Quartermaster Corps, Research & Development Program, Natick, Mass. - 1 million curies (to be installed); Walter Reed Army Medical Center - 2200 curies; Aberdeen Proving Ground - 17,000 curies (planned).

TABLE II

RADIATION PROTECTION GUIDE*

Type of Exposure	Condition	Dose (rem)
Radiation worker:		
(a) Whole body, head and trunk, active blood forming organs, gonads, or lens of eye.	(Accumulated dose....	5 times the number of years beyond age 18.
	(13 weeks.....	3.0
(b) Skin of whole body and thyroid....	(Year.....	30.0
	(13 weeks.....	10.0
(c) Hands and forearms, feet and ankles	(Year.....	75.0
	(13 weeks.....	25.0
(d) Bone.....	(Body burden.....	0.1 microgram of radium-226 or its biological equivalent.
(e) Other organs.....	(Year.....	15.0
	(13 weeks.....	5.0
Population:		
(a) Individual.....	Year.....	0.5 (whole body).
(b) Average.....	30 year.....	5.0 (gonads).

*As printed in the Federal Register, 18 May 1960, and as approved by the President, 13 May 1960.

TABLE III

*EXPOSURE OF INDIVIDUALS TO RADIATION IN RESTRICTED AREAS**
Rems per calendar quarter

1. Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads.....	1¼
2. Hands and forearms; feet and ankles.....	18 3/4
3. Skin of whole body.....	7½

* As printed in the Federal Register 7 September 1960, with effect 1 January 1961.

TABLE IV

DETERMINATION OF ACCUMULATED DOSE*

Part of body	Column 1 Assumed exposure in rems for calendar quarters prior to Jan.1, 1961	Column 2 Assumed exposure in rems for calendar quarters beginning on Jan.1, 1961
Whole body, gonads, active blood-forming organs, head and trunk, lens of eye.	3 3/4	1¼

*As printed in the Federal Register 7 September 1960, with effect 1 January 1961.

BASIC BIOLOGICAL ASSUMPTIONS UNDERLYING RADIATION PROTECTION STANDARDS

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Federal Radiation Council
Washington, D.C.

The basic biological concepts underlying the formulation of radiation protection standards have been undergoing modification in recent years. In the past these standards were based upon the concept of tolerance dose, defined as a dose which when received by exposed individuals would produce no deleterious biological effects. Under this concept, the development of radiation protection standards was a scientific job involving the determination of the radiation dose below which effects would not occur.

In recent years, however, evidence has been accumulating which casts doubt on the assumption that it is possible to determine a safe dose; if by safe dose one means a dose which, even when administered to a large population, will produce no harm in any individual. Evidence, particularly in the area of genetic effects of radiation, suggests that even small doses of radiation delivered to the gonads prior to reproduction will be accompanied by an increase in genetic mutations.

If it be true that there is no safe dose of radiation, the task of developing radiation protection standards becomes very much more difficult. Not only is one plagued by the scientific uncertainties as to the amount of effect which might be produced by low radiation doses, but also one is faced with the uncomfortable prospect of consciously accepting a certain risk with any dose which one chooses as a protection standard. There must be a reason for accepting such a risk and this reason is sought in what has been termed the benefits to be derived.

The term "balancing benefit against risk" rolls off the tongue with great ease. Performance of this balancing, however, is another matter. Obviously, it cannot be done in any exact quantitative way. To begin with, accurate data to determine either side of the balance are not available. We do not know how many people would be injured and to what extent by exposures to low doses of radiation. Neither can we assess with precision the benefits to be derived from the many applications of radiation and atomic energy. However, even if such data were available, the balancing would require the wisdom of Solomon. How does one balance cases of leukemia with benefits of nuclear power, for example?

At best, the task involves the exercise of judgment. The nature of this judgment was expressed in the following language in the first memorandum of the Federal Radiation Council to the President: "Fundamentally, setting basic radiation protection standards involves passing judgment on the extent of the possible health hazard society is willing to accept in order to realize the known benefits of radiation. It involves inevitably a balancing between total health protection, which might require foregoing any activities increasing exposure to radiation, and the vigorous promotion of the use of radiation and atomic energy in order to achieve optimum benefits."

As the basic biological concepts underlying radiation protection standards were undergoing modification, environmental levels of radioactivity were increasing. Public concern over possible health hazards of radioactivity in the environment was also increasing. This concern was expressed in an increasing number of questions being asked concerning the health significance of radiation exposure.

Answers to these questions were, in many instances, not satisfactory. On the one hand, they often appeared to be inconsistent, and on the other hand, they were frequently not reassuring. The inconsistency was usually more apparent than real. This is not to say that differences in the interpretation of inconclusive biological data have not occurred. However, even in those instances in which such differences did not occur, imprecise terminology often accounted for apparent differences in the interpretation of the significance of environmental radioactivity. The precise definition and interpretation of terms, such as "safe," "maximum permissible," and "tolerance" would have been helpful. Basic to much of the misunderstanding has been a failure to make a careful distinction between manifest injury in a single exposed individual and a statistical increase in disease and disability in an exposed population. The concepts of probability are unfamiliar to the general public. For this reason, it often seems simpler to refer to situations of very low probability of disease as "safe" situations. From the point of view of a single individual, the error in this oversimplification is very small. When, however, one is referring to large populations, even a low probability of disease may result in a relatively large absolute incidence of disease and the error in the oversimplification becomes large.

Formation of the Federal Radiation Council

On April 3, 1959, the White House announced the initiation of a review of the organization of radiological health activities in the Federal agencies by the Secretary of Health, Education, and Welfare; the Chairman of the Atomic Energy Commission; and the Director of the Bureau of the Budget. This review indicated that radiological health activities were centered around the development, promulgation, and application of radiation protection standards. It also indicated that the development of basic standards, on the basis of current scientific evidence, involves a balance between benefit and risk. It was felt that the health, economic, social and ethical considerations involved are of such importance that the decisions represented by basic standards or guidance are matters of public policy so broad as to require Presidential action. The Federal Radiation Council was established to advise the President in the discharge of that responsibility.

Members of the Council are the heads of the Federal agencies most significantly involved with radiation: the Secretary of Health, Education, and Welfare; the Chairman of the Atomic Energy Commission; the Secretary of Defense; the Secretary of Commerce; and the Secretary of Labor. The Secretary of Health, Education, and Welfare was designated as Chairman of the Council.

The function of the Council was described in the following language in Public Law 86-373: "The Council shall advise the President with respect to radiation matters, directly or indirectly affecting health, including

guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with States."

Work of the Federal Radiation Council

On May 13, 1960, the President approved the recommendations contained in a memorandum from the Federal Radiation Council, entitled, "Radiation Protection Guidance for Federal Agencies." The memorandum was published in the FEDERAL REGISTER May 18, 1960. There was also released at the same time Staff Report No. 1 of the Federal Radiation Council, "Background Material for the Development of Radiation Protection Standards," dated May 13, 1960.

A major objective of the Council's first report was to provide a general philosophy of radiation protection for Federal agencies. Toward that end, the Council introduced and defined the terms Radiation Protection Guide and Radioactivity Concentration Guide. These terms were to replace the often misunderstood expressions "Maximum Permissible Exposure" and "Maximum Permissible Concentration." There is more involved here than an arbitrary change in terminology. As has been alluded to above, these terms have unfortunate and inaccurate connotations not intended by either the NCRP or the ICRP which has used them to describe radiation protection standards. The new terms, with their definitions, were intended to more accurately reflect the significance of numerical values in radiation protection programs.

Current Activities of the Federal Radiation Council

The first report of the Council provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population as well as an average population gonadal dose. The Council is currently studying the problem of providing radiation protection guides for selected radionuclides to be used in the control of human exposure from environmental sources. As a part of its study, the Council has solicited comments from a large number of interested organizations and individuals. For this purpose the Council prepared and transmitted widely a paper stating major policy issues involved in the development of radiation protection guidance in connection with the radionuclides under study: strontium-89, strontium-90, iodine-131, and radium-226. Work on the development of recommendations to the President in connection with these nuclides is proceeding.

Conclusion

Thus the Council is proceeding to discharge its statutory responsibility to advise the President on radiation protection standards. The Council represents a valuable mechanism for bringing to bear on the difficult task of the development of radiation protection standards the kinds of competencies and the breadth of judgment necessary to make the important decisions involved.

ENLISTING THE PHYSICIAN IN SMALL PLANT HEALTH

Christine Einert, M.D., M.P.H.
California Department of Public Health

As both an ex-private practitioner and an ex-industrial medical director, small plant health services are close to my heart, so that this opportunity to share with you a very small beginning in California is particularly welcome and I am honored to have this opportunity to tell you about our experience and, I hope, to enlist your comments towards the future.

I would like to re-title this paper, "Part Time Occupational Medicine - The General Practice of the Sixties"; for, if small plants and small groups of employees are to be given the occupational medical services they need, many physicians now in private practice will have to give these services.

People outside our Public Health field do not always realize that a major objective of any governmental program in Occupational Health is to have adequate in-plant preventive health services provided as a completely non-governmental function.

Private physicians who render good part-time services to small plants seem to need some special attributes and convictions:

I. A willingness to practice only the same quality of medicine inside the plant which they practice outside.

II. A willingness to commit sufficient time to the work places served.

III. A willingness to become a member of the production team, but not its leader, except in medical matters.

Let us take a moment to examine more closely these three attributes.

I. The practice of good inplant medicine for each employee seems to require:

A. That the physician interpret to management even more than to the employees, his concept of industrial medicine; namely, that the best medical service to any employer consists of the best long term health care of each employee. It must be made clear by the physician that whether he is "employer-selected" to give care at the plant or "employee-selected" outside the plant, the legitimate health interests of each employee are first served. The part-time physician must then go one step further, and make it clear that in-plant services will be identical whether the employee served is, or is not also a private patient of the plant physician.

Further, the part-time physician must interpret both to those whom he serves and to his professional colleagues, the patient-oriented nature of the in-plant services for which he was "employer-selected", and his willingness to cooperate with any "employee-selected" outside physician.

B. That the physician send injured employees to the physician and place able to offer the best care. This means that the in-plant physician often relinquishes industrial injury cases to other physicians, and accepts them back on return to work with equal ease.

C. That the physician consistently maintains and enhances each employee's relationship to his personal physician. This again means referral of many, if not most, interesting medical cases as soon as a diagnosis of disease is suspected.

Therefore, good in-plant medicine essentially excludes most treatment (other than first aid) of sick or injured employees. It includes instead, first aid and injury follow-up; diagnosis, both personal and environmental; stimulation of individual responsibility for health; physical or psychological techniques of adaptation of the person to the job, of the job to the person, and of person to person; and continuing efforts to eliminate the causes of illness and injury. It includes active efforts toward individual health maintenance and the prevention of individual physical or mental deterioration.

However, while most practicing physicians have some concept of routine pre-employment examination as a physical appraisal, many have little concept of physiological appraisal examinations and even fewer physicians really know how to be medically active in preventive health maintenance if they are not treating sick or injured persons.

II. If the physician is to give sufficient time to industry on a part-time basis:

A. He must be geographically reasonably close.

B. He must reconcile his other responsibilities, usually private practice, with the demands of his in-plant program, and

C. He must obtain through management adequate in-plant personnel and facilities for the job to be done.

Not only personnel, but space and equipment best for in-plant work, may be somewhat different from that needed in his own office.

III. For a physician to consider himself a member of the production team may be difficult at first, since this constitutes quite a change from private practice. However, since his medical goal is 100% healthy employees earning their best possible income, there is no conflict between medical and production objectives. The physician giving in-plant services must know that he is not a solo player, nor is he the quarterback, in obtaining his objectives. His function is to produce changes beneficial to health through the voluntary efforts of others, not through any commands or directives.

In short, for part-time, in-plant medical services to really promote over-all health and with it increased productivity, there must exist, in all areas, not only physicians who are competent in the medical care of the sick or injured, but who are also interested in, and conversant with, the active medical maintenance of employee health.

How is industry to get such physicians in the large numbers and with the attributes needed? This has been the crucial shortage for years.

Yet managements look to private physicians for advice and leadership in establishing in-plant services. You are aware of the University of Michigan study which so clearly showed that in-plant medical services are effectively stimulated through the personal persuasion of private physicians, whereas governmental agents' efforts showed a negative correlation with mangement action! The physician in private practice then, actually controls the amount and quality of small plant health services.

Medical schools and hospitals are today preparing few such physicians. Nor can successful private practitioners be expected to take a year or more in graduate training or in a School of Public Health, at least until they understand the potential value of such training. Efforts in California to create University Extension courses have had limited acceptance. Discussions regarding in-plant and related industrial work with individuals, by government specialists, evoke much interest on the part of physicians in private practice, but are quantitatively inefficient as a public health, tax-supported activity.

The County Medical Society, however, is an accepted avenue for informing physicians of trends they need to know, and is in a position to teach its members why and how to perform good in-plant medical services. Thus, the California Department of Public Health, Bureau of Occupational Health, concluded that intensive effort within the framework of organised medicine was the best method of obtaining interested, able physicians for part-time medical services to small plants.

Fortunately, in the location of the California State Department of Public Health, the County Medical Society is an especially forward-looking one, - the Alameda Contra-Costa Medical Association. You may recall that this is the society which sponsored and published the so-called Dichter Report, a psychological study of Doctor and Patient attitudes and relationships. It also participated in various pioneering studies such as Median Fee Schedules, Relative Value studies and others. Thus, it seemed that action of this county society would have a good chance of statewide acceptance.

To implement this conclusion, a physician in the Bureau of Occupational Health asked to be appointed to the Industrial Health Committee of the Alameda Contra-Costa Medical Association. (Known for short as A.C.C.M.A.) Membership in a committee does not, however, bring action, and five years elapsed; two with only sporadic and unproductive meetings; three with no meetings called, by two successive chairmen!

Finally, in 1958, a committee was brought together. The chairman was a surgeon. On the committee were a dermatologist, an orthopedist, an industrial psychiatrist, a Kettering-trained national medical director,

a full time in-plant physician from one branch of a large company, a physician in general practice and the governmental occupational health physician. Most were strangers to each other.

We often hear about the "small question that gets the large answer"! Three small questions at this first committee meeting started a four-year program: One doctor innocently asked, "Does this Committee do what we think should be done or do we wait for work to be referred to us?" The answer was: "The latter." Next, "Has any work been referred to us?" Answer: "A letter from another county medical society asking a question." The third question was asked in the letter: "What does your society consider the proper ethical way for physicians to get themselves associated with industries and known to compensation insurance carriers?" It took six months to agree on the answer to that question.

With this letter as a starting point, the committee began meeting monthly. A code of ethics was hammered out, starting where the A.M.A. Guiding Principles had left off, or perhaps, more correctly, proceeding up to the point where the A.M.A.Guiding Principles begin. You will recall that the Guiding Principles discusses the ethics of arrangement for medical service and for making overtures to physicians in charge of Medical Departments. The A.C.C.M.A. Committee dealt with the ethics of medical conduct where no services had ever existed. Its mandate for this action came in the closing statement of the Guiding Principles. "Specific inquiries on matters relating to Occupational Health should be directed to the appropriate County or State Medical Societies."

In December 1958, the code of ethics was approved by the society. An abstract of this material is attached to the mimeographed material. It clearly stated that a relationship between industry and an interested, nearby physician was good. It established the County Medical Association as the mechanism for informing industry and insurance carriers of available physicians and for maintaining through a Voluntary Roster, the names and qualifications of interested physicians.

This approved code of ethics was summarized in the December 1958 issue of the A.C.C.M.A. Bulletin. Immediately thereafter, in 1959, the questionnaire form devised by the Committee as a Voluntary Roster, was distributed to all (1400) active members of the Society. To the astonishment of both staff and committee, 75 roster forms arrived by return mail and altogether 388 were returned within one month. The Voluntary Roster form had been planned, in part, as a means of acquainting practicing physicians with the different facets of industrial medical work. It detailed various categories of in-plant medical services, and space was included for those physicians who wished only to treat special kinds of occupational injury in their offices. Nevertheless, many physicians expressed themselves as willing to conduct pre-employment and periodic examinations of employees, and 146 physicians expressed an interest giving part-time in-plant medical services. (Under space for "Experience", however, few gave evidence of special training or qualification.)

The Roster was indexed by location and made available for inquiries.

At this point, the A.C.C.M.A. Committee on Industrial Health asked itself other questions. "What will happen if we circulate to compensation insurance carriers and to managements, the list of interested physicians which we now possess?" "What quality of medical service will be recommended to or developed for managements by physicians?" "Will employees benefit?" "Will medical satisfaction and prestige be increased?" "Will the Society have performed a worthwhile service?"

The committee discussed these questions and re-discussed them with new committee members. Perhaps not only for employee but for employer, county society and for the physician himself, some orientation as to what might be asked of him, was indicated before physicians' names were broadcast to managements, insurers, etc. Did physicians in private practice want such orientation? Such publicity?

The Committee decided to submit a series of "points for discussion" and canvass the opinions of interested physicians.

Executive Council approval was secured, and April 1960, the Society circulated to all its (now 1500) members a letter asking each doctor whether he would be willing to express his opinions on four groups of "points for discussion" with respect to part-time, in-plant medical services. The four groups of questions were: "What are the medical responsibilities you assume?" "What facilities should the plant provide?" "How would you discuss your time and remuneration?" "How would you estimate the advantages the Company and its employees gain?"

Details with respect to all four points were attached. Also, as possible "goals", the I.M.A. and Occupational Health Foundation statement on "Minimum Standards for Small Plants" was appended. The physicians were offered the choice of times and a promise of local meetings. Only an enclosed postcard, not the points for discussion, was to be returned. Once again, the responses were unprecedented. One hundred seventy-five physicians expressed their willingness to consult with the Committee, while one hundred and ten others who took the trouble to reply in the negative often added comments such as "pediatrician", "eye specialist", or "see nothing I could contribute" . . . . which, it was supposed, indicated that they had perhaps read the material distributed, were aware of the Voluntary Roster and the variety of "Points for Discussion".

What did the points for discussion of part-time, in-plant medical service include? They will be quite familiar to this audience, so I will not read them. A copy of the material sent to the Medical Society members is attached.

To interrupt for a moment our California story, it was about this time, April 1960, that Dr. William L. Wilson, Chief of Occupational Health in the North Carolina State Board of Health, received a copy of these "points for discussion" with full permission to use them, and it is interesting that the North Carolina State Medical Association Committee on Occupational Health did use them, adding various improvements and one more question, "How would you estimate benefits to the Community?" - with various sub-headings. Parenthetically also, the State Committee in North Carolina, in the past year, has accomplished just about all that the local California Committee has accomplished in the past nine years!

Back to California: faced with one hundred seventy-five (175) interested local physicians in private practice, the A.C.C.M.A. Committee on Industrial Health had considerable "cold feet". They knew they didn't have particular answers to all the points for discussion and they felt quite insecure. Moreover, at least two responding physicians thought the Committee was going outside its domain and said so. What could the committee do?

The solution was remarkably easy! Starting in June, 1960, the regular monthly committee meetings were moved into five different areas of the bi-county jurisdiction and into small private dining rooms. The local interested physicians were invited to join the committee for a 1 3/4 hour luncheon meeting to express opinions. This they did . . . . often on subjects other than in-plant medical service, but on the industrial subjects which were important to them. The "points for discussion" were again reviewed and freely discussed pro and con. Over fifty different physicians participated. Several groups expressed the desire for further meetings.

At this time, several avenues for further action were evident:

1. The Committee could turn over the information assembled for the use of the State Medical Association Committee on Industrial Health.

2. It could follow the expressed wishes of those who met with the Committee and inform managements and insurers of the available Physician Roster.

3. It could ask for a larger committee to follow up and make available a core group of practicing physicians to consult with private physicians and small employers to assist in starting in-plant services.

The first avenue has been accomplished and the other two begun.

Summary

Part-time in-plant Occupational Medical Service should become an integral part of general practice in the next decade. As part of a governmental Occupational Health program in California, enlisting the physician in small plant health services was explored through the Alameda-Contra Costa Medical Association. The program involved the County Society's Committee on Industrial Health in the education of the Society membership. Steps included a Society Code of Ethics re soliciting in-plant relationships to industries, formation of a Voluntary Roster for physician-referrals, the distribution of a detailed "Points for discussion of part-time, in-plant medical services" to all member physicians, and medical group discussions aimed at maintaining the interested local physicians as leaders with respect to the kind, quality and quantity of medical services to employees.

The Committee believes better small plant medical services will come out of its activities. Looking at the way Dr. Blackie Wilson and the North Carolina group have used our experiences and have forged ahead, it seemed that perhaps this sharing of our experience might help accelerate others.

It has been a pleasure to have this opportunity to come before you. Your frank comments and suggestions will be appreciated. Thank you.

ACCMA COMMITTEE ON INDUSTRIAL HEALTH 1958

Summary of Statement of Ethical Principles approved by A.C.C.M.A. Council.

Statement reaffirms conduct of practice according to the Guiding Principles of Occupational Medicine. (J.A.M.A. Vol. 155, pp. 364-365. 1954)

Code of Ethics is directed towards the best medical care of each individual.

Employees gain where management provides a relationship between employees and an interested physician located relatively close to the workplace.

It is advantageous for managements to have knowledge of all local physicians and for physicians to be aware of the occupations of employees working in the area of their offices.

Employees profit when physicians interested, as well as qualified, are responsible for their occupational health care.

The employer (or his insurance carrier) is legally responsible for the selection of the physician caring for injuries arising out of occupation.

Since it is unethical to solicit medical practice, bringing managements and interested physicians together presents problems.

It is therefore the responsibility of the County Medical Society to make available to industry the essentials of a sound Industrial Health Program and knowledge of interested physicians.

Therefore a Roster of interested physicians should be maintained by the A.C.C.M.A.

ALAMEDA-CONTRA COSTA MEDICAL ASSOCIATION
6230 Claremont Avenue - Oakland 18, California - Telephone OLympic 4-5383

April 26, 1960

MEMO TO: All Members of the Alameda-Contra Costa Medical Association

FROM: ACCMA Industrial Health Committee
Lawrence Cannon, M.D., Chairman

Almost 400 members completed the voluntary roster of physicians interested in industrial and/or compensation medical practice. The ACCMA now has available by areas, lists of physicians interested in all general and special fields of industrial practice. These are being made available to industrial managements and compensation insurance carriers on request.

Industrial managements considering inplant medical services may also need guidance in the extent of services appropriate to their particular establishments. The interested practicing physicians will most often be called upon for informed opinions.

Accordingly, the ACCMA Committee on Industrial Health has felt that discussions among ACCMA members interested in inplant medical work would be helpful in clarifying the problems and establishing goals. Some of the points which a discussion might entail are listed on the attached memorandum.

The following would be some suggested topics for medical meetings on this subject:

The medical responsibilities you assume.
The facilities the plant should provide.
Your time and remuneration.
The advantages the company and its employees gain.

Also attached are some general goals which have been established for the national accreditation of industrial medical installations.

Would you be willing to discuss your ideas on these topics with members of the committee and/or small groups of physicians in your vicinity:

a. Over luncheon.
b. Over dinner.
c. After dinner.
d. At your hospital.
e. At other times or places.

Your interest and cooperation in returning the attached card will be appreciated.

Points for Possible Discussion Regarding Part-time Inplant Medical Services:

What could be considered to be medical responsibilities?

a. On call emergency care of injuries.
b. Supervision of first-aid given and the personnel giving it.
c. Development of written guides for plant personnel to follow.
d. Pre-employment physical examinations for selection and placement of employees.
e. Periodic re-examinations and health maintenance of employees.
f. Executive health examination and/or consultation with executives concerning their physician's findings.
g. Plant inspections for physical or toxic hazards.
h. Plant inspections for the cleanliness and adequacy of eating and washing facilities.
i. Arrangement for immunizations of employees.
j. Transmittal of employee health findings to their personal physicians.
k. Supervision of return to work after sick absences.
l. Care of serious injuries at the plant.
m. Care of serious illness at the plant.
n. Care of non-occupational emergencies.
o. Consultation to employees who request advice regarding:
    1) Their personal health care.
    2) Their choice of a physician.
    3) Their nutrition, personal hygiene and living habits.
    4) Family health problems.
    5) Medical and hospital insurance.
    6) Personal worries.
p. Filling out of insurance claim forms.
q. Consultation.
r. Setting up a Blood Bank for employees.
s. Supervising food served in plant lunchroom.
t. Selection of safety clothing and equipment.
u. Periodic reports to management.

What facilities and auxilliary personnel should be provided?

a. How much space would you ask for.
b. What assistant personnel would you ask for.
c. How much initial equipment would you ask for.
d. How would you arrive at these requests.

How would you estimate the time involved?

a. By what you would be willing to give.
b. By what the company asks for.
c. By the total number of employees employed or hired during the past year.
d. By the number of occupational injury cases during the past year.
e. By the number of cases you have had referred to you in the past year.
f. By the company's estimate of their employment in the future.
g. By the number of responsibilities you undertake.

How would you discuss "recompense"?

a. As an hourly fee.
b. As a monthly retainer.
c. As a unit amount per employee on payroll.
d. As a fee for each examination and/or injury treatment given at the plant.
e. As a courtesy without fee if all the injury cases are sent to your office.

How would you estimate that the company would benefit?

a. Because the injuries are treated at the plant.
b. Because injuries are treated more promptly.
c. Because a nurse or first-aider takes care of many injuries.
d. Because less time is lost going for treatment.
e. Because employees are better selected when you know their jobs.
f. Because unnecessary absences are reduced.
g. Because employees have earlier referral to their own physicians.
h. Because a place to talk with a physician may reduce
    1) Labor turn-over.
    2) Inplant tensions.
    3) Problems which lead to alcoholism.
    4) Problems which lead to mental breakdowns.
    5) Problems which lead to faulty production and increased scrap.
i. Because of improved employee morale.
j. Because of longer productivity of employees.
k. Because of improved community relations.
    1) Less labor turn-over.
    2) More production while on the job.
    3) Fewer accidents.
    4) Earlier return to production after illness or injury.
    5) Less disability retirements.

SOME POSSIBLE GOALS FOR OCCUPATIONAL HEALTH SERVICES

of the

Occupational Health Institute and the Industrial Medical Association

The goals for industrial organizations of 100 to 2,500 employees are:

A. The organization has a stated medical policy endorsed by management. This includes the following provisions:

   1. Preplacement medical examinations are performed. Chest X-ray, blood serology and urinalysis are recommended.

   2. Periodic medical examinations are performed on all employees who are exposed to special occupational hazards such as chemical hazards, physical hazards including excessive noise, and biologic health hazards.

   3. Voluntary periodic health inventories are encouraged. These examinations are conducted by a physician who is familiar with the specific work environment of the individual employee.

B. The professional staff is sufficient to carry out the above stated policy. (This usually requires the presence of a physician in the plant approximately 1.5 hours per week for each 100 employees.) Members of the medical and nursing staff are competent to perform the duties prescribed in the stated policy. They are graduates of accepted schools of learning; are in good standing; and licensed to practice in their respective states or provinces. They are worthy in character and in matters of professional ethics.

C. Facilities are available for the performance of thorough preplacement and periodic medical examinations. These facilities may be located within the confines of the plant proper or in the offices of the consultants or part-time physicians whose duty it is to carry out the prescribed company policy.

D. A system of adequate and confidential records is maintained.

E. A competent consulting staff is maintained.

F. Sufficient attention is given to plant environment, i.e., sanitation, safety precautions, and industrial hygiene.

G. The medical director, medical advisor, or chief medical officer reports to some responsible member of management who is familiar with managerial interpretation of medical policy and whose assistance can be relied upon in implementing that policy.

H. In addition to facilities for preplacement and periodic inventories, a well equipped dispensary for emergency care is maintained.

ACCMA VOLUNTARY ROSTER OF MEMBERS
FOR INDUSTRIAL AND/OR COMPENSATION
INSURANCE MEDICAL PRACTICE

Replies received indicating interests.
Number of physician active members of Society sent Roster (about 1400)

Physicians completing initial Roster form	388
" willing to give services in their own offices only	222
" willing to work inplant only (full-time or part-time)	20
" willing to perform industrial medical services in either plant or offices	146
Total number willing to give services in own offices.	368
" " " " " " in plant . . .	166

ACCMA VOLUNTARY ROSTER OF MEMBERS
FOR INDUSTRIAL AND/OR COMPENSATION
INSURANCE MEDICAL PRACTICE

Replies received indicating interests

Physicians offering general pre-employment and/or periodic office examinations	236
Physicians offering examination and treatment of injuries	293
Physicians offering care of general medical (non-traumatic) cases	210
Physicians offering general inplant services	138
Physicians offering regular preventive special services	64

ACCMA-VOLUNTARY ROSTER OF MEMBERS
FOR INDUSTRIAL AND/OR COMPENSATION
INSURANCE MEDICAL PRACTICE

Count of physician responses showing range of interest in various medical services to industry.

	Interests of physicians limiting practice	Total number of interests expressed by all responding MD's
Total of medical special services offered	129	1187
Care of eye conditions	15	109
Care of ear, nose and throat conditions	6	108
Care of chest conditions - chest)	20	154
heart)		158
Dermatologic and/or allergies - skin)		130
allergy)	18	118
Gastrointestinal conditions	8	166
Psychiatric care	8	33
Orthopaedic conditions and)		129
rehabilitation).	29	56
Other (specialty)	26	26

MEETING NOTICES 1960
DOUBLE POSTAL CARD FOR REPLY

The ACCMA Committee on Industrial Health acknowledges the interest you have expressed in discussing part-time inplant medical services to industry. The Committee has therefore arranged one of its regular meetings in your vicinity, and invites you to express your views. The meeting will begin at 12:15 P.M. and end by 2:00 P.M. on _____
at _____ Price $ _____
A reservation card is attached.

_____
Lawrence Cannon, M.D.
Chairman

I will ___ be present at a meeting with the ACCMA Committee on Industrial Health.

Please reserve a place for me on _____
at _____

Name _____ M.D.
Address _____
_____

OCCUPATIONAL HEALTH PROGRAM - A SELF-INSPECTION PROJECT

Philip Zullo, B.S.
Haven L. Williams, B.S.
John W. Knauber, B.A., M.P.H.
Edward J. Baier, B.S., M.P.H.

Division of Occupational Health
Pennsylvania Department of Health

INTRODUCTION

It is a function of the Pennsylvania Department of Health to provide consultative service and evaluation of health hazards to all industrial establishments within the Commonwealth. It has been policy to provide these services by means of personal visits to each industry by industrial hygienists.

Pennsylvania has more than 17,000 industrial plants, 2,600 of which have labor complements in excess of 100 persons. It is presently the responsibility of approximately thirty industrial hygienists, stationed in field offices throughout the Commonwealth, to carry out the various and ever-increasing occupational health projects.

Plant inspection is a major concern. This project entails the accumulation of general and specific plant information for statistical purposes and a tour of inspection of an industrial plant. These data are recorded on a marginal punch-card, Figure 1. The punch-card is a two page form. The first page is used to record general plant information such as: name of plant, address, products manufactured or services rendered, plant official interviewed, medical program personnel, safety program personnel, workmen's compensation insurance carrier, recommendations made as a result of the inspection, and remarks pertaining to details of the above information and plant processes.

The second page is used to list all plant processes, the industrial health hazards associated with these processes, and the control measures employed by the plant to safeguard employee health. The information is then converted into a code and indicated by punched notches along the margins of the form for subsequent sorting and compilation of statistical data.

Another project linked quite closely to plant inspection is the environmental survey. This is the collection, determination, and evaluation of the chemical and physical agents resulting from operational stresses. Activity in this project is obtained not only by personal inspection, but also by request from industry, labor unions, occupational disease reports, and individuals.

Pennsylvania has been engaged in an extensive radiation protection program since World War II. It is mandatory for all industrial, medical, and governmental users of radioactive materials and machines to register their sources. The radiation program also encompasses monitoring of all industrial applications and monitoring of X-ray, fluoroscopic and photofluorographic machines and all therapy applications of isotopes used by

practitioners of the healing arts. Under the provisions of a Radiation Protection Regulation, installations in the above categories are surveyed for stray radiation levels and recommendations pertaining to operational procedures, labeling, shielding, personnel protection, and record keeping are rigidly enforced.

The air pollution investigation and control program is expanding greatly since a state-wide air pollution control act was adopted in January 1960. Increased complaints have resulted from increased public awareness of this problem. Much of the investigational work is carried out by industrial hygienists in the field.

Pennsylvania has recently embarked on an agricultural health program. Numerous surveys have already been conducted at tanks in feed mills for carbon dioxide, alcohol, and other combustible gases and vapors and during crop spraying operations for toxic agents contained in various sprays. An investigation into the prevalence and cause of pneumonitis among mushroom workers has also been initiated.

While these expanding and additional projects have meant increased service to our citizens, they have understandingly pressed our small field force to make maximum accomplishments in all areas. It therefore became necessary to re-evaluate our activities in order to consolidate our efforts and to proportion our time to better advantage. We found an answer by studying the plant inspection project.

In the three years since the adoption of the punch-card system of plant inspection, 9,221 personal inspection visits have been accomplished. While this number may be substantial in comparison with other State programs, it is nevertheless far below our projected goal. Experience had shown that many plants as well as whole industry classifications were without significant industrial health hazards, and that the amount of time spent on the evaluation of these industries was out of proportion to the amount of positive service that was required. The fact that many of these relatively safe plants are both small and geographically isolated caused our industrial hygienists to justify their neglect by the axiom of: the greatest good for the greatest number per available time.

We felt that if these plants could be contacted in some manner other than by a personal visit, much time could be saved without sacrifice of service. The idea of sending a specialized form, tailored for a particular industry classification, through the mail found large acceptance with our staff.

It was agreed that a self-inspection project should therefore be undertaken. It was also agreed that in order for the project to be effective and worthy of adoption, it would have to meet the following criteria:

1. It had to conserve technical time.
2. It had to acquaint non-informed industrial personnel with the industrial health services available to them.
3. It had to be a means not only for obtaining pertinent information regarding plant programs and processes but also for selecting from the group of supposed non-hazardous plants those which would best profit from a personal visit.

MECHANIZATION

Following establishment of the project of self-inspection, thought was given as to how the program could best be effectuated.

It was immediately realized that large industries, or those having a large number of significant health hazards, would not lend themselves to this project. The multitude of health hazards and the complexity of operations embraced by a large industry would necessitate a questionnaire of such voluminous proportions as to be infeasible. Many years of inspections by the industrial hygienists had provided adequate information regarding exposures in the large industries and in those having a multiplicity of more pronounced health hazards. Consequently, the steel, metal fabricating, electronic, plastics, brick, and many of the more hazardous industries were eliminated from consideration in the project of self-inspection.

Hazard charts for all industries located within the Commonwealth had been prepared by industrial hygienists. From an examination of these charts, criteria were established for the selection of industries to be included in the project. These were:

1. Industries with few or no occupational diseases.
2. Those with relatively few health hazards.
3. Those with a comparatively small plant population.
4. Industries having the largest number of establishments falling within the first two categories.
5. Industries which had not previously been inspected by industrial hygienists.

From these considerations, seven industries were selected which appeared to satisfy these requirements. Those selected were bakeries, woodworking plants, apparel manufacturers, dairies, dry cleaners, scrap yards, and printing establishments.

The formulation of questionnaires for mailing to these industries was now begun. It was immediately recognized that one general questionnaire which would be applicable to the seven industries selected would not be feasible. Such a questionnaire would have to be extremely large to accommodate the various aspects of the plants involved. It could not be easily executed and consequently a smaller number would be returned. It was therefore decided that separate questionnaires, aimed at conditions within the specific industries, be designed.

In designing the questionnaires, thought was given to the type of information desired. Accordingly, forms were devised which would supply definite answers regarding exposures within the plant and which could easily be answered within a modicum of time. Since the information which we hoped to receive from self-inspections would have to be permanently recorded, it was believed that this information should be readily transferable to our record system.

In keeping with this, most of the information designed for the marginal punch-card was contained on the self-inspection questionnaire. Insofar as possible, the questions were designed to secure the desired information and to educate the individual executing the form as to the possible health hazards present in his plant.

Copies of the questionnaires were criticised by each of the industrial hygienists involved in the program. These criticisms were considered and a final draft was formulated.

Such a questionnaire designed for the dry cleaning industry is outlined in Figure 2. In a similar manner a questionnaire, Figure 3, was directed to the apparel and fabric products industry. Other questionnaires, specific for the other industries, were then completed.

It was believed that a covering letter should accompany the forms mailed to the plants. Industrial hygienists compiled such a letter, Figure 4.

Several trial mailings were made. This pilot study was undertaken to answer several questions:

1. Should mailings contain a self-addressed stamped envelope for the plants' convenience in replying?

2. Should questionnaires be sent to plants which previously had been inspected?

3. How trustworthy would the replies be?

4. Would the number of returned forms be large enough to justify the program?

The results of one trial mailing are presented in Table 1.

Another trial mailing was made to the apparel industry. The design for this mailing included all of the criteria enumerated above. The results of this mailing are presented in Table 2.

The results of the pilot study indicated that there was not a sufficient difference in the number of replies received, whether or not a self-addressed, stamped envelope was enclosed. Consequently, all subsequent mailings have been made without the enclosure of a self-addressed stamped envelope.

Experience and reflection have indicated that part of the mechanization of the project could be improved. To eliminate some of these imperfections the project has been subjected to periodic revision.

ANALYSIS OF QUESTIONNAIRES

Following the acceptance of a form by the industrial hygienists, mailings were made to selected industries. The sources of information and addresses for these companies were our own files, the Pennsylvania Industrial Directory, and the classified section of telephone directories.

These were sent in an attempt to receive valid information concerning routine operations. Since we are interested in being able to utilize factual data, all information garnered from a self-inspection report is recorded on a plant information record. Upon receipt of a completed self-inspection form it is reviewed by an industrial hygienist and the information is transferred to a marginal punch-card. Initially this was done by the industrial hygienist but it has been found that clerical personnel can be trained to perform this function. Each report is evaluated by an industrial hygienist, however.

All reports received can be tabulated in one of five categories, Table 3. More than half of the reports indicate that control measures are in effect to protect the health of employees. One-fourth of the plants were found to have inadequate controls or no processing operations. Approximately 10 percent were found to be out of business or complete information was not available to evaluate the report.

In order to assess the validity of the information received, a comparison was made of previous inspection records with self-inspection reports, Table 4. The results indicate that 15 percent of the self-inspection reports contained more information than was obtained from previous personal inspection. This information included such items as change in solvents and cleaning materials used and additional operations which had been instituted.

Approximately half of the self-inspection forms contained information which was similar to that previously obtained by an industrial hygienist's inspection of the company. Approximately one-third of the self-inspection reports contained less information than had been found during previous inspections, and 5 percent contained highly questionable answers. It is our belief that those reports which contained less information and those which were returned with questionable answers were the result of problems of terminology or a misunderstanding of the intent of the question.

At the present time there has not been enough follow-up inspection of companies completing self-inspection questionnaires to present valid information on this phase of the project.

Many of our forms contain space for comments from the company. Much additional information was received in this section. In some instances comments are placed on the backs of the questionnaire. These comments deal with the individual's explanations of processes and accidental health exposures which had occurred, such as a report of an individual who had been overcome by gas from a faulty heating unit. Some individuals report time study data for various operations.

In reviewing self-inspection reports from companies not previously visited, some generalities have been observed. The majority of the metal salvage yards supply eye protection and gloves to their employees. In the dairy industry, approximately 80 percent of those using an ammonia refrigeration system maintain leak testing equipment and gas masks. Approximately 7 percent of the replies from the dry cleaning industry indicated a desire for a personal visit by an industrial hygienist.

In the over-all review it has been determined that approximately one-fifth of the companies completing self-inspection questionnaires should be visited in the near future. This is based on the following general reasons:

1. Controls were not indicated for operations such as solvent and fume exposures, and many did not indicate that occupational diseases had ever occurred.

2. In the bakery industry, only 30 percent of the companies indicated that they used licensed pest control operators. Of the remaining 70 percent, approximately one-half indicated that they personally do the pest control work and utilized a wide variety of pesticides and insecticides. Those doing their own work gave no indication of the method used nor the extent of their exposure.

3. Approximately 10 percent of the forms were incomplete for the reason that random questions were not answered and that no comment was made explaining the reason for failure to reply.

In reviewing the self-inspection questionnaires, it has been noted that those companies which had had a previous inspection by an industrial hygienist seemed to be more familiar with the areas of interest of industrial health and replied and commented with more useful information.

EVALUATION OF THE PROJECT

Self-inspection has proved to be a useful tool in meeting a challenge to industrial hygienists - travel and workload. When this project was announced in a Quarterly Report of the U. S. Public Health Service, many agencies requested more information. For this reason, the project has been discussed in detail.

Of 1643 questionnaires sent to the industries enumerated, 1054, or approximately 64 percent, have been returned. Acceptance of the project varies within areas of the Commonwealth, however. By area, the range of return was from 41 to 69 percent. Six of seven areas reported returns in excess of 60 percent.

Information was obtained on more than 500 plants as a direct result of this project. These data probably could not have been obtained with the present field staff.

Self-inspection data were obtained for 176 plants which had previously been personally inspected by the field staff. Our existing records were more complete for 70 of these, significant changes were warranted for 28 plants, and minor changes were made in the records of 78 plants to bring them up-to-date. The major changes included modifications in process or raw material usage or even a complete alteration in the product manufactured. The minor changes included the names of new on-call physicians or safety representatives.

Frequently, a plant manager is able to supply information such as types of gas masks and respirators when answering a questionnaire. He is also more likely to check his compensation insurance policy and determine his carrier's name than he is during a personal interview. In direct contact, he frequently supplies information to the best of his ability from memory..

This is an important principle which can be extended to more complicated industries. Much of the time spent during a personal inspection involves the gathering of statistical information, such as employee population, legal owner, medical and safety supervision, and the like. Through periodic mailings, this type of information may be obtained prior to the personal visit. This can be a practical method of up-dating records, maximizing the actual number of plant inspections, and minimizing travel and conference time.

The usefulness of the project solely for up-dating records is an adequate reason for its adoption. However, it also serves two other major functions - health education and a screening device.

The type of question asked and the method of phrasing the question can point up hazards which may have gone unnoticed by a plant manager. By asking a question about an operation, an important thought can be placed in the mind of the person completing the questionnaire. "Why did they ask that question?" This may prompt him to really take a thorough look at his operations and determine how he might improve them. Another aspect to education is that it may be used as a public relations device. The plant owner or manager learns that such a service as occupational health exists. He also learns whom he might call, should he desire to do so, when he is faced with control of an industrial health hazard.

The self-inspection project also is an important screening tool. Toxic metals and solvents are being used under the most illogical circumstances. On a trial run of a questionnaire designed for scrap yards, it was found that many metals, including beryllium, were processed. Benzol and carbon tetrachloride were frequently used as solvents. These could have been kept in unmarked cans and placed on a shelf with cans of oil and paints, and thus have gone unnoticed during a personal inspection of the plant.

Following a review of the questionnaire, by an experienced industrial hygienist, those plants which require further inspection or evaluation of hazard may be personally visited. This is essential to the effective operation of a public health program. Industries which are located in areas far removed from field offices may thus be evaluated.

It is of interest to point out the seriousness with which this project has been taken by industry. We recently received a questionnaire which had been sent to a plant in northwestern Pennsylvania. It was returned bearing a Porto Rican return address. It appears that the owner was deceased and the form was forwarded to his widow who is now residing there.

In summary, a project has been adopted which enables the industrial hygienist to extend himself into many activities without sacrificing the vital function of plant inspection. It is realized that refinements and improvements will have to be made periodically. The fact that a small percentage of replies are not useful indicates a necessity for a thorough review and revision of existing questionnaires. The project is a workable one and should become more useful as more experience is gained with it.

* * * * * * *

Table 1. Pilot Study of Self-Inspection Forms Mailed Dry Cleaners

	Mailed	Returned	% Returned
Forms with self-addressed stamped envelopes	20	16	80
Forms without self-addressed stamped envelopes	20	12	60
Total	40	28	70

Table 2. Summary of Data Obtained from Pilot Study of Apparel and Fabric Products Industry

	No. Sent	No. Returned	% Returned
Plants previously inspected:			
Self-addressed envelopes-stamped	25	20	80
Self-addressed envelopes-not stamped	25	20	80
Plants not previously inspected:			
Self-addressed envelopes-stamped	25	17	68
Self-addressed envelopes-not stamped	25	17	68
Plants previously inspected:	50		
Returned within 30 days		36[b]	72
Returned within 60 days		6	8
Returned after 60 days		0	0
Total		40	80
Plants not previously inspected:	50		
Returned within 30 days		29[a]	58
Returned within 60 days		1	2
Returned after 60 days		4	8
Total		34	68
Grand Total	100	74[c]	74

a 79% of these were returned within 2 weeks.
b 91% of these were returned within 2 weeks.
c 7 of these were returned for wrong address or plant out of business.

Table 3. Summary of Self-Inspection Questionnaires Returned

Out of Business	4.3%
No Processing Activity	11.8%
Indicate Controls Present	57.5%
Indicate Controls Not Present	12.8%
Incompletely Answered	5.6%

Table 4. Comparison of Previous Inspections with Self-Inspection Information.

More Information	16.2%
Similar Information	40.6%
Less Information	38.1%
Questionable	5.1%

Table 5. Table of Industrial Response to Questionnaires

Number of questionnaires sent	1,643
Number of questionnaires returned	1,054 (64%)

Figure 1. Plant Information Record

(Unable to reproduce)

Figure 2. Self Inspection Questionnaire - Dry Cleaners

Please fill in the spaces after each question. If answer is none, write none. Use an X mark for questions not requiring a written answer.

Name and address of plant _____

List number of employees. Male ____ Female ____

List name of compensation insurance carrier _____

List name of plant physician _____

What is your principal solvent used in cleaning? Perchlorethylene ____ Naphtha ____ Stoddard Solvent ____ Other (specify) _____

Does washer have an exhaust stack vented to the outside? Yes____ No____

Is washer equipped with exhaust ventilation for use when washer door is opened? Yes____ No____

Is the solvent redistilled or filtered? Yes____ No____

During which operations are employees exposed to the solvent? _____

For how long a time are employees exposed to the solvent? ____ hrs/day

List number and approximate size of wall fans in the cleaning area or room _____

Give approximate age of washer and extractor _____ years.

Give approximate size of cleaning room (or area) _____ sq. ft.

List number and types of steam presses _____

Is pressing room equipped with wall fans? Yes____ No____ Number____
Circulating fan? Yes____ No____ Number____

List names of spotting agents used _____

Do you wish to be visited by an Industrial Hygienist for the purpose of evaluating the exposure of your employees to solvent vapor or heat exposure? Yes____ No____

Legal owner of plant _____

Questionnaire executed by:

Name _____

Title _____

Figure 3. Self Inspection Questionnaire - Apparel and Fabric Products Industry.

Please fill in the spaces after each question. If answer is none, write none. Use an X mark for questions not requiring a written answer.

Plant name: _____

Street _____ County _____ City _____

What is the manufactured product or service of your plant? _____

Who owns the plant?

Corporation _____ Partnership _____ Single owner _____

Number of employees presently employed in plant _____

In case of accident or illness, to whom are employees referred?

To a physician of employees' own choice? _____

To a company physician on call? _____ Doctor's name _____

What is the name of the insurance carrier with whom the company has workmen's compensation insurance? _____

Does the company require a preplacement physical examination? Yes ___ No ___

Does company require a periodic physical examination after employees are hired? Yes ___ No ___ How often? _____ Which employees? _____

Does company have a safety program? _____

Who is in charge of the program? _____

How often does Safety Committee meet? _____

Are radioactive static eliminators used in the plant? Yes ___ No ___ How many? _____ Where used? _____

Are the radioactive sources registered with the Pennsylvania Department of Health? Yes ___ No ___

Are ultraviolet detecting lights (Black light) used in the plant? Yes ___ No ___ How many? _____ Number of hours used per day? _____

Are individual lights attached to each sewing machine? Yes ___ No ___

Explain: _____

List cleaning agents used, either for general dry cleaning or for occasional spot removing:

Trade Name	Manufacturer's Name & Address	Chemical composition (if known)

Also list solvents used to clean machinery:

Describe containers from which cleaning fluids are dispensed: _____

Figure 3 (continued)

Number of employees using cleaning agents:_____Number of hours per day that solvents are used:_____

Are steam pressing operations provided with localized mechanical ventilation? Yes___ No___ Explain:_____

Does plant cut its own materials? _____ If yes, does cutting operation utilize a pattern, dry stencil, or wet stencil method? (Underline one)

Does plant maintain a repair shop? Yes___ No___

Are the manufactured products heat sealed in plastic wrappers? Yes___ No___

Have any cases of dermatitis or allergy occurred within the past year which was attributable to a plant operation? Yes___ No___

Number of cases? _____At which operations?_____

Name of company official who supplied above information:

Name_____

Title _____

Date _____

Figure 4. Commonwealth of Pennsylvania
Department of Health
Occupational Health

One of the many functions of the Division of Occupational Health is the inspection of all industries within the Commonwealth. These inspections are made to determine the existence of any hazards which may affect the health of those employed. For any given plant, we must know the processes carried out, the materials used, and the control measures adopted to protect your employees.

Naturally, each industry has its own particular problems, and experience has shown that the processes and materials used by some industries are less hazardous than in others. For those industries whose processes are likely to be relatively less harmful, we have instituted a program of "self-inspection". This will enable us to provide service for all plants within a given industry, economically and efficiently. Will you therefore, as soon as possible, complete the enclosed form, adding any informative comments you may with to make.

We should like to remind you that, as in the case of personal visits, all information is held confidential and that the services of this Division are available to you free for the asking.

JOINT SESSION WITH AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

April 11, 1961 - 2:00 P.M.

Arranger & Moderator - Thomas L. Shipman, M.D.
Los Alamos Scientific Laboratory

MODERN CONCEPTS OF AIR SAMPLING AND PROBLEMS FOR THE FUTURE

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Introduction

I would like to begin this talk with the following quotation, "Most books on industrial poisons have a chapter on sampling, which consists, perhaps naturally, almost entirely of descriptions of sampling instruments. It is generally stated that great care is needed to collect a sample that accurately represents the quantity of air from which it is taken, since otherwise the careful work of the analyst may be wasted. Occasionally, some mention is made of the principles which must lie behind the design of a successful sampling instrument. However, recognition that the sampling problem does not end there is generally confined to one or two sentences such as 'Since no atmosphere is likely to be uniform it is desirable to make tests at various points,' or, 'Most of the methods are snap tests and they will not record fluctuations in concentration, nor the mean concentration over a period of time; it may be necessary therefore to perform a series of tests at the same site.' No one, not even the statistician, can complain at such sentiments, which are unexceptionable, but the reader might well complain that they give no help in answering questions such as 'Where do I site my instrument?', 'How many samples do I need?', "How do I interpret the results?" The detailed answers to these questions depend on the local characteristics of the problem concerned, but there are general principles which can and should be understood by all.[1]" This is from a paper by R. C. Tomlinson at a Conference on Instruments for Use in Occupational Hygiene sponsored by the British Occupational Hygiene Society in April 1957. The general principles he refers to are still in need of discussion. In fact, the brief treatment in the above paper is the only attempt that I know to arrive at such principles on a truly rational and statistical basis. One may ask the question, "To what text would you refer a novice in the industrial hygiene field for a satisfactory treatment of this subject, which forms the basis of so much of our activities?" We have all used various devices to avoid meeting this need. Personally, my own favorite has been to recommend the services of an experienced industrial hygienist. We feel that somehow our experience gives us an instinct for correct techniques. By and large, this is probably true but there is a real need for someone to distill out the essence of this knowledge and to examine critically its basic tenets. Air sampling has been a technique which is purely empirical but with rather outstanding accomplishments to its credit. Now, however, it is about to become a science and as such it must be based on something more than a collection of "do's" and "don'ts."

To some extent, we in the United States have even lost ground in work on basic principles. In the period when most industrial hygiene was carried out in official agencies, there were a remarkable series of reports from the U.S. Bureau of Mines and the U. S. Public Health Service dealing with fundamentals in the evaluation and use of the existing sampling devices.

Such work is still being done in England and Germany. Reports from the Safety in Mines Research Establishment and the National Coal Board in England apparently have no counterparts in this country today. Undoubtedly, this is related to the shift in basic support for industrial hygiene from government to industry.

Recent Developments

Having thus raised a question of a basic nature, I propose merely to let it rest in your minds for the immediate present. I hope some of our mathematically-minded brethren will become interested in this problem. Let us look at some of the newer concrete developments in this field. The last few years have brought rapid advances in the mechanics of sampling, and for the first time one can buy combinations of pumps, flowmeters, and sampling heads sold as a unit for the specific purpose of air sampling. Our technique has at least won commercial attention. The wide use of filter papers, and especially of the membrane filters, has greatly increased the versatility of samplers and the variety of analytical methods that can be employed. Also, the variety of semiquantitative indicating and detecting tubes that have been introduced now enables the industrial hygienist to evaluate many conditions directly in the field where formerly it was necessary to collect air samples for subsequent laboratory analysis. The real advantage of this, apart from its simplicity, is that the results of one test are known immediately so that the subsequent samples can be taken on a basis of steadily increasing knowledge of the situation. Samples can be taken quickly and in larger numbers, although costs of detector tubes impose limitations in some cases.

The fact that such tests are only semiquantitative should not be forgotten and samples for laboratory analysis are still valuable for more quantitative information. Also, such detectors in general give only grab sample or short time results. For integrated average concentrations, a single bubbler or long term filter sample is equal to many grab samples. Let it be recognized that the availability of such equipment does not eliminate the need of a trained industrial hygienist. If anything, the skill required in taking and interpreting meaningful samples with these devices is greater than in the case of integrated samples. More than ever, sampling locations and times must be carefully chosen to obtain useful information. The collection of ten samples in place of one does not per se mean that a more valid conclusion will be drawn. These detector tubes have been highly variable in quality, accuracy, and storage life. I hope we will now see many papers published giving information gained through field experiences with these samplers. Only in this way can be benefit by our collective experience and the manufacturers be given a continuous incentive to improve their products.

One of the basic principles of air sampling which has been discussed[2] is that of determining a daily weighted average. We have paid lip service to this principle even when we have failed to make use of it. The technique of obtaining the daily weighted average is fairly straight forward when the operation being studied is a repetitive one such as is found in most industrial situations. However, the expansion of scientific work, particularly in atomic energy, has brought new problems. Here are a large group of occupations where men are exposed to inhalation hazards and in no sence are these people engaged in repetitive operations. In these fields, the practice

has been to take shift-long samples during every working day in every working area. The evaluation of this tremendous number of samples in terms of the exposure of the individual workers is almost hopeless. Yet, the standard against which these measured concentrations are compared is one which is carefully calculated on a basis of the physiology of a standard, but individual, man.

This, then, poses a real dilemma. Here, our need is for an air sampler which is small enough to be worn like a film badge and which collects continuous samples in the worker's breathing zone. Several workers in the industrial hygiene field are endeavoring to produce such a device, and at least one approximation to it has been described in recent literature by Sherwood[3] who calls it a "personal air sampler." One commercial supplier has also come forth with a unit based on the British work. Sherwood's preliminary results with this sampler show a disturbing but not surprising lack of correlation between such a true breathing zone sample and an estimated average based on fixed position air samplers. Improvement of these personal samplers should provide us with basic data for evaluating other sampling techniques. Since such samplers must be small, the mass of material collected is small and extremely sensitive, analytical techniques are required. Fortunately, our analytical chemists seem to be more than equal to this challenge.

The use of integrated samples taken over a full shift and in numerous locations simultaneously, poses the problem of costs of a multitude of expensive samplers. Many industrial plants and laboratories are meeting this by installing sampling facilities along with other utilities. These consist of vacuum lines with numerous outlets for sampling heads all connected to a large pump. Thus, many units can sample simultaneously and more samples can be collected merely by adding more sampling heads. Even more important, such lines can be brought close to the worker without placing bulky sampling equipment in his way and a closer approximation to a breathing zone sample can be obtained.

With the daily sampler operating continuously, it becomes possible for such samplers to serve as useful warning devices in some cases. There is a certain sense of futility about telling management that the sample you have just analyzed shows that the man should not have been breathing the air in the workroom yesterday. Photoelectric cells can be used to detect stains on a filter paper sample immediately after it is collected. For radioactive samples, the same can be accomplished by various detecting devices. Colors produced in sampling liquids can also be immediately detected and all of these effects can be electronically amplified to produce an audible or visible alarm. On hearing such a warning the man can leave the area, don respiratory protective equipment, or correct the condition before he is subjected to an average excessive concentration. The beryllium monitor, various plutonium detectors and the SO_2 detector are examples of this type.

A survey of technical literature and commercial brochures of the last few years cannot fail to impress one with the variety of new sampling devices available.[4] These utilize such principles as infrared and ultraviolet light absorption, gas chromatography, de-ionization, thermal and electrical conductivity, emission spectroscopy, depolarization and others.

More impressive still is the supplementary equipment in the form of amplifiers, recorders, direct plotters, print readouts, alarms, servo controls and transducers which can be associated with the basic sampling device. Most of these devices are particularly useful in air pollution work where samples can be taken continuously at one point and not related to the exposure of a particular individual. Even more impressive than the complexity of these devices are their prices. Most of these are out of reach of industrial hygiene groups and particularly so of official agencies who must be prepared to evaluate a wide variety of exposures. Fortunately, good industrial hygiene can still be done without such expensive equipment, and the filter papers so widely used for sampling today are even cheaper than the fragile impingers and bubblers with which some of us learned the trade a few years ago. Nevertheless, one still is apt to get the feeling of a poor man looking at expensive items in the shops of an exclusive neighborhood.

It has long been recognized that the total concentration of a contaminant in the air does not always correlate with clinical findings of disease, with urine analyses, or with deposition in body tissues. One of the known factors causing this lack of correlation is the particle size of the contaminant in the air. Recently, there has been considerable interest and development work on two stage air samplers which will separate the size fraction which deposits in the upper respiratory tract from that capable of reaching the deeper portion of the lungs.[5] Since deposition in the upper tract is largely by inertial forces, these same forces have been used in two stage samplers. The first stage then may be an impactor, impinger, cyclone, or similar device which collects particles with increasing efficiency as the dynamic particle size increases. Small cyclones have been used successfully to simulate the deposition efficiency curve of the upper respiratory tract. It must be recognized that this is more complex than merely eliminating all particles above a stated size. Recently, at the request of the Atomic Energy Commission, a committee recommended use of a collection efficiency vs. size curve for such devices to be used in evaluating dust concentrations under certain specified conditions. This action is similar to that taken by the Medical Research Council in England several years ago. The use of such a device is limited to cases where the contaminant produces damage only as a result of entrance into the body through the lower respiratory tract or where the damage produced is in the lower tract. Devices for direct determination of particle size in dust suspended in the atmosphere have also appeared. These usually involve detection of scattered light from individual particles with discrimination circuits to separate the pulses out by size. Automatic counters have also been used to size particles from photomicrographs.

Problems Urgently Needing Investigation

As already discussed, there have been many interesting developments in the field of air sampling. I would like to mention a few areas where much more research is needed in hopes that these will prove tempting to some. There is a whole new area needing investigation as a result of the fact that we are now called to evaluate many hazards in the absence of clinical data. A few years ago, one could be confident of the validity of his sampling data when a decrease of measured dustiness paralleled a decrease in the incidence of silicosis, for example. Now, we are asked to say whether our system of sampling for plutonium is correct when there has never been even a minor

clinical case of plutonium poisoning. Our controls are apparently effective, but are we really collecting meaningful data? Will the first case of plutonium poisoning occur in a location where we least suspected it? Even in silicosis, the point has been reached in some cases where a decline in measured dustiness is not followed by a further decline in silicosis incidence. This can only mean that what is being measured now is not specifically related to the etiological agent. Such factors as size, shape, and density of particles, solubility, chemical composition, etc., must be studied closely in relation to their importance in the disease-producing process in the body. This calls for close collaboration between the industrial hygienist and the physiologist rather than the physician.

We need a great deal of further work on the problem of the effect of the sampler itself on the situation being studied. One obvious effect is psychological. Several years ago, we attempted to study the cause of high uranium concentrations in one of our machine shops by placing a unit in the shop which collected a series of 30 minute samples on a filter paper roll. The machinists were interested in this instrument and they could see that a black stain was produced whenever they allowed the uranium chips to burn and that the stain was extremely light during the noon hour. As a result, they exercised greater care and reduced the air concentrations. Had we not been told of this, we would have assumed that we were measuring air concentrations as they existed prior to installation of the sampler.

Another possible effect of an air sampler is to change the air flow pattern in the room. For this reason, high volume air samplers should be used only in very large work areas. Also, air samplers must be recognized as air cleaners. A unit drawing 50 cfm of air through a filter can completely clean the air in a room 15 x 15 x 10 feet in 45 minutes. The measured air concentration then is hardly that which would exist in the absence of the sampler.

Another example of sampler interference occurs in stack or duct sampling where the sampling head changes the flow lines. Few industrial hygienists today would fail to recognize the need for isokinetic sampling to correct this condition if, indeed, it needed correction. There is a tendency to go to great pains to sample isokinetically where the particle size of the contaminant may be so small that this is unnecessary. On the other hand, when large particles and high duct velocities are involved, the amount of dust collected is related to the cross sectional area of the sampler times the duct velocity rather than to the sampling volume.[6] A great deal of work still needs to be done to understand the movement of particles with reference to airstream flows.

A somewhat analogous condition prevails in sampling large particles below a dusty operation or out-of-doors. Here, the air is essentially still and the particles are moving at their own terminal settling velocities. If the dust is homogeneously dispersed and the sampler is small in physical dimensions, there are theoretical reasons for thinking that little error will be introduced.[7] However, there is a real need for experimental investigation of this point and for determining the actual effects of various sizes, shapes, and orientation of samplers. Sampling errors due to sedimentation are most significant in the presence of large particles and it might be argued that failure to capture large particles is unimportant since they are deposited in the upper respiratory tract and are usually

biologically inactive. However, the quantitative aspects of this means of eliminating large particles may be quite different than those prevailing in the body.

I have mentioned the desirability of using a small sampler which can be fastened to the worker. Also, I have mentioned the new developments in samplers performing their own analyses, eliminating certain size ranges, actuating alarms, and other useful functions. Obviously, there is a contradiction here since the sampler which performed all these functions would be much too bulky and heavy to be fastened to a man. Nevertheless, there is still plenty of room for the instrument development man to provide us with usable gadgets to get better data. The accomplishments in miniaturization in recent years are so astounding that I almost believe we may achieve our goal yet.

The last area for development work I wish to mention is in the field of statistics. There is a remarkable deficiency in our application of statistical techniques in the field of air sampling as compared to other fields. The chemist runs a group of identical samples and from this establishes the standard deviation of his method. How many publications have contained the results of running three impingers side by side to establish their standard deviations? When one is faced with a whole series of sample results from a particular plant area, the most sophisticated statistical treatment which is usually invoked is to calculate the numerical average. The use of air sampling to investigate a worker's exposure on a specific job is, first, a problem of a well-designed experiment. Here, we need the help of a statistician. Unfortunately, he is largely ignorant of our problems and we lack a knowledge of what he can do for us. We need a great deal of co-operative work in this field.

I do not wish to leave the impression that we are very badly off with regard to air sampling and that we are making no progress. It is only because we have made so much progress that we can now see that there is so much to be learned. That there has been an increased interest in sampling is well evidenced by the fact that there are now many more companies, relatively speaking, making sampling equipment than there were ten years ago. The tendency now among manufacturers of such equipment is to design for use under field conditions rather than to take a laboratory bench full of bubblers, U-tubes, manometers, etc., and attempt to mount it on a board to be suspended somehow in the industrial plant. Those who have had the experience of trying to take breathing zone samples with the old Willson chlorinated hydrocarbon apparatus will know what I mean.

The increasing use of analyses of urine samples as an adjunct to air sampling should be encouraged, although the exact use which can be made of such data in conjunction with air samples varies from one substance to another. With some materials, such as beryllium, very little use can be made of the data and with mercury its value is doubtful. At the other extreme, urine analysis for tritium gives a better measure of air concentration than do any existing air samplers.

We are on the verge of an era where air sampling will be a key factor in scientific progress. The nuclear submarine and the manned space ship are entirely dependent on the rigid maintenance of the quality of a recirculated atmosphere. Air samplers with their associated automation can make

future progress in these fields possible. Thus, the field of air sampling is filled with many interesting questions which should make it an attractive field of work for experimental, scientific-minded industrial hygienists.

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MODERN CONCEPT OF ANALYTICAL CHEMISTRY IN INDUSTRIAL HYGIENE AND PROBLEMS FOR THE FUTURE

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In the practice of industrial hygiene considerable use is made of numbers derived in part from the application of analytical techniques. Numbers not only serve as guide posts for judging occupational safety, they are also used by engineers in designing industrial ventilation systems. The physician uses them as aids in the diagnosis of industrial disease, and the toxicologist for comparing and studying the toxicity of materials. The reliability of both the numbers and the conclusions drawn from them depend in large measure upon the accuracy and sensitivity of the analytical procedures employed in obtaining direct information.

Changes in the practice of industrial hygiene during the last twenty years have multiplied the importance of the role played by analytical chemistry. The gross nature of certain environmental hazards and the often dramatic character of the physiologic responses which, early in the history of the practice of industrial hygiene, made it easy to establish cause and effect relationships are less frequent in their occurrence in industry. Now, analytical procedures must meet requirements set by the more sensitive physiologic criteria being employed. For example, toxic limits based upon the excitation or inhibition of conditioned reflexes, regardless of their practical value, require analytical approaches of sensitivity and accuracy never considered necessary or desirable by the early workers in the field of industrial hygiene. The application of such precise analytical methods requires the services, in at least a supervisory capacity, of an highly skilled individual well trained in the basic technical sciences.

Place of the Chemist in Industrial Hygiene

The satisfactory conduct of any investigation is possible only after the examination of all of the available facts, among which the collection and identification of pollutants are often prominent requisites. The latter may also involve analyses of biological materials, a very specialized field of analysis. The analytical work being so important, it follows that the details of sampling and analysis should be the final responsibility of the analyst. He should be consulted as to the choice of the equipment and procedures of sampling, so as to insure efficient collection of contaminants in quantities sufficient to meet the sensitivity and accuracy suited to the scope of the investigation.

It should be stressed that the most satisfactory functioning of the team in industrial hygiene is attained when it maintains its own laboratory facilities. This point is a matter of importance which often is not fully appreciated. Many industrial hygienists have no separate laboratory facilities, relying on the plant control laboratory or research and development groups for their analytical work. This situation is far from ideal in most instances. The technical personnel engaged in industrial hygiene should have facilities which match their capabilities, requirements and responsibilities. Furthermore, the analyst must have an appreciation of the special problems which characterize his field, and an interest and enthusiasm,

if he is to contribute usefully to the team effort. Such a degree of interest is hardly to be maintained unless his work is directed exclusively into problems of industrial hygiene. When the chemical work has to be farmed out, so to speak, experience has shown that it is apt to be laid aside to the last minute and so to be done hastily and incompletely, perhaps as an unpleasant chore imposed upon technical persons who are occupied with other duties. This defect in the organization of the technical work of industrial hygiene has become clearly evident, and in more and more industries, great improvement in performance can be noted when all of the work is carried out in a separate facility under responsible supervision. Separate facilities, which serve as clearing houses for information in matters of industrial hygiene and toxicology, provide the best means for carrying out the analytical work promptly and satisfactorily.

Current Trends

Advances in analytical techniques have kept pace with the tremendous strides made in other scientific fields. While the advances in general technology have increased the number and complexity of the environmental hazards in industry, they have also led to the development of many new techniques for the appraisal of hazards. Since World War II, new problems have arisen in many fields, and consideration must now be given to hygiene problems incident to the formulation and use of an increasing number of pesticides, some of which possess appreciably toxic qualities. There is increasing concern with exposure to radioactive materials and wastes, with problems arising from exposure to excessive noise, vibration, heat and various types of microwave radiations, as well as to the numerous new chemicals now being synthesized and introduced into general commercial and public use. The increasing use of exotic and rare metals, many with unknown toxic properties, cannot be overlooked. All of these fields have demanded new methods for making the observations required to provide the numbers which facilitate the practice of industrial hygiene. Some of the problems have been solved by the physicist or engineer, but many still require the skill, experience and technical ability of a chemist.

Although many purely chemical procedures are useful, the analyst is no longer able to handle all of the problems by the application of classical wet chemical procedures. In fact, it is extremely difficult and often frustrating to attempt to differentiate chemically between materials which are structurally very similar in nature. As a consequence, the analyst must often turn to analytical physics if he is to come up with a satisfactory evaluation of a hazard. The analyst in the field of industrial hygiene, therefore, is no longer a mere pair of hands carrying out a simple chemical test, but an educated investigator whose scientific knowledge and judgment enable him to use the physical tools required to obtain the information desired. These tools generally fuse physics and electronics with analytical chemistry to make the evaluation more exact and less laborious.

Specific Techniques

The trends in the evaluation of atmospheric pollutants run in the direction of increasing accuracy, specificity and speed of analysis. As a result, there is great activity in the development of automatic analyzers and simple and mobile equipment for field use. Some equipment of the latter type has been used for many years to determine a variety of combustible

gases (the combustible gas indicator, for example), and some of the more toxic gases, as carbon monoxide, hydrogen sulfide and hydrogen cyanide. All are familiar with the use of the N.B.S. detector tubes for determining trace concentrations of carbon monoxide. This technique, as far as general equipment and principle are concerned, has been expanded to make possible the detection and determination of about forty gaseous contaminants. The general popularity of the indicator tube method for monitoring the air has stimulated some investigators to explore their limitations, with particular regard to specificity, sensitivity, reproducibility and aging characteristics. In general, it must be noted that such tests have limitations, but are useful for preliminary surveys or screening purposes. Users should be aware of the fact that they offer only semi-quantitative information.

Radiation is, of course, measured instantaneously in the field, and a variety of radiation monitors are available either as indicators or as devices for continuous recording. Dust counts may now also be made directly and instantly in the field. Numerous types of portable equipment have been developed which not only count the number of particles but even discriminate between sizes, down to a certain limit. One instrument is capable of counting and differentiating all particles greater than 0.3 microns in diameter. In the developmental stage, the cost of this instrument was estimated at $6000 but the cost can be expected to be reduced appreciably with increasing numbers in use.

Many automatic analyzers, designed to measure products and impurities in plant production streams, have been modified and redesigned for determining contaminants in the general atmosphere in the range of parts per million or even parts per billion. These instruments take advantage of such principles as spectrography (for traces of such metals, as beryllium and lead), neutron activation such as is now being used for the detection of beryllium in ore prospecting, infrared spectrophotometry for measuring carbon monoxide and vapors of a variety of organic solvents, ultraviolet spectrophotometry for detecting mercury and many other vapors in the air, and gas chromatography for most gases and many organic compounds.

The industrial environment is often highly complex, so that samples collected in the field must frequently be returned to the laboratory for analysis. It is here that the physical techniques of analysis have first been applied, and then modified later to meet the special need for speed and direct analysis in the field. Although there are still many problems to which the common wet chemical methods are applicable, others call for the use of physical tools which are more rapid, more sensitive, and possessed of a specificity that ensures the greater reliability of the analysis.

During the thirties, there was much activity in the development of emission spectrochemical techniques, resulting in the publication of many methods for the determination of traces of metals. These methods are generally held in such high regard that they serve as standards of precision for the development of other methods. In our hands, spectrographic methods are the methods of choice for determining traces of such elements as beryllium, cadmium, antimony, boron, nickel, manganese and aluminum in biological material and in the air. Along with the development of the spectrographic techniques, came the development of the spectrophotometric procedures for measuring colors and energy levels in various regions of the energy spectrum. Those of you who have worked in this field, for at least 20 years, can appreciate the contribution to

convenience and accuracy made by such equipment as the Beckman, Coleman and Cary visible and ultraviolet spectrophotometers, as well as the various dispersing and nondispersing types of infrared detectors which are now available. These tools, by which spectral energies are identified and measured, are being used extensively to determine metals and other inorganic or organic materials in the industrial or general atmosphere.

The period of World War II, and the years immediately following, were marked by considerable activity in the use of the polarograph. The usefulness of this instrument has now been developed to the point of rendering it essential to the efficient operation of an industrial hygiene laboratory.

There are other instrumental methods of analysis, including x-ray diffraction analysis, electron microscopy, and mass spectrography which greatly facilitate the collection of information in the practice of industrial hygiene, but which cannot be treated adequately in the short time allowed for this discussion. However, we would be remiss if we did not say a word on the application of the various chromatographic techniques, particularly those of gas chromatography. Advances in this field have been dramatically rapid. In the gas chromatograph, the analyst in industrial hygiene now has available an analytical tool which has proved itself and promises to be even more useful in the future. Mixtures of solvents or vapors no longer give rise to the frustrations which were so commonly experienced before the advent of this instrument. The analyst need no longer depend on the willingness of the formulator to supply him with an analysis of his product, nor does he now have to undertake tedious, difficult and complex fractional distillations and chemical separations to determine the composition of a solvent, paint thinner or degreaser. As little as 0.05 ml. of liquid passed through the equipment provides a fractionation that, with the aid of a few reference tests, permits the identification and determination of most of the components of the product in a matter of a few minutes. In fact, advances in this field have been so tremendous that improved equipment, employing flame-ionizing detectors and long microcolumns, can be used to detect odorous material in the same concentration as that perceptible to an observer.

Problems for the Future

I am not so clairvoyant as to be able to visualize the specific problems of the future, but is certain that many problems will develop in parallel with advances in our dynamic technology. Analysts and industrial hygienists are no longer satisfied with the determination of types of classes of contaminants. The challenge today is to attain more uniform results, to collect more accurate data, and to do it more efficiently because of simplifications of analytical procedures, and the development of automatic analyzers some of which will make use of the newer discoveries including neutron or electron magnetic resonance. Future instruments in general will be more versatile, more amenable to the use of the nonspecialist, and lower in cost. In many cases, dial readings and tedious calculations will be eliminated by the employment of digital readouts or strip chart records such as are now being used in emission spectrography and in radiation counting.

It is also clear that the development of future problems will require the more active participation of the analyst in the day's work in industrial hygiene, thus involving him more fully in the objectives and plans of investigations, imposing upon him and increasing professional responsibility for the promotion of industrial health.

MODERN CONCEPTS OF DIAGNOSIS AND TREATMENT IN OCCUPATIONAL MEDICINE

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Occupational medicine is concerned with almost all of the aspects of medical practice. To imply that occupational medicine is limited to a narrow area of interest would be to give a misleading impression, yet there are areas of medical practice, engineering practice, legal practice and the practice of many other non-medical specialties with which the practitioner of occupational medicine is very much concerned. It would require a very lengthy discourse to dwell on these many new concepts and activities which are influencing the practice of occupational medicine. Of necessity these remarks are limited to those concepts which are most closely associated with the practice of medicine, recognizing that in following this course much important material is omitted which has bearing on diagnosis and treatment.

In arriving at the diagnosis of a disease we begin by placing the patient on an imaginary scale of normality. If the values we find appear to deviate greatly from our mental image of the normal, we label this as abnormal, a disease. What is normal? Is it one standard deviation in either direction from the mean or may we have more deviant values without labeling the condition "abnormal"? When does normal become abnormal? For many functions normality is not yet defined for man. We are inclined to assume that deviations from what we view as a customary value is necessarily indicative of a disease state. This assumption may be incorrect. Many persons currently under treatment for high blood pressure have both systolic and diastolic pressures which fall within what must be considered the normal range for their age, race, sex, and national group.

Arbitrary limits are often set and deviations beyond those limits result in the diagnosis of disease.

Difficult as it is to set an arbitrary limit on normality, we are faced with this very problem in defining disease, a form of abnormality opposite in definition to health. To be sick is defined as to be "not well" (2) but in the continuum that extends from health to sickness it is difficult to establish criteria which will help us recognize sickness and separate it from health.

The same problem of definition may arise in defining a "disease of occupational origin." A disease may be caused by exposure to a specific material at the place of work but what of materials present in the general environment, as well as the environment of the work place. Cause and effect relationships may be established for material which results in an immediate effect. Not so easily established are cause and effect relationships for a material which results in long delayed effects or when combinations of materials are required to cause an effect.

Diagnosis is confounded by erroneous and inadequately evaluated data which fill the medical literature. We have many reports of disease attributed to a specific etiologic agent. In some instances the agent in question is known not to result in the type of disease reported (3,4,5). In another context Warren Weaver once wrote, "It is rather surprisingly the case that the only time man is ever real sure is not when he is dealing with science but when he is dealing with matters of faith" (6). Would that medicine when

it attempted to assign cause treated its attempts as scientific exercises rather than matters of faith.

We have little information about the possible role of the environment in the etiology or aggravation of many diseases. Yet, while we watch, our environment is constantly changing. Unless we can observe the changing environment and record those changes in quantitative terms we may never know what role the environment plays. Tomorrow's environment may differ radically from today's and as Dobzabinsky has written (7) "Man still evolves by natural selection for his environment, but it is now an environment largely of his own making. Moreover, he may be changing the environment faster than he can change biologically."

In occupational medicine we are frequently faced with the necessity of confirming or refuting a diagnosis of occupational disease or injury. We are also frequently faced with the necessity of determining whether a material or an environmental stress is the primary cause or an aggravating factor in the etiology of a disease process. The methodology for answering these questions is becoming more refined in some instances but the same fundamental principles of investigation continue to hold true.

THE DIAGNOSIS OF OCCUPATIONAL DISEASE

Epidemiological Method

How do we determine whether a disease exists in relation to exposure to a known substance? One author (4) has written, "Non-experimental proofs for biological problems may have to be relied on when problems go beyond the life span of commonly used laboratory animals and may even last for more than the useful life span of the average investigator." Obviously, when the cause and effect relationship is of such a low order as to require a lengthy time factor for the effect to be evident we are faced with problems which may well be insurmountable with present techniques. A few examples will illustrate.

Mankind has been exposed to radiation for many years. There is in fact little doubt that man has been subjected to ionizing radiation since creation. We can speculate that his evolution has been significantly influenced by this continuous exposure to ionizing radiation and that both somatic and genetic cells have been affected. What effect does additional radiation exposure, that over and beyond natural background, have on men so exposed?

The effects may be non-existent, readily observable, or observable only in relation to a change in the mean for certain determinable values among the group so affected. If this latter possibility should prove to be the case, the only method of proof would be the study of a large group of exposed persons over a long period of time while observing a control group who were subjected to all other factors except the additional radiation. The control group would have to be matched for such variables as age, sex, race, ethnic background, geographical location and as many other variables as it is possible to include. We are faced with this problem in the uranium industry today. Are there occupational diseases present but not detected because the low frequency and similarity to commonly occurring disease states precludes recognition of a cause and effect relationship?

The radiation industry is not alone in facing this type of problem. Concern with air pollution has highlighted that case of a blight in search of a disease. In the last analysis it may be only by epidemiological methods that we prove or disprove the existence of disease causally related to or aggravated by air pollutants.

Every new chemical developed in the laboratory poses the possibility that it may be the etiologic agent for a new disease syndrome. Unrecognized relationships may well exist between presently existing exposures and existing diseases or known diseases may unknowingly be aggravated by these same exposures. Carefully conceived studies of exposed populations are essential if many of the materials in use today are to be given a clean bill of health or to have their potential for harm recognized. The employee population engaged in manufacture and distribution may be the only group with exposure limited to a specific material. Employed groups are often the only possible study group. To pass up the opportunity for such study would be most unfortunate.

When the criteria for diagnosis of a disease are established then the epidemiologist can determine the incidence of the disease. In the course of such a determination the epidemiologist may help to clarify the incidence of certain specific findings in the disease process and may show that only variations from a predetermined mean value are meaningful and that individual differences, as opposed to group differences, are virtually meaningless.

Clinical Methods

Measurement of the individual under observation in comparison to an accepted norm, and the placing of a name on any significant deviation from the norm, is the process of diagnosis. The diagnosis of occupational disease by clinical procedures is in no way different from the diagnosis of non-occupational disease. A complete history and a physical examination are necessary in either case. The art of observation has few new tricks. A perceptive eye, an ear to record what is being heard, and correlation of all that has been learned are still necessary. Too frequently the final step, correlation, is overlooked because of failure to reflect adequately on what the patient has said or a failure to ask the right questions. Perhaps a case history would best describe this situation while simultaneously illustrating the methodology of diagnosis.

Mr. D. K. was referred for evaluation with a diagnosis of "chronic hydroquinone intoxication." As this diagnosis was not familiar to us we first made a literature search and determined that this entity was not reported in the literature. We were then faced with the necessity of diagnosing an illness which was supposedly due to hydroquinone exposure. The first step in our diagnostic procedure was to take a detailed history including exact details of D.K.'s work and exposure to chemicals at his place of work. This was followed by a thorough physical examination. The original complaint had referred to pain in the lower legs. After careful appraisal we decided that we could find nothing objectively wrong on physical examination but that in order to rule out all possibility of abnormality we would have to utilize more refined tools. Accordingly, we did oscillometric studies on both lower limbs to study the vascular function and had an electromyographic examination of the same area. Electrocardiogram, chest x-ray, and the previously mentioned studies all appeared to be within normal limits. The laboratory determinations were equally normal. We did a complete blood count, sedimentation rate,

fasting blood sugar, and blood cholesterol. All we could conclude was that this man had no organic disease..

This investigation was time consuming and costly. Much of it could have been avoided by more careful analysis before we were asked to see the patient but it does serve to illustrate the type of diagnostic procedures that may be needed to diagnose the presence or absence of disease.

The Record of the Examination

Observations should be recorded in such a way as to facilitate correlation with known phenomena. When only a few persons are involved, hand recorded records may be feasible, but at a time when so many of the effects for which we search may be obscured in a maze of confusing fact, recording of information for machine sorting and correlation begins to appear to be essential to any advance in clinical observation and deduction. Systems for recording history and physical findings on punch cards have been perfected. Their more extensive use might accelerate the correlation of clinical findings with environmental phenomena.

Though the history and physical examination are fundamental there are occasions when these will not suffice for diagnosis and additional procedures are required.

Additional Diagnostic Procedures

A wide range of diagnostic procedures are now available to supplement the basic methods of history taking and physical examination. The modern concept is turning increasingly toward measurement of physiological function and biochemical change. The use of the x-ray, the electroencephalograph and the electromyograph are known but not as widely used as they might be in occupational medicine. The more widespread use of the electroencephalograph might be of considerable help in the diagnosis of some occupational diseases. At present this instrument is not as readily available as it might be and its use is too costly for routine purposes.

The x-ray is almost as basic a part of today's medical examination as is the physical examination. Used properly, it is a valuable aid. Used improperly it can be misleading, dangerous, and produce answers which are without basis in fact.

The use of back x-rays continues to be controversial. Can a diagnosis of a back abnormality from an x-ray film be used as the basis for rejection of an employee? Obviously, it has been and is being so used. But the diagnoses are controversial in many instances and the validity of the criteria for rejection are in dispute. Fluoroscopy is valuable as a means of observing dynamic processes. It is of less value than a film in studying fixed changes and its use in the average industrial medical department may be challenged.

Electromyography is a comparatively new diagnostic tool. As a means of measuring the electric potential of muscle its use is in its infancy. This appears to be a tool with a great potential in occupational medicine.

The routine electrocardiogram has become commonplace for examination of employees over 40 years of age. The electrocardiograph (ECG) records the changing electric potential in the heart muscle just as the electromyograph does for other muscles. It is a valuable tool for the evaluation of physiological changes in the heart but may have little prognostic value and disappointment has resulted when a negative ECG has been followed shortly by a myocardial infarction.

The trend in diagnosis is toward insistence on assessment of functional impairment. Anatomical descriptions, either in the living or the deceased, serve a useful purpose and are a step in directing our thoughts toward the function of specific organs, but today the emphasis must be on the evaluation of function. Tradition to the contrary, the pathologist no longer has the last word. The question that requires answering after the pathologist's report is read is "what impairment of function does this represent?"

In response to this demand for information about function and functional impairment we have seen the development of the pulmonary function laboratory and a great increase in interest in metabolism. The physiologist, pharmacologist, and biochemist are working in an area which seems to advance daily. Advance has been so rapid that evaluation of the advances and their application to clinical diagnosis lags considerably. Nevertheless the demand for additional information about function is being met in a number of ways. Wroblewski (9) has advanced the concept of the biochemical profile. The pulmonary function laboratory, the work evaluation laboratory, and other facilities designed to study function are now more generally available. All contribute to the need for information about function.

Studies of pulmonary function are more widely used than formerly in the evaluation of pulmonary disease and disability. These new functional tests have been of great value in quantitizing pulmonary capacity and in providing us with a better understanding of the mechanisms of pulmonary function and pulmonary impairment. There may be some question as to how much such studies have actually contributed to the diagnosis of occupational disease.

Enzyme measurements are now widely used for diagnostic and control purposes. It may be some time before enzyme studies become sufficiently standardized to allow us to run profiles on each individual for aid in assessing response to any exposure, but the day when enzyme studies will be routinely used is already here. Wolfsie (10) has described the use of cholinesterase levels as a control method for persons exposed to cholinesterase inhibitors. Serum lactic dehydrogenase estimation is now a routine procedure for measuring renal impairment and electrophoresis of this enzyme is of great interest. Many other enzymes are now being used as diagnostic aids in occupational medicine or show potential for such use.

Psychometrics

In the diagnosis of disease subtle biochemical changes may be evident before anatomic changes become evident. At a time when we do not yet know how to evaluate or even measure many of these biochemical changes we do have a tool that is potentially of almost equal sensitivity. I refer here to the use of psychological tests as a means of detecting early changes in central nervous system function. Psychometric studies may yet prove to be a powerful tool in the diagnosis of disease caused by exposure to chemical and physical agents.

Though our discussion has been mainly concerned with the diagnosis of disease we cannot forget that this is actually a very minor part of occupational medicine. Mention of psychometric examinations in the diagnosis of intoxications brings up a diagnostic tool that is presently used most widely in the personnel department for the evaluation of employment applicants and for promotion examinations. We may question the validity of some of the prognostic testing used so widely by American industry but we cannot overlook the fact that large numbers of psychologists are employed by industry. The number of psychiatrists employed by industry is minute in comparison. The psychologist and the methodology in which he is trained offers a great potential to the medical department, not only in the early diagnosis of effect resulting from exposure to a toxicant but also in raising the level of ability to diagnose behavioral disorders among old employees, as well as the newly hired.

Genetics

Inborn errors of metabolism which are genetically determined have interested biologists for a long time. Only recently has some progress been made in understanding these genetically determined faults. Some of the facts that have been established are of great importance to occupational medicine.

The absence of glucose-6-phosphate dehydrogenase in the erythrocytes and platelets of certain individuals is genetically determined and is probably transmitted through an incompletely dominant sex-linked gene (11). Absence of this enzyme results in hemolysis of erythrocytes when exposed to materials whose detoxification requires the presence of the enzyme. Surveys have indicated a greater incidence of this abnormality among some ethnic groups than among others. This deficiency is often referred to as primaquine sensitivity after the compound associated with discovery of the enzyme deficiency. Some previously unexplained hemolytic episodes may be due to this or other similar enzyme deficiencies. In the future, screening for some genetic abnormalities may be a routine portion of the pre-employment examination in some industries.

TREATMENT IN OCCUPATIONAL MEDICINE

Many a justification has been advanced for the institution of an occupational medical program. One justification has become increasingly obvious as industry has assumed a larger share of the financial responsibility for employee illness. This primary justification is the limitation on the length of absence from work when the physician in the plant is able to work closely with the private physician caring for the employee. Close attention to the needs of the individual employee, as regards his illness and the requirements of his job, means: that an employee may be back on the job two months after a disc operation, instead of six or eight months; that the employee with early scleroderma is given training for a different job before he becomes unable to do his present job; that the employee recovering from abdominal surgery returns to work weeks earlier than he would have because the plant physician who knew the man's job was able to describe the physical requirements in medical terms to the employee's own physician. This is modern treatment in occupational medicine; it is also the best old fashioned treatment because it individualizes the treatment.

In general, treatment in occupational medicine has followed the trend of treatment throughout medical practice. There are, however, certain

noticeable trends in thinking in this specialty. The concept of prevention is now pre-eminent. Even when lip-service is the only attention prevention gets, it is noteworthy that prevention is considered the treatment of choice in occupational medicine. There is a tendency for the term "finger wrapping" to be used with a derrogatory inflection, even by those who have time only for "finger wrapping."

Prevention is now paramount. Treatment is to be individualized and rehabilitation is the watchword throughout all of medicine. Early return to work is a concept that is no longer confined to the Comptroller's office but is often advanced by the private physician.

In intoxications, though prevention is the watchword, human error and mechanical failure combine to produce many cases. Treatment in some instances is now more specific than ever before. Biochemical advances have sometimes made specific treatment possible. In other instances the hunt and peck system has made its own notable contribution.

The discovery of Dimercaprol (BAL) by Stocken and Thompson opened up the vista of specific therapy for heavy metal intoxication. BAL has been used successfully in the treatment of intoxication from arsenic, mercury, gold, cadmium, and zinc (12).

Next to appear was ethylene diamine tetra-acetic acid (EDTA) or Versene, a chelating agent which will inactivate a metallic ion and form a stable soluble complex with calcium and some heavy metals. It has been used in the therapy of hypercalcemia, to promote the excretion of yttrium, zirconium, radium, and plutonium, and most widely in the treatment of lead poisoning.

More recently Wilson has introduced 2-pyridoxine aldoxime (13) as a therapeutic agent in the treatment of organic phosphate intoxication. This last development was based on the synthesis of a compound because theoretically it appeared that such a compound should work. It did.

As our knowledge of the body's biochemistry advances it is now entirely conceivable that the theoretical biochemist will be able to develop specific therapeutic agents. There are already a number of methods of treatment which have not been mentioned, which developed on theoretical grounds and have proven successful.

The rapid introduction of new chemical compounds has meant that in many instances only limited information has been available regarding the effects of the compound at the time numbers of persons first became exposed during manufacture. Attempts to extrapolate range finding data from animals to man has usually let us get by, but there have been exceptions. The future will require better screening methods than now exist and better correlation of medical records. Otherwise we will not have the information on treatment when we first need it, rather than after the first fatality.

CONCLUSION

Diagnosis and treatment in occupational medicine has changed remarkably in recent years yet the fundamentals of diagnosis and treatment have not really changed at all. As all of medicine advances it carries occupational medicine with it, yet this specialty has a unique opportunity to contribute in the

manner in which it solves its special problems, problems which may affect such a large proportion of the gainfully employed adult population. We are becoming more concerned with function and comparatively less concerned with anatomical change. We are becoming more specific in our diagnostic techniques while simultaneously depending more on epidemiologic methods to indicate the presence or absence of effect. Diagnosis and treatment in this specialty have advanced remarkably but unless we can train practitioners to think in logical terms, future advances will be by fits and starts rather than on a broad general front.

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BUSINESS SESSION - April 10, 1961

Allan L. Coleman, Chairman, Presiding

The first business session of the American Conference of Governmental Industrial Hygienists convened in the Crystal Ballroom, Sheraton-Cadillac Hotel, Detroit, Michigan, at 11:00 A.M., Monday, April 10, 1961, Mr. Allan L. Coleman, Chairman, presiding.

CHAIRMAN COLEMAN: The business session is called to order. The first item on the agenda is the announcement of the Resolutions Committee. This consists of Mr. Charles Couchman, Dr. Clark Cooper, and Dr. Christine Einert. Mr. Couchman is Chairman. That group will get together today, this evening, or some time between now and 7:45 tomorrow morning when their Chairman will discuss the proposed resolutions with the Executive Committee at breakfast in the Town Hall Restaurant.

The next item on the agenda is the report of the Secretary-Treasurer, Mr. Charles D. Yaffe.

MR. YAFFE: First of all I wish to announce the names of your newly elected officers. Chairman-Elect - E. Lynn Schall; Secretary-Treasurer - Andrew D. Hosey and Member-at-Large of the Executive Committee - William F. Reindollar.

Since, after six years, I shall be turning the office of Secretary-Treasurer over to my successor at the end of this year's Conference, I shall use this annual report as an opportunity for a brief summary of the highlights of ACGIH activities and accomplishments, particularly since 1955.

Including 32 applicants approved at yesterday's meeting of the Executive Committee, we now have 568 members compared with 305 six years ago. This is about an 86% increase.

We also have more money - over twice as much.

The volume of our correspondence and business transactions has increased to the point where we may have to employ paid personnel. Over 900 letters were sent out by your Secretary this past year in addition to the Bulletin Board, ballots, membership cards, dues statements, the Transactions and other publications.

It is always pleasant to be able to look back with a feeling of accomplishment, but, in doing so it is important not to lose sight of the future.

How do you measure the value of an organization like ours? The total number of members is important, but not nearly as important as the number who will work to accomplish its objectives. Money in the treasury has little meaning unless it is to be used to help achieve those objectives. A staff of employees likewise does not insure that the proper goals will be kept in sight.

What is the meaning of ACGIH? What are its objectives? Are they subject to change, and, if so, how?

According to our Constitution the objectives of ACGIH are "to promote industrial hygiene in all its aspects and phases; to coordinate industrial hygiene activities in all their aspects and phases by official federal, state, local and territorial industrial hygiene agencies; to encourage the interchange of experience among industrial hygiene personnel in such official organizations; to collect and make accessible to all governmental industrial hygienists such information and data as may be of assistance to them in the proper fulfillment of their duties; and to hold annual and such other meetings as may be necessary to effectuate the purpose of this organization."

These objectives were first stated some 23 years ago. They are still worthy, and the only justification for our continued existence is to keep working towards them. With the growth of industrial hygiene, as reflected by our increased membership, has come a broadening of the field and an increase in the number and types of agencies having interests in it. There are those who feel that ACGIH lost something when it changed from a small group made up almost exclusively of directors of State programs, to an organization open to all personnel of official industrial hygiene agencies, and that a return to the original form is needed. To that I would say "You can't go back." I would also ask "Should we go back?" ACGIH is a unique organization, which enjoys a world-wide reputation. Why? For one reason, because the small group of State and local program directors had the foresignt to realize after the early formative years of the organization that they alone could not fulfill their stated objectives. So, fifteen years ago they opened the doors and brought in help. And it has been this help which established standards, codes, regulations and threshold limits, analytical methods, reporting systems, information on instrumentation, and on the composition of trade names materials used in industry, and which has taught the world how to design an effective ventilation system.

Fortunately, these accomplishments have brought in revenues which can be applied to further the constructive work of ACGIH. Don't be fooled, however, into thinking that it is money which keeps this organization moving. It is people - dedicated people who believe enough in the aims of ACGIH to work, to lead, and to give of themselves. If and when these people lose their enthusiasm, the American Conference of Governmental Industrial Hygienists will cease to be an effective force for good in its field.

Let us turn now to some of the activities of this past year.

Of great significance, of course, has been the joining this year with AIHA in this first American Industrial Hygiene Conference. The development of such a Conference to the complete mutual satisfaction of the participating organizations will not be accomplished overnight. A first important step, however, was taken when a written agreement was developed by a joint committee and approved by the governing boards of both organizations at a special meeting in Pittsburgh last October. I need not review its details here, but would point out that it provides a suitable mechanism for revision of the agreement, or, if desired, its termination upon two years notice. Under the present arrangement ACGIH assumes no risks and receives no profits from the Conference. Incidentally the 1962 Conference will be in Baltimore and the 1963 meeting in Cincinnati.

ACGIH and AIHA have developed other close relationships in several ways during recent years. One is through the Joint Committee on Respiratory Protective Equipment which has developed a manual due to go to press within a year. This will be issued as a joint publication with profits to be shared. Another is the joint sponsorship of an American Standards Association project on recommended hygiene practices.

Another partnership is in the support of the certification program through the American Board of Industrial Hygiene. During the past year the Board was incorporated and its first official meeting was held. A second meeting of the Board is to be held here in Detroit later this week. Considerable work has been accomplished in between meetings through an Executive Committee. At the first Board meeting, Mr. John Soet, an ACGIH representative, was elected Chairman.

More and more ACGIH publications are appearing and receiving steadily wider distribution. Two new ones were published during this past year, the Manual on Air Sampling Instruments and the Guide to Records for Health Services in Small Industries. Both have been well received and approximately 350 copies of each have already been sold. Demand for the Manual on Analytical Methods continues. The original printing of 500 copies is practically exhausted, and a new printing will be required. When the Threshold Limit Values for 1960 were printed we mistakenly ordered only 24,000 copies. Later we had to have an additional 1000 printed. If my reports are correct, the Ventilation Manual has again broken its previous sales record. When the Chairmen of these various Committees report, I assume they will furnish additional details concerning these publications.

There has been a disquieting silence during the year from several of our Standing Committees. I hope to be pleasantly surprised by the reports of their Chairmen later this morning.

Taking care of the many problems connected with holding a Conference is always difficult. The task was probably harder than usual this year since a new mechanism had to be set up. To George Tubich and Fred McDermott who had the main responsibility for looking after our interests and needs, I wish to express my appreciation, and I am sure you all join me.

This concludes the Secretary's report. Unless there are questions I shall now present the report of the Treasurer.

Statement of Financial Transactions
Fiscal Year 4/1/60 to 3/31/61
American Conference of Governmental Industrial Hygienists

Cash Receipts		
Sale of Analytical Methods (Published 1958 & expensed 1958)	$ 360.00	
Received from Ventilation Committee from Sales of Ventilation Manual	5,248.00	
Sale of Air Sampling Instruments (Published 1960 & expensed 1960)	2,376.75	
Sale of Guide to Health Services (Published 1960 & expensed 1960)	337.50	
Sale of Reprints of Threshold Limits	698.60	
Sale of Guide to Uniform Ind. Hyg. Codes or Regulations & Supplements	17.50	
Sale of Copies of Transactions	70.00	
Sale of Trade Names Index & Supplement (Published 1955 & expensed 1955. Supplement published 1959 and expensed 1959)	165.00	
Membership Dues	951.00	
Share of Profit on 1960 Industrial Health Conference	355.73	
Total Cash Receipts		$10,580.08
Cash Disbursements		
Travel & Hotel Expenses of Sec-Treas. to 1960 Conference	210.23	
Miscellaneous 1960 Conference expenses	205.72	
Production Costs - 1960 Transactions	456.85	
Printing - Membership Book	362.56	
Printing - Air Sampling Manual	2,389.44	
Mailing Boxes for Air Sampling Manual	92.22	
Printing - Flyer for Air Sampling Manual	36.00	
Printing - Health Services Guide	911.45	
Purchase 25,000 Threshold Limit Values	549.94	
Merit Award Expense	26.60	
Stationery	216.06	
Surety Bond - Sec-Treas.	25.00	
Postage, Addressing of Membership Service and List Maintenance	522.59	
Audit of Books	25.00	
Travel Expense - Committee Meetings	458.87	
Copyrights (Air Sampl. & Health Services)	8.00	
Stencils	40.17	
Advance to American Board of Industrial Hygiene	500.00	
Misc. Office Expense	11.08	
Total Cash Disbursements		7,047.78
Excess of Cash Receipts over Cash Disbursements		$ 3,532.30
Add: Cash Balance April 1, 1960		2,387.26
Add: Withdrawal from Savings Account 4/11/60		2,500.00
Cash Balance Checking Account March 31, 1961 (The Provident Savings Bank & Trust Co., Cincinnati, Ohio)		$ 8,419.56

Statement of Financial Transactions
Fiscal Year 4/1/60 to 3/31/61
American Conference of Governmental Industrial Hygienists

Savings Account	
Cash Balance Savings Account April 1, 1960	$ 7,857.52
Less Withdrawal 4/11/60	2,500.00
	5,357.52
Interest Earned on Savings Account	161.90
Cash Balance Savings Account March 31, 1961 (The Provident Savings Bank & Trust Co., Cincinnati, Ohio)	$ 5,519.42
Total Cash Available March 31, 1961	$ 13,938.98

AUDITOR'S CERTIFICATE

I have examined the Statement of Financial Transactions for the fiscal year 4/1/60 to 3/31/61 of the American Conference of Governmental Industrial Hygienists as submitted by the Secretary-Treasurer of the organization.

In my opinion the above statement presents correctly the financial transactions for the above organization for the period as stated.

/s/ Charles Gehler
Certified Public Accountant
Charles Gehler
1801 Carew Tower
Cincinnati 2, Ohio

April 6, 1961

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(On motion duly seconded and carried, the report was adopted.)

CHAIRMAN COLEMAN: The next item is the report of the Executive Committee. I am sure that there will be somebody who will want to add to this, because we broke up last night at 12:30, and breaking up at such an early hour, I can't help but feel that something might have been left out, so listen carefully.

MR. YAFFE: I hate to correct the Chairman. We broke up at 12:40.

I would like to say that I dictated this report this morning and my secretary has done a wonderful job getting it typed up. I have not read it since it was typed, so there might be some interesting surprises.

Report of Executive Committee

The Executive Committee met at the Sheraton-Cadillac Hotel in Detroit, Michigan at 3:45 P.M. on April 9, 1961. All members of the Committee were present and in addition the newly elected officers for next year also attended. Since the Executive Committee had held a special meeting last

fall, the work load was reduced and, consequently, it was possible to adjourn this meeting at 12:40 A.M., April 10. As a result of the deliberations, the following actions are presented for your consideration and approval:

1. The report of the Secretary-Treasurer which you have just heard was reviewed and discussed.

2. Mr. George Tubich, Vice Chairman for the American Industrial Hygiene Conference, reported on the important matters which had been considered in organizing and arranging this first Conference and made recommendations for our guidance in future Conferences.

3. The 1962 Conference is to be held in Baltimore, Md. Mr. Dohrman H. Byers was selected to be Vice Chairman of that Conference representing ACGIH. Dr. William F. Reindollar will be over-all Chairman of Arrangements for both organizations. He will select other individuals from ACGIH to assist him with arrangements.

4. The 1963 Conference is to be in Cincinnati, Ohio. At the suggestion of the American Industrial Hygiene Association, the General Chairman of that Conference is to be selected from the ACGIH membership and Mr. Dohrman H. Byers will occupy that position.

5. The AIHA Board of Directors submitted a list of cities under consideration for the 1964 Conference and asked for our preference. Our first choice was Philadelphia, Pa. and this has tentatively been agreed upon by both organizations.

6. Mr. Joseph E. Flanagan, Jr., Chairman of the Ad Hoc Committee on Qualifications for Membership reported on the work done by his Committee during the past year. The Committee made several recommendations of far-reaching significance. The questions raised will be discussed further this week at a special meeting of the Executive Committee which will also be attended by Past-Chairmen of the organization.

7. 32 applications for membership were approved.

8. Several members are delinquent in their dues payment. The Secretary was instructed to notify these individuals that they are being dropped from the rolls of the organization unless payment is made without further delay.

9. Dr. Lewis J. Cralley reported on the arrangements being developed for the Joint ACGIH-AIHA Manual on Respiratory Protective Devices which is in the process of being completed by a Joint Committee.

10. Dr. Cralley also reported on a proposed project for an Intersociety Committee to develop a manual on Air Sampling Analysis. Representatives from a number of organizations have been meeting to determine the desirability of such a publication. Dr. Cralley represents ACGIH on this Committee.

11. Mr. Irving Davis, Chairman of the Committee on Air Sampling Instruments, appeared before the Executive Committee and obtained authorization for the expenditure of $500.00 by his Committee for an advertizing campaign to promote a wider sale and distribution of the Manual on Air Sampling Instruments.

12. Mr. Bernard Bloomfield, Chairman of the Committee on Air Pollution, appeared before the Executive Committee and discussed the industry flow sheets which his Committee is developing. It was decided that these should be reproduced and made available to the membership. It is hoped that the first of these can be included in this year's Transactions. Plans will also be developed for making these available to non-members.

13. Mr. James Barrett, Chairman of the Committee on Industrial Ventilation, reported to the Executive Committee concerning the operations of the Ventilation Committee during the past year. There was considerable discussion as to the possibility of developing a Spanish Edition of the Ventilation Manual, as proposed at last year's Conference. Methods for best accomplishing this are to be explored.

14. Mr. Allan L. Coleman, Chairman of the Committee on Threshold Limits reported on the recommendations of that Committee concerning future publication of the annual list of Threshold Limit Values. After considerable discussion the Executive Committee decided upon the following procedure. ACGIH will print and copyright the list each year and obtain enough copies to meet the demand for copies. The list will be made freely available to any and all publications which wish to reprint the list with suitable acknowledgment of the source.

15. It was decided that the material prepared by the Committee on Threshold Limits, documenting the various values, should be reproduced in loose-leaf form and made available to the membership and arrangements made for the sale of this material to non-members.

16. Arrangements for manning the ACGIH promotional booth at this year's Conference were discussed. In the event that any members wish to volunteer their services, their assistance is still most welcome. Such individuals should get in touch with Fred McDermott, Irving Davis, Robert Keenan or James Barrett.

17. The Executive Committee decided upon a standard type of placque to be issued to future recipients of the ACGIH award.

18. The following Committee appointments were made:

1962 Conference

ACGIH Vice Chairman for 1962 Conference - Dohrman H. Byers
ACGIH Arrangements for 1962 Conference - W. F. Reindollar
ACGIH Program Committee: E. Lynn Schall, Chairman

Miss Irene Courtenay	Dr. Mitchell Zavon
Dr. Irma West	Mr. Jesse Liberman
Mr. Norman Schell	Mr. Carl Jensen
Mr. Robert Keenan	Dr. Ralph Smith

Miss Mary Louise Brown

Standing Committees

Agricultural Health

Mr. Emil T. Chanlett, University of North Carolina, Chairman	'60 1/
Dr. Clyde M. Berry, State University of Iowa	'60
Mr. Charles D. Bond, Tennessee Dept. of Public Health	'60
Mr. Paul E. Caplan, California Dept. of Public Health	'60
Mr. George S. Michaelson, University of Minnesota	'61
Mr. J. Lee Mayes, Kansas State Bd. of Health	'61

Air Pollution

Mr. Bernard D. Bloomfield, Michigan Dept. of Health, Chairman	'60
Mr. John M. Brown, Maryland Dept. of Health	'61
Mr. William A. Munroe, New Jersey Dept. of Health	'60
Mr. Norman E. Schell, Kentucky Dept. of Health	'60
Mr. Raymond Smith, Philadelphia City Dept. of Public Health	'60
Mr. George W. Walsh, U.S.P.H.S.	'60
Mr. Charles R. Ross, Dept. of Nat'l Health & Welfare, Ontario	'60

Air Sampling Instruments

Mr. Morton Lippmann, A.E.C., Chairman	'60
Mr. Irving H. Davis, Michigan Dept. of Health	'60
Mr. Edwin C. Hyatt, Los Alamos Scientific Lab	'60
Mr. Francis P. Jung, Tennessee Dept. of Public Health	'60
Mr. Howard L. Kusnetz, U.S.P.H.S.	'61
Mr. Grant H. Vance, Connecticut Dept. of Health	'61
Mr. Herbert H. Jones, U.S.P.H.S.	'61
Mr. Victor Lavetter, Detroit Dept. of Health	'60
Mr. Paul E. Caplan, California Dept. of Public Health	'61

Awards

Mr. Jack Baliff, New York Dept. of Labor, Chairman	'60
Miss Victoria M. Trasko, U.S.P.H.S.	'61
Mr. Louis F. Weller, New Jersey Dept. of Health	'61
Miss Elizabeth A. Neubert, Tennessee Dept. of Public Health	'61
Dr. Irma West, California Dept. of Public Health	'60

Epidemiology of Occupational Disease

Dr. R. B. Sutherland, Department of Health for Ontario, Chairman	'60
Dr. Robert H. Flinn, U.S.P.H.S.	'60
Dr. Jan Lieben, Pennsylvania Dept. of Health	'60
Dr. Thomas F. Mancuso, Ohio Dept. of Health	'60
Dr. Curtis P. McCammon, Tennessee Dept. of Public Health	'61
Dr. Warren R. Lawson, Minnesota Dept. of Health	'61

Industrial Hygiene Codes and Regulations

Mr. E. J. Baier, Pennsylvania Dept. of Health, Chairman	'60
Mr. C. Fred Berghout, Army Chemical Center, Md.	'60
Mr. Louis J. Proulx, Connecticut Dept. of Health	'60
Mr. Carl Jensen, New Mexico Dept. of Public Health	'61
Mr. Robert L. Harris, Jr., U.S.P.H.S.	'61

1/ Refers to year of appointment

Industrial Hygiene Records and Reports

Mrs. Eloise T. Worden, U.S.P.H.S., Chairman	'61
Dr. Robert H. Duguid, Army Chemical Center, Md.	'60
Miss Edna May Klutas, University of Washington	'61
Dr. Ralph R. Sullivan, Oregon Board of Health	'61
Miss Beth Berkov, California Dept. of Public Health	'60

Industrial Ventilation

Mr. James C. Barrett, Michigan Dept. of Health, Chairman	'60
Mr. Howard E. Ayer, U.S.P.H.S.	'60
Mr. George Hama, Detroit Dept. of Health	'61
Mr. Jack Wunderle, Ohio Dept. of Health	'60
Mr. Benjamin Feiner, New York Dept. of Labor	'61
Mr. John Lumsden, North Carolina State Bd. of Health	'61
Mr. Marvin M. Schuman, Michigan Dept. of Health	'61

Ionizing Radiation

Mr. Donald P. Roberts, Tennessee Dept. of Public Health, Chairman	'60
Mr. P. W. Jacoe, Colorado Board of Health	'61
Mr. D. E. Van Farowe, Michigan Dept. of Health	'60
Mr. P. J. Valaer, U.S.P.H.S.	'60
Mr. Julian Olishifski, Illinois Dept. of Labor	'60
Mr. Charles L. Cheever, Argonne Nat'l Lab	'60
Mr. Byron Keene, New Jersey Dept. of Health	'61
Col. Francis W. Lanard, Army Chemical Center, Md.	'61

Recommended Analytical Methods

Mr. Robert G. Keenan, U.S.P.H.S., Chairman	'61
Mr. Leonard Pagnotto, Massachusetts Dept. of Labor & Industries	'60
Mr. Harry E. Jaworski, Detroit Health Dept.	'60
Mr. Martin W. Jeremias, New York Dept. of Labor	'60
Mr. John L. Monkman, Dept. of Nat'l Health & Welfare, Ontario	'60

Standard Labeling Procedures

Dr. Samuel Moskowitz, New York Dept. of Labor, Chairman	'60
Dr. Hervey B. Elkins, Massachusetts Dept. of Labor & Industries	'60
Dr. Kingsley Kay, Occupational Health Laboratory, Ontario	'60
Mr. John Soet, Michigan Dept. of Health	'60
Dr. Herbert E. Stokinger, U.S.P.H.S.	'60
Mr. Joseph E. Flanagan, Jr., U.S.P.H.S.	'61

Threshold Limits

Dr. Herbert E. Stokinger, U.S.P.H.S., Chairman	'61
Mr. Allan L. Coleman, Connecticut Dept. of Health	'61
Dr. W. Clark Cooper, U.S.P.H.S.	'60
Dr. Hervey B. Elkins, Massachusetts Dept. of Labor & Industries	'61
Dr. Keith Jacobson, Army Chemical Center, Md.	'61
Dr. William F. Reindollar, Maryland Dept. of Health	'61
Mr. Russell Scovill, Michigan Dept. of Health	'60

Ad Hoc Committee on Qualifications for Membership
Mr. Joseph E. Flanagan, Jr., Chairman
Mr. Jack C. Rogers
Dr. Ralph R. Sullivan
Mr. Charles E. Couchman
Dr. Thomas F. Mancuso
Dr. Clyde M. Berry

Joint Committees with American Industrial Hygiene Association

American Board of Industrial Hygiene

*Mr. John C. Soet, Chairman
*Dr. Thomas F. Mancuso
*Mr. Allan L. Coleman
*Mr. Charles D. Yaffe
*Dr. Hervey B. Elkins
*Mr. Louis F. Garber
Mr. Edgar C. Barnes
Mr. William R. Bradley
Dr. Lester V. Cralley
Mr. Kenneth M. Morse
Dr. Henry F. Smyth
Dr. James H. Sterner

Respiratory Protective Equipment

*Mr. E. C. Hyatt, Chairman
*Dr. C. M. Berry
*Mr. Henry N. Doyle
*Mr. A. D. Hosey
*Mr. Fred R. Ingram
*Mr. Harry S. Jordan, Jr.
*Mr. S. J. Pearce
Mr. Frank E. Adley
Dr. Leslie Silverman
Dr. H. H. Schrenk
Dr. William P. Yant

*ACGIH member

Representatives on Committees of American Standards Association

N2 - Dr. Mitchell Zavon (nuclear energy)
N3 - Mr. Jesse Lieberman (nuclear instrumentation)
N5 - Mr. E. V. Barry (chemical processing)
N6 - Dr. Dade Moeller (nuclear reactors)
S3 - Mr. C. D. Yaffe (bioacoustics)
Z9 - Mr. Jack Baliff (ventilation)
Z37 - Dr. H. E. Stokinger (threshold limits)
Z49 - Dr. Lewis Cralley (welding)
Z54 - Mr. D. E. VanFarowe (radiation)
Z62 - Mr. C. D. Yaffe (industrial hygiene standards)
Z74 - Mr. James Barrett (air cleaning equipment)
Z82 - Mr. Martin Jeremias (cleaning solvents in graphic arts)

Representatives on Committees of American Society for Testing Materials

ASTM D-26 - Mr. Howard Kusnetz (halogenated organic solvents)
ASTM D-22 - Mr. Robert G. Keenan (atmospheric sampling and analysis)

Representative on Intersociety Committee on Air Sampling & Analysis

Dr. Lewis J. Cralley

The next meeting of the Executive Committee will be at 7:45 A.M. on Tuesday, April 11, to receive the report from the Resolutions Committee.

This concludes the Report of the Executive Committee.

(On motion duly seconded and carried, the report was adopted)

CHAIRMAN COLEMAN: The next item on the agenda is the report of Standing Committees. First the report of the Committee on Respiratory Protective Devices.

MR. A. D. HOSEY: Mr. Chairman, members of ACGIH, and friends: Mr. Ed Hyatt, Chairman of the Joint AIHA-ACGIH Respiratory Protective Committee asked me to make this brief report for him.

The committee was in session yesterday afternoon; it was also in session again this morning, and I attended a portion of that meeting.

The manual, or, rather, rough drafts have been received for all of the originally planned chapters, and final drafts have been received on approximately fifty per cent of the material. At the meeting yesterday, it was decided to include a new chapter which will be prepared by Mr. Pierce of the U. S. Bureau of Mines, and it was also decided to include in Chapter 11 a discussion on the training in the use of respiratory protective devices.

As the Chairman indicated a moment ago - I guess it was the Secretary-Treasurer - a deadline has been set and it is planned to have the material ready for publication either in August or September of this year.

Thank you.

(On motion duly seconded and carried, the report was adopted.)

CHAIRMAN COLEMAN: We will continue now with the reports of Standing Committees. First in order is the Committee on Agricultural Health, Mr. Emil Chanlett.

MR. CHANLETT: Mr. Chairman and members of the Conference:

We have a doleful report. There has been little - if the word "little" may be equated with the word "no" - progress on the development of the Manual on Agricultural Health Practices.

This is due to the choice of the Chairman to allot his time to certain loads which the Dean of our School of Public Health elected to place on me. This is an evident confession of the lack of what we might call administrative technique in transferring the burden to the four elusive members of the committee, including the one new one whom I thought, you know, sort of might take the bait, but apparently he had been already coached as to how you function on this committee. Therefore, this year they will not receive the usual beef and beer luncheon because they didn't function.

We do have a real issue, however. This helped to stymie the Chairman, or, at least, dissuade him from acting more vigorously.

A year ago, we set forth a rather ambitious plan or outline for the contents of this Manual on Agricultural Health Practices. That outline ducked the issue. It came to light when the first chapter was actually prepared and submitted to the Chairman - who also serves as Editor - and lo and behold this brought an angle which I had not anticipated, namely, is it within the scope of this Manual and within the function of this Committee to embrace the area of traumatic injury control in the agricultural setting?

The Committee was canvassed on a straight "yes" or "No". This produced two "yes's", one flat "No", and one "No" which, when you read the fine print, meant he really wanted to take it in, but he wasn't sure whether this Conference would accept the proposition. Parliamentary procedure would permit the Chairman to cast the deciding ballot and this would be fine for a write-up.

We do need the direction of this organization on this matter. I think all of us who have worked in essentially the manufacturing realm rather cautiously leave traumatic injury control to our Labor Department colleagues or Safety Engineering colleagues, or whatever terminology they wish to apply to them.

I should consult the out-going Secretary-Treasurer or Executive Secretary on the proper procedure to bring this issue to the group. Certainly I don't think it is at this moment. My own immediate thought is that this Committee should formulate and state this question and, perhaps, set forth the issue with its pros and cons and place it before the Executive Committee. This would seem to be a reasonably good means to then bring the matter further forward and before the whole Conference if the Executive Committee wishes to do that.

This is not merely a device to temporize and further delay the onorous task of preparing the manual, but one in which, perhaps, we are a little over-sensitive, but one in which I do think there are implications if some official manual of this organization comes forth and embraces within its domain the area of traumatic injury control in an occupational setting.

Mr. Chairman, such as it is, I recommend the adoption of this report, and if it is favorably acted upon, if it is appropriate for you to give instructions as to how to proceed to bring this particular issue further along, we would indeed appreciate that too, sir. Thank you.

MR. YAFFE: Since Mr. Chanlett pointed his finger at me and asked for rules and regulations, I don't think that there is any hard and fast procedure to be followed in trying to solve your problem.

I think if time permitted here - and unfortunately I don't think it will as there are something like fifteen or twenty reports yet to be heard - we ought to get the sentiment of the people here. I think it is desirable to get it, and I think this could be done in two ways. One is by the two-step method which you hinted at by going through the Executive Committee first, and the other would be for your Committee to prepare some discussion on this, the pros and cons, and mimeograph it and mail it out to the membership with some sort of a ballot or some way that they can indicate their ideas on it, and this is another way that it might be handled.

I have some personal views on the thing right now but it wouldn't be fair for me to tell you how to do it because everybody else would want to get up and argue on it.

You have got a free hand on how to get the sentiment of the membership and I think you are wise in asking for it. The way this organization has functioned successfully is by hearing from the various members and getting their viewpoint, and it is not something that is handed down by just a few, or a small group who dictate everything. We don't operate that way.

MR. CHANLETT: Thank you very much.

(Motion made and seconded for adoption of the report)

CHAIRMAN COLEMAN: Any discussion?

MR. GEORGE HAMA: I just want to ask Emil why the traumatic injury should be introduced with the agricultural worker and why we should include that when we don't generally do it with the factory workers?

MR. CHANLETT: George, I think in the interests of time it may be best not to embark on that, don't you agree, because that brings us into a broad realm of discussion and I don't think we can do it here. But we have to specifically set it forth, and we will do that, as to the thinking within the Committee.

MR. HAMA: Thank you.

CHAIRMAN COLEMAN: You gentlemen will get together. Any other discussion?

MR. CHANLETT: May be George and I will have the beef and beer anyway, even if the Committee doesn't get it.

(Motion for adoption of the report carried)

CHAIRMAN COLEMAN: The report of the Committee on Worker Health Information.

DR. CHRISTINE EINERT:

Report of Committee on Worker Health Information

The Committee on Worker Health Information has not met either last year or this year. Since it is widely scattered, it has also been unable to carry out suggestions made in last year's recommendation and committee report.

The following materials are recommended:

1. A new member of the Committee, Mr. Paul Taloff, is conducting a study of health education in industry in Los Angeles County, California, which may in the future hold information of interest to the membership. We recommend that you keep in touch with that project.

2. The Metropolitan Life Insurance Company has developed the preliminary draft of a pamphlet entitled "Health Education in Industry" which summarizes extremely well the professional and lay requirements for stimulating a health education program in industry. This is worth reading by everyone planning to start an educational program in industry.

3. Dr. Aston has offered, from the State of Pennsylvania, a bibliography of useful educational material on fluoridation which that State Health Department has used in their current program on fluoridation. The bibliography is attached.

4. Project Heed - an actual questionnaire form used successfully recently.

With considerable regret, the majority of this Committee recommend that the Committee be abolished.

Perhaps some explanation is in order.

The mandate of this Committee is "study, assemble and recommend effective method to worker health information."

Most of the members have had several years on this Committee and the Committee itself has been in existence about nine years.

During this time, we believe that the following concepts have been developed and represent current opinion.

Health education is an essential part of occupational health. It must be carried on in response to the employee's wishes in preference to responding to the employee's needs, whether or not it is carried on by the medical and nursing staff of an industry. When carried on outside of the medical department of an industry, it must also respond to the wishes and felt needs of the workers. Hence, motivation is the first problem.

It is essential that liaison with available sources of information be established by an industry with which is contemplated a health education program geared to the wishes of its personnel. For this purpose, perhaps a governmental occupational health unit or a local health department can be the logical transmitting center. The sources of information include not only medical and nursing personnel but also all the community health agencies.

After motivation and methods of liaison, the third prerequisite is to have available time with the interested population.

The actual information to be imparted is plentiful both in the forms of films, and as pamphlets, posters and other demonstration materials. But selection of those materials to be used must be based on knowledge of the wishes of those to be informed and not on the validity of the informational content of the material available. Thus, effective methods of worker health information cannot be assembled in advance of the known wishes of those involved and must be tailored specifically to the desires which can be motivated.

In summary, the Committee believes that its mandate can only be answered in these general terms:

Motivate those who need health education to want the kind of education they need and then supply it through the good offices of the medical or para-medical health agencies of your vicinity. If possible, organize a scheme of communication outside the industry whereby all community resources may be tapped.

In view of this concept, we believe that the mandate for this Committee is not one which can profitably be further explored. Perhaps a committee might fruitfully be concerned with the specific place of governmental occupational health agency activities in health education in industry.

Respectfully submitted,

Edward R. Aston — Tula Brocard
Alice Devers — Paul Taloff
Christine Einert, Chairman

(The report, on motion duly seconded and carried, was adopted)

MR. CHANLETT: Mr. Chairman, would it be appropriate for this body to express a word of thanks to this Committee that has functioned in a very difficult area over a number of years, and has given us some useful and appropriate guide lines so that we are in a position to implement them. If so, I would so move, sir.

(The motion was duly seconded and carried)

CHAIRMAN COLEMAN: The next report is from the Committee on Air Pollution.

MR. BERNARD BLOOMFIELD:

Report of Committee on Air Pollution

The Air Pollution Committee considers the preparation and issuance of air pollution process flow diagrams to be a valuable Committee activity and one that can generally benefit the Conference membership. The Committee has not made as much progress as anticipated and desired during the past year and to date only five process diagrams (ferrous foundry, cement manufacture, asphalt paving plant operations, gold milling operations, and super phosphate manufacturing) have been prepared. Three of these (ferrous foundry operations, cement manufacture and asphalt paving plant operations) will be included in the Transactions of this meeting and will also be made available for general distribution. (See Appendices 1-A, 1-B, and 1-C).

It is anticipated that air pollution committee activities will be stepped up during the coming year and as usual any suggestions concerning Committee activities are solicited from the membership and would be appreciated.

Respectfully submitted,

Bernard D. Bloomfield, Chairman
John M. Brown — Norman E. Schell — Raymond Smith
William A. Munroe — George W. Walsh — Charles R. Ross

(The report, on motion duly seconded and carried, was adopted)

CHAIRMAN COLEMAN: The next report is that of the Committee on Air Sampling Instruments.

MR. IRVING DAVIS:

Report of Committee on Air Sampling Instruments

The work of this Committee during the past year has been directed primarily to the promotion and sale of the new Manual on Air Sampling Instruments which was published at the time of the 1960 Annual Meeting. Since that time a total of 352 copies have been sold with a gross dollar return to the Conference of $2,376.75. Included in these figures are 34 foreign orders originating from twelve countries throughout the world. The Committee is currently planning advertising programs and confidently expects to sell the remaining copies of the publication during the next 18 months.

During this period the Committee will be engaged in the project of preparing a second edition of the Manual with a publication target date of April 1963. A complete revision of the Manual appears to be necessary because of substantial changes taking place in the instrument field. While this plan is an ambitious one, we feel that we can best serve the Conference and its members by undertaking this project.

Respectfully submitted,

Irving H. Davis, Chairman
Andrew D. Hosey
Edwin C. Hyatt
Victor Lavetter
Francis P. Jung
Howard L. Kusnetz
Morton Lippmann

(On motion duly seconded and carried, the report was adopted)

CHAIRMAN COLEMAN: The next Committee, we don't have a formal report here, but I wonder if Dr. Cooper can tell us whether there will be a report at the banquet tomorrow night.

DR. COOPER: Yes, there will be a report.

CHAIRMAN COLEMAN: The next committee is on Epidemiology of Occupational Disease.

DR. R. B. SUTHERLAND:

Report of Committee on Epidemiology of Occupational Diseases

The Bill of Particulars states that the Committee on Epidemiology of Occupational Disease is "to provide guidance in areas of critical studies, including definition of terms, development of methods of investigation and minimum criteria for diagnoses".

While the epidemiologic approach has been used in many studies to assess the relationship between employment in particular occupations or

environmental exposures on the one hand, and the subsequent development of certain specific diseases or physiological disabilities on the other, we know of no published report which attempts to present a comprehensive consideration of the application of the epidemiologic method to the study of occupational disease generally. The Committee interprets the terms of reference set forth in the Bill of Particulars as a directive to provide such guide.

The Committee was unable to meet during the past year, and your Chairman has had difficulty in finding sufficient time, due to the pressure of work, to correspond freely with the members of the Committee. However, he has prepared a 16-page draft outline of the contents of the proposed manual which he intends to circulate to Committee members for their criticism and suggestions.

1. The outline suggests definitions for the terms "epidemiology" and "occupational disease".

2. It points out the importance from the epidemiological point of view of recognizing a distinction between those diseases which are specifically occupational and can only result from exposure, and those which can occur in the general population regardless of any definite occupational exposure but which may occur with greatly increased frequency in certain occupational groups, as e.g. lung cancer, bladder cancer, hearing loss, etc.

3. A suggested classification of occupational diseases, by causative agent, is given in detail.

4. With respect to the diagnosis of occupational disease in general certain characteristic features of such diseases are noted.

5. The epidemiologic method is described.

6. Its application to the study of occupational disease is discussed under the headings.

    a. Five possible approaches to making a study, with discussion of the advantages and limitations of each method.

    b. Variables which may influence production of an occupational disease, classified as to: secular changes in the disease; agent variables; variables related to opportunity for exposure; host variables; observer variables; and other variables.

7. A proposed plan for conducting a practical field investigation is outlined.

8. It is planned to include a brief discussion of tests of statistical significance.

9. It is planned to include a list of selected references covering the epidemiologic method in general, and certain specific diseases.

Our next step is to circulate the draft outline to various members of the Committee, for comment and criticisms, after which preparation of the complete manual will be undertaken.

Respectfully submitted,

Dr.R. B. Sutherland, Chairman
Dr. Robert H. Flinn — Dr. Thomas F. Mancuso
Dr. Jan Lieben — Dr. Irma West
Dr. J. Wister Meigs

(The report, on motion duly seconded and carried, was adopted)

CHAIRMAN COLEMAN: The next item is on Industrial Hygiene Codes and Regulations. Mr. E. J. Baier of Pennsylvania, Chairman.

MR. BAIER:

Report of Committee on Industrial Hygiene Codes and Regulations

Your Committee was primarily concerned with a proposed Guide for Uniform Industrial Hygiene Codes or Regulations for Industrial Plating, Degreasing, and Cleaning in Open Tanks during the year. The previous Committee had begun the draft and this activity was continued.

Upon receipt of the draft, it was circulated to the members of the Committee. Each commented profusely, and their comments were incorporated into a revised draft.

In order to obtain the comments of industrial hygienists employed by industry a copy of the draft was sent to representatives in the areas comprising Committee membership. Approximately two dozen comprehensive replies have been received, the most recent dated April 3, 1961. There has not been sufficient time to thoroughly digest and incorporate these comments, and I regret that this activity will fall upon the new Committee.

One member of the Committee felt that more emphasis should be placed on the promotion of the American Standards Association approved version of the Safety Code for Ventilation and operation of Open-Surface Tanks, Z9.1-1951, than in our proposed draft. This matter will have to be resolved by a subsequent Committee.

The Committee wishes to thank all those persons who took valuable time from their busy schedules to comment on our endeavor.

Edward J. Baier, Chairman
Louis J. Proulx,Jr. — Martin C. Wukasch
C.Fred Berghout — Irving Kingsley

(The report, on motion duly seconded and carried, was adopted)

CHAIRMAN COLEMAN: Industrial Hygiene Records and Reports. No report. Committee on Industrial Ventilation - Mr. James Barrett.

Report of Committee on Industrial Ventilation

Mr. Chairman and members of the ACGIH and guests:

This, we feel, is an occasion because it was just ten years ago that the first edition of the Industrial Ventilation Manual was published, and there has been a lot of water under the dam in these ten years. I would like to review a few landmarks.

As of the 31st of March of this year - that is a little under ten years - we have sold 24,500 manuals, and these manuals have returned to ACGIH a total of $22,541.21. That includes the repayment of the original $300 investment. So that is a pretty good return.

In these ten years, the manual has been accepted as a text and a reference in many of our Universities, and it has been used in industrial ventilation conferences, and it has been distributed throughout the world.

I would like at this time also to just take a moment for what I consider a corps of very distinguished alumni who have served on this Committee from the start and who have passed on to other responsibilities. These include John Soet, Ken Morse, Ken Robinson, Jack Baliff, Lynn Schall, Dick Page, Ron Bales, and Harry Jordan, and two fellows, John Kane and Jack Willis, who have contributed so much even though they were never members of the organization.

The accomplishments of the past ten years are due in no small part to the efforts of these alumni. We are happy to have them with us. I notice that at least one of them has left.

The Committee has sought to further these accomplishments. Presently we are preparing new material to keep the manual alive and up-to-date. As your Secretary-Treasurer remarked, we are planning to go ahead with a Spanish Edition of this book. To date we have not moved very fast on this because it is a large and very important undertaking, but we hope to show some progress, some very definite progress, in the coming year.

It has also been pretty well illustrated here in the other Committee remarks this morning that we are counting on the continued interest, comments and criticisms of the Conference members, because this is not the book of any one Committee, but it belongs to all of us, and the Manual can profit from you and your experiences.

I might remark on two things that are of interest before passing on. One is that the past calendar year was a record for us. We sold 4335 books in 1960 alone. There were two things involved there that I would like to point out. One is that we were able to take advantage of large orders at the time of printing, and if any of the other Committees can take advantage of this you may find it is very profitable and gets a lot of books in circulation.

But then at the end of the year, as the fruit of an advertising program that we carried on, our sales skyrocketed again. And so I want to just underscore the importance of advertising. We were very fortunate..

We usually consider a one or two percent return on advertising to be very good. We had over six percent return. And if you don't think this causes a snow-storm of books, you have got another think coming.

Attached to our report is a summary of our business and a certified audit of our accounts, and to start this decade I will present a check for $605 to the Secretary-Treasurer.

MR. YAFFE: I wanted a chance to get up here and make an acceptance speech. I want to say, of course, we all know the Ventilation Committee has done a wonderful job. They might check with the Committee on Hydraulics, though, or with somebody else. They have had water running under the dam all this time, and that is not very good engineering.

CHAIRMAN COLEMAN: Do I hear a motion to adopt?

MR. CHANLETT: Mr. Chairman, on the occasion of this decade of accomplishment of this Committee, which is measured not only by monetary returns to our coffers, but by the fine contribution to our professional capabilities, may I move that we accept this report with a standing ovation for the alumni and all of those who have been so fine in their contribution to this effort.

CHAIRMAN COLEMAN: I think that would be in order.

(Members of the Conference arose and applauded)

CHAIRMAN COLEMAN: It goes without saying that we accept the report. We will go through the formalities of accepting it, however.

(The report, on motion duly made and seconded, was adopted.)

(Financial Statements continued on next page)

COMMITTEE ON INDUSTRIAL VENTILATION
American Conference of Governmental Industrial Hygienists
Balance Sheet March 31, 1961

Assets		
Cash:		
Cash in bank	$ 8,500.09	
Savings account	2,154.12	$ 10,654.21
Accounts receivable		
Pending	702.10	
Over 30 days	269.50	971.60
Inventory:		
Paper	2,763.20	
Cloth	174.00	2,937.20
Total Assets		$ 14,563.01
Liabilities and Net Worth		
Accounts payable:		
Withholding taxes payable	$ 73.20	
Printer's invoice payable	3,284.82	$ 3,358.02
Net worth:		
Balance, April 1, 1960	11,523.27	
Decrease for the year	(318.28)	
Balance, March 31, 1961		11,204.99
		$ 14,563.01

COMMITTEE ON INDUSTRIAL VENTILATION
American Conference of Governmental Industrial Hygienists
Statement of Income and Expenses
for Year Ended March 31, 1961

Sales of "Industrial Ventilation" and Calculation sheets		$ 13,469.51
Cost of materials sold		3,851.69
Gross profit		$ 9,617.82
Expenses:		
Secretarial	$ 1,558.71	
Advertising	1,191.30	
Postage	790.12	
Committee expense	393.82	
Office supplies and expense	576.23	
Accounting services	75.00	
Lost and damaged copies	16.42	
Uncollectible accounts written off	50.00	
Sales taxes	57.32	
Other expense	46.62	4,755.54
		4,862.28
Interest income on savings account		63.44
		4,925.72
Remitted to ACGIH		5,244.00
Decrease in net worth		$ (318.28)

"Michigan State University, East Lansing
College of Business and Public Service
Department of Accounting & Financial Administration

April 7, 1961

Mrs. Arlyn Donovan, Secretary
Committee on Industrial Ventilation
P. O. Box 453
Lansing, Michigan

Dear Mrs. Donovan:

I am enclosing a balance sheet for the Committee on Industrial Ventilation as of March 31, 1961 and a Statement of Income and Expenses for the year ended March 31, 1961, both prepared from records kept by the secretary.

Recorded receipts and disbursements were test checked to supporting documents and to the bank statements. Nothing was disclosed that would cast doubt on the accuracy of the records.

The second printing of the current edition's costs included the cost of rebinding. This cost was allocated between the types of printed materials as follows:

Item	Unbound (200)	Wire (1807)	Cloth (113)	Total
Printing	$ 220.00	$ 1,986.00	$ 110.00	$ 2,316.00
Re-binding	-	756.00	91.00	847.00
Over-runs	-	6.37	18.98	25.35
Postage and freight	-	90.45	6.02	96.47
	$ 220.00	$ 2,838.82	$ 226.00	$ 3,284.82
Inventory cost		1.60	2.00	

It might be well to ask the printer to divide the costs of future printing bills between types of materials delivered.

The books and records seem to be well kept and are adequate for the purpose for which they are used.

Respectfully submitted,

/s/ Charles Lawrence
Charles Lawrence
Certified Public Accountant"

CHAIRMAN COLEMAN: Next, the Committee on Ionizing Radiation, Mr. Don Roberts.

Report of Committee on Ionizing Radiation

Communications among members of your Committee on Ionizing Radiation has consisted entirely in the exchange of memorandums and letters. Four items have been under consideration during the year as follows:

1. Inquiry as to a possible service that the Committee might render in connection with evaluation of the step-wedge film method of dental x-ray machine monitoring indicated no need for Committee activity.

2. Compilation of a manual on radiological health has been considered. There are differences of opinion among Committee members regarding content of such a manual, ability and available time of members to compile it and demand for such a manual if available.

3. Interest in the x-ray calculator has continued, but again Committee opinion has not been unanimous or overwhelming in favor of any proposed action in this project. Since National Bureau of Standards Handbook 76 is now available, it should be possible to make some definite disposition of this project within the next year.

4. ACGIH published in 1950 a model code for regulating shoe-fitting fluoroscopes. It is the majority opinion of this Committee that use of such devices results in unnecessary exposure of customer and sales personnel and that through continuation of the model code, ACGIH gives tantamount approval of such exposure. It is therefore recommended that this code be withdrawn. It is further recommended that ACGIH go on record as being opposed to the use of shoe-fitting fluoroscopes.

Donald P. Roberts, Chairman

P. W. Jacoe	P. J. Valaer	D. E. Van Farowe
Maxwell Dauer	James Wynd	C. L. Cheever
		J. B. Olishifski

(Motion made and seconded to adopt the report)

MR. CHANLETT: Mr. Chairman, by the adoption of this report, does the Conference approve, accept and endorse that recommendation for the withdrawal of the Code on Fluoroscope Shoe-Fitting Machines?

CHAIRMAN COLEMAN: I think that will come up in the discussion before the Board. As a matter of fact, the Executive Committee in its discussion last night planned to abandon that.

MR. YAFFE: I think the comment is right. In other words, by accepting this report the membership is approving that concept and is really directing the Executive Committee to follow it.

CHAIRMAN COLEMAN: Is there any discussion on this shoe-fitting fluoroscope omission from our reports?

MR. CHANLETT: I don't know about the Committee, but speaking for myself I would approve this action. But I want to make sure that the mechanism is the right one, that by adopting the committee report you implement their recommendation and accept it, and it becomes the Conference policy.

CHAIRMAN COLEMAN: I think perhaps we should have a motion to amend the report to include the omission of the shoe-fitting fluoroscope code from our codes that we have available.

MR. CHANLETT: You see, may be it is just a procedural matter. On a different issue there might be a more divided opinion than on this one. You do get yourself into a peculiar bond where you accept a committee report which embraces a declaration of Conference policy. It is sort of locked in there. It isn't clear enough.

CHAIRMAN COLEMAN: That is right. The report has suggested that the Conference consider the suggestion of the elimination of this code on fluoroscopic shoe-fitting. I think that it would be in order to discuss that and get the Conference's feeling on it, and then take action on the report.

MR. JOSEPH FLANAGAN: Mr. Chairman, I don't have anything to add to this technically but I think Professor Chanlett is, in effect, raising the question of whether the adoption of such a position, or even thinking about it, whether this should or should not be brought to the total membership for consideration. I think Secretary Yaffe indicated that we have something better than five hundred people who belong to this organization and most of them are not at this meeting.

I don't know the answer myself. There has to be a mechanism to do it. But I think that is the effect of the question that you are raising, Emil.

MR. YAFFE: This is one of the things that I hoped six years ago we could do something about, and we haven't succeeded yet. The question is how to properly handle committee reports. It is still not clear in this organization. As it has grown, the old procedure has not been entirely satisfactory.

This is an important question, whether the membership at an annual meeting like this can take official action on the committee reports. We set on the agenda for last night's meeting this very subject. We decided, at 12:40, to heck with it, and so we did not take it up.

I think, under the circumstances, the best procedure would be to leave the final action on this particular recommendation to the discretion of the Executive Committee, but to seek right now, at this meeting, sentiment from the membership as to whether they approve the idea of withdrawing this. As far as we know, nobody is in favor of keeping it, and unless somebody speaks up and says, "I think we need it," and gives a good reason for it, the Conference, by its discussion here, can pretty much furnish a guide for the Executive Committee to follow.

CHAIRMAN COLEMAN: There still might be an organization that has this in a local code that feels that they would use it.

MR. YAFFE: Okay.

MR. GEORGE HAMA: Would it be in order to move that we remove the reference to the fluoroscopic machines and accept the report?

CHAIRMAN COLEMAN: I think that would be in order.

MR. HAMA: Then I do move that.

CHAIRMAN COLEMAN: Motion has been made that we remove this section on shoe-fitting fluoroscopic devices from the report and accept the report.

(The motion was duly seconded.)

MR. SCET: Would you mind repeating the reference to fluoroscopy and what the question is?

CHAIRMAN COLEMAN: The question is as to whether the Code that has been prepared on radiation exposure from shoe fitting fluoroscopy should be eliminated from our collection of codes that we have prepared, whether it should be stricken out and cancelled as a code prepared by the ACGIH.

It has been taken out of a good many of the States where it is set up as a law or part of a sanitary code or regulation. I think Pennsylvania has. I know Connecticut has. It is no longer used because that equipment has been practically outlawed.

DR. WILLIAM REINDOLLAR: Mr. Chairman, I think what Professor Chanlett is driving at is the technique to be employed in handling this matter. It is always a poor approach to make a recommendation in a report because adoption of the report implies favorable action on the recommendation or resolution.

The device for handling that is very simple, and it would be merely to modify the language very slightly and say that it is recommended that the Conference give consideration to the removal of this Code, and then the report can be adopted and the Conference can consider the matter which has been authorized by the report to do, and can take any action on it whatsoever.

CHAIRMAN COLEMAN: Do I have a motion that the report be revised along the lines Dr. Reindollar has suggested, to recommend that the Conference consider the removal of this Code?

DR. REINDOLLAR: I will make the motion.

(The motion was duly seconded.)

DR. McCAMMON: There was a previous motion to completely strike this out that you have to get rid of before you can do this.

DR. REINDOLLAR: This is a motion to change instead of strike out, to change the report as submitted.

DR. McCAMMON: You have two previous motions.

CHAIRMAN COLEMAN: The motion to strike it out has been seconded.

A MEMBER: Yes. I seconded it.

CHAIRMAN COLEMAN: Any discussion on that?

MR. CHANLETT: Will the movers and seconders agree to withdraw that motion and substitute the motion by Dr. Reindollar? That would get us off the hook here.

A MEMBER: I will withdraw my second.

MR. HAMA: I will move that we strike out the first motion and substitute the one just made by Dr. Reindollar.

CHAIRMAN COLEMAN: That brings in an entirely new motion.

COL. DEHNE: Mr. Chairman, the move is getting so complicated that it is hard to tell what we are going to vote on. When the Committee Chairman made his report, those that understood it, when he said "Resolved that we drop this Code", I think that inside of that most of us understood that if it is a fact that there is a Code regulating something that is outlawed, it is reasonable to drop the Code. Is that correct?

CHAIRMAN COLEMAN: Yes.

COL. DEHNE: So why don't we word this motion that has to do with the Code in rather clear language, dealing with that alone, and then take up the report. I made the motion on the Chairman's recommendation.

CHAIRMAN COLEMAN: That it be stricken? That the Code be withdrawn?

COL. DEHNE: Yes, I withdraw that motion at this time.

CHAIRMAN COLEMAN: All right. We can start fresh now. All motions that have been made on this report are withdrawn.

Would you care to make a new motion in words that you think would fit this particular case, Mr. Chanlett?

MR. CHANLETT: I think it would be appropriate for Dr. Reindollar, who has already done it. If Mr. Roberts has got that down and will accept it, it merely introduces one phrase in the report, and that is that they recommend that the Conference consider the withdrawal.

CHAIRMAN COLEMAN: Will you have that change made in your report?

MR. ROBERTS: Yes.

CHAIRMAN COLEMAN: Will you read it, then?

MR. ROBERTS: I will modify the last sentence to read: "It is further recommended that the ACGIH consider going on record as being opposed to the use of shoe fitting fluoroscopy."

CHAIRMAN COLEMAN: Do we have a motion that the re-wording of the report be accepted?

(The suggested motion was duly made, seconded and carried.)

CHAIRMAN COLEMAN: Now we will vote on the acceptance of the report as it now stands.

(The modified report, on motion duly seconded and carried, was adopted.)

CHAIRMAN COLEMAN: May we now proceed with the report of the Committee on Recommended Analytical Methods. The Chairman is Bob Keenan.

Report of Committee on Recommended Analytical Methods

The Committee on Recommended Analytical Methods has been faced with a matter of increasing concern in recent years, namely, the slowing down of referee-collaborator activities in testing and presenting to the Committee proposed methods for its consideration. There are a number of reasons for this situation - the shortage of personnel, coupled with added official duties, being the primary one. However, no one will argue that a continuing, aggressive program devoted to the design, modification, and critical testing of modern methods for sampling and analysis is essential if we, in our official capacity, are to operate effectively in our evaluation of the working environment.

To accomplish our objectives, we are calling for the active support of all members of the Conference. For this purpose we have prepared a short answer type of questionnaire. This questionnaire is designed to solicit your participation as a referee or a collaborator on your choice of those needed analytical methods which you are also asked to indicate in your return. Your comments and experiences with the present compilation of 11 recommended methods are also requested to assist us if certain of the present procedures may require replacement. This questionnaire is being mailed to the directors and chemists of the State and local agencies. Your cooperation in returning the completed questionnaire is earnestly sought. Please discuss this situation and the information requested in the questionnaire with your associates in order to give the Committee the benefit of your collective experiences and plans to support this essential activity.

Respectfully submitted,

Leonard D. Pagnotto
Harry E. Jaworski
John L. Monkman
Martin W. Jeremias
Robert G. Keenan, Chairman

MR. KEENAN (continuing): Mr. Chairman, this completes the formal presentation of our report. I would like to make a few additional comments, if permissible.

We have a number of referee appointments which are sort of dragging along. We have two or three referees which have been quite active and are able to support their activity and report fairly favorable progress. We are obligated morally and financially to present and provide nine additional methods to our present Manual to those who have already purchased this Manual. We made the commitment in the sale of the Manual that they would,

for $5.00, get the present collection of eleven methods and the binder, and the next nine would be mailed automatically.

However, in my opinion - and I wish to emphasize this - this point is secondary to the real need of getting good, critical, tested methods into the hands of our membership. That is the reason this committee was originally established back in 1944, to get good, reliable methods that could be available to the most modest industrial hygiene lab that would take, in as many cases as possible, the minimum of equipment.

The questionnaire that I have designed and which I am discussing with the members of my committee this week who are here at the Conference is a short answer type of thing that can be answered rather quickly, and I would like you to discuss it with your associates and plan to give this activity some priority in your own organization so that we can proceed to get more needed methods out to the membership and to the world at large. And when I say "the world at large" it is because our manual has been sold in many countries, overseas as well as in the United States.

Mr. Chairman, I wish to move that the formal portion of this report be accepted.

CHAIRMAN COLEMAN: Thank you. You have heard the motion.

(The motion was duly seconded and carried and the report adopted.)

CHAIRMAN COLEMAN: The next Committee to be heard from is that on Standard Labeling Procedures. Is Dr. Moskowitz here?

MR. YAFFE: Mr. Elkins is to give the report.

CHAIRMAN COLEMAN: Mr. Elkins. Is there somebody here on this committee to give the report?

A MEMBER: I understand that Dr. Moskowitz appointed somebody to read the report.

MR. YAFFE: I did receive a letter from Dr. Moskowitz saying he would be unable to be here. He didn't have the report. He said Dr. Elkins would present it. He is not here either.

One of the principal things in the report, I think is important, at least it is worth mentioning here right now, is the Committee's concern over the fact that there is need for labeling for industrial chemicals, the very subject that Dr. Brown talked about this morning on our formal program.

The Committee on Labeling has wanted ACGIH to take an active role in sponsoring legislation in this area, and there is some question as to whether this is appropriate action for us to take or whether it is something that we can do legally, or whether it might, for one thing, affect our tax exempt status, and questions of that sort. I think there are many ramifications to this. I am sorry the Committee is not present to express its viewpoint.

We promised - by "we", I mean I promised the Chairman of that Committee that we would get a legal opinion on this matter this year, and I did contact an attorney to arrange a meeting to discuss it, and he couldn't make the date I suggested and I couldn't make the date he had free, so I said, "I will get together with you later," and I didn't, so we have still not kept our promise to Dr. Moskowitz to get legal guidance. But this is an important question and one that I am sure will come up again in the future.

CHAIRMAN COLEMAN: I believe there is one more Committee report, and that is on Threshold Limits. I have a short one this year. This consists of additional new materials, a tentative list, and also changes.

1961

Report of Committee on Threshold Limits 1/

Your Committee on Threshold Limit Values suggests that the following materials and values be placed on the tentative list for 1961.

New Materials and Values to be Placed on 1961 Tentative List	P.P.M.	Approx. Mg. Per Cu.M. Air
Dimethyl Acetamide	10	35
Endrin (1,2,3,4,10,10-hexachloro-6.7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethanonaphthalene)		0.25
Ethanol Amine	0.5	1.0
Heptachlor (1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene)		0.25
2,4,5-T (2,4,5-trichlorophenoxyacetic acid)		10
Tertiary butyl chromate (as CrO_3).		0.1
Triphenyl Phosphate		3.0

It is also suggested that the following changes be made in values previously adopted for the materials listed.

Substance		P.P.M.	Approx.Mg. Per Cu.M. Air		P.P.M.	Approx. Mg. Per Cu.M. Air
Allyl Alcohol.	From	5	12	To	2	5
2-Butanone (methyl ethyl ketone) . .	From	250	740	To	200	590
Cyclohexanol .	From	100	410	To	50	200
Cyclohexanone.	From	100	400	To	50	200
Hydrogen Bromide . .	From	5	17	To	3	10
2-Nitro Propane. . .	From	50	180	To	25	90
Perchloro-ethylene . .	From	200	1,350	To	100	670
Pyridine . . .	From	10	30	To	5	15

1/ The 1961 Threshold Limit Values are printed separately.

(Continued)

Substance		P.P.M.	Approx.Mg. Per Cu.M. Air		P.P.M.	Approx. Mg. Per Cu.M. Air
*Tolylene-2,4-diisocyanate.	From	0.1	0.7	To	0.02*	0.14*
Trichloro-ethylene . .	From	200	1,050	To	100	520

*Probably sufficiently low to protect against primary sensitization, but may not protect persons specifically sensitized.

* * * * * * * *

The above changes resulted largely from review of documentary material supporting threshold limit values. Final editing of documentary material covering all materials on the list of recommended values has been completed. Copies should be available soon for distribution.

Other minor changes will be noted in the 1961 list of values, one of which is the designation of those compounds which in the liquid form can penetrate the skin to cause systemic effects.

The Committee wishes to thank members of the Conference for their interest and cooperation in the past and looks forward to their continued support.

William L. Ball H. E. Stokinger Hervey B. Elkins William F. Reindollar
W. Clark Cooper Keith H. Jacobson Russel G. Scovill Allan L. Coleman, Chairman

CHAIRMAN COLEMAN: Is there any discussion of this report or any of the values given there? Sometimes there is discussion.

MR. E. J. BAIER: One question on the trichloroethylene. Is this based on European findings?

CHAIRMAN COLEMAN: No. This question of perchloroethylene and trichloro stirred so much discussion last year we have held to that 200 and we felt it was justified. There are several speakers on the program for tomorrow and the following day on this subject. Our Michigan representative, pretty close to trichloroethylene manufacturers, also the DuPont Company, and Mr. George Hettrick - I have had some contact. I brought this thing a little more to a head than it has been in the past.

We have got some information from those plants who manufacture and who have maintained levels of 100 parts per million and they find it necessary and desirable. We have had several letters from industrial hygienists who also found that local State governments have found it desirable to reduce that, so we do find some effect of getting this 200 parts per million which may be conducive to accidents. We have had several good, strong feelings from members of our Committee.

Considering those items, together with the fact that much of our sampling now-a-days is done by methods other than continuous average samples,

by such instruments as squeeze bulbs and direct reading instruments which means it may be more difficult to determine average concentrations, we felt a little greater safety factor on these materials might be indicated at this time.

I will make the motion that the report be accepted.

(The motion was duly seconded and carried and the report adopted.)

(Due to an oversight, the following Committee Report on Case Study, prepared by Dr. Thomas F. Mancuso, Chairman, was not called for at the Business Meeting.)

Report of Committee on Case Studies

Our Committee has prepared an outline of the material and information to be included in industrial hygiene case studies. A few sample case studies have been prepared but these still need some review. It has been suggested to us that the compilation of case studies be preceded by an introductory chapter. This would include a section on the relations to local and other official and voluntary agencies, management, labor, etc. The purpose is to provide some insight in the areas of responsibility and various interrelations and interests. With this information as background, suggestions and guide lines, then, could be more specific in terms of the investigation or study, including how one conducts himself, whom should he see, what should he say, what approaches may be utilized, etc. There would also be a section on the principles of investigation which would consider the basic principles and problems relating to investigations, etc., methods of handling reports and problems of follow-up.

After these sample case studies have been further improved, then arrangements will be made for distribution of the outline format and the sample case studies to the various industrial hygiene divisions so that they may prepare their contributions along similar lines.

Mr. Dohrman Byers	Dr. Hervey Elkins
Mr. Charles D. Yaffe	Mr. John Soet
Dr. Joseph Stapor	Dr. Thomas F. Mancuso, Chairman

CHAIRMAN COLEMAN: I will make this announcement at this time. Our Chairman of the Resolutions Committee requests that if anybody has any resolutions in mind they would like to have given consideration, get in touch with the Chairman, Mr. Charles Couchman.

I will also mention again the banquet tickets that are on sale. The sales are pretty slow so far. If you will see Mr. McDermott out at the registration booth you may make your dinner reservation for tomorrow evening.

With those announcements, I will ask for any old business that may come up from the floor. Old business. (no response)

Any new business? (no response)

A MEMBER: I move we adjourn. (The motion to adjourn was duly seconded and carried. The meeting was adjourned to Tuesday, April 11, 1961, at 11:00 A.M.).

BUSINESS SESSION - April 11, 1961

Allan L. Coleman, Chairman, Presiding

The second business session of the American Conference of Governmental Industrial Hygienists convened in the Crystal Ballroom, Sheraton-Cadillac Hotel, Detroit, Michigan, at 11:20 A.M., Tuesday, April 11, 1961, Mr. Allan L. Coleman Chairman, presiding.

CHAIRMAN COLEMAN: The business session is called to order. The first item on the agenda is to hear from the Resolutions Committee, which is composed of Mr. Charles Couchman, Chairman, Dr. Clark Cooper and Dr. Christine Einert. Mr. Couchman:

MR. CHARLES COUCHMAN: The resolutions we have to present are as follows:

Resolution #1

"WHEREAS, Manfred Bowditch, a former member and colleague in Governmental Industrial Hygiene work, passed away since our last meeting, and

"WHEREAS Manfred Bowditch, was a conscientious worker who contributed both in and out of Governmental circles to the advancement of knowledge of industrial hygiene and the protection of the public, therefore

"BE IT RESOLVED, that the American Conference of Governmental Industrial Hygienists express its deep regret on the death of Manfred Bowditch and extend its sincere sympathy to his family and that the Secretary be instructed to transmit this resolution to his family."

I move this resolution be adopted.

(The resolution was adopted after being duly seconded and carried.)

Resulution #2

"WHEREAS, Professor Constantine Yaglou, an inspiring teacher whose contributions are in daily use by members of this association, passed away during the past year, and

"WHEREAS, the professions in industrial hygiene owe much to his meticulous research, therefore

"BE IT RESOLVED, that the American Conference of Governmental Industrial Hygienists express its deep regret on the death of Professor Yaglou and extend its sincere sympathy to his family, and that the Secretary be instructed to transmit this resolution to his family."

I move this resolution be adopted.

(The motion was adopted after being duly seconded and carried.)

Resolution #3

"WHEREAS Professor Philip Drinker, a member of our association, after more than 40 years of teaching industrial hygiene is entering a well earned retirement, and

"WHEREAS a large portion of this membership has had the benefit of his teaching and his writings, and

"WHEREAS this association owes much of its effectiveness to the work and stimulus from the pioneers in industrial hygiene of which he is an outstanding example, therefore

"BE IT RESOLVED, that the American Conference of Governmental Industrial Hygienists take this opportunity to congratulate him and wish him many years of happy retirement, and that the Secretary be instructed to transmit this resolution to Professor Drinker."

I move this resolution be adopted.

(The motion was adopted after being duly seconded and carried.)

Resolution #4

"WHEREAS this first American Industrial Hygiene Conference has achieved a very high level of competence and organization, and

"WHEREAS the difficult task of a first venture have been overcome and

"WHEREAS the membership of the American Conference of Governmental Industrial Hygienists as a participant has benefited, thereby now, therefore

"BE IT RESOLVED that this resolution be forwarded to the President of the American Industrial Hygiene Association as a token of appreciation of the American Conference of Governmental Industrial Hygienists."

I move this resolution be adopted.

(The motion was adopted after being duly seconded and carried.)

Resolution #5

"WHEREAS, it is to the advantage of the American Conference of Governmental Industrial Hygienists to meet together annually with all other industrial health organizations, and

"WHEREAS, the future separation of the participating organizations will not make this possible and

"WHEREAS, the American Conference of Governmental Industrial Hygienists by majority membership vote has elected as an alternative a meeting with one of the formerly participating organizations for 1961, therefore

"BE IT RESOLVED that the American Conference of Governmental Industrial Hygienists wishes to be on record that it maintains its readiness to participate in the efforts of all industrial health organizations in establishing a basis for restoring a single annual Industrial Health Conference which would serve the best interests of all these contributing organizations, and

"BE IT FURTHER RESOLVED, that the Secretary transmit a copy of this resolution to each of the organizations which have constituted the Industrial Health Conference."

COL.DEHNE: The only statement in there that might be modified, that we make a statement that there be a single annual industrial health conference, that the term industrial health conference might be stricken out and terminology to the effect that conferences on industrial health be held at the same time. I think that most of the people concerned do expect there will be two different conferences, but they will be held at approximately the same time and place.

This raises the question of time and place, as to whether they should actually be held during the same week or have an overlapping period. The terminology might be to the effect that they would be held at the same place simultaneously.

MR. YAFFE: I would like to add one personal view, and that is that there are several other organizations, in addition to those that participated in the old Industrial Health Conference, who might appropriately be brought in, and therefore I don't think that any resolution that this group draws up should limit its invitation, if it wants to send it, or copies, to just the old five organizations. Also, it is possible that there are advantages to bringing a large number of organizations together every two or three years rather than annually. I think this is too complex to say we only want it one way, like we had it in the past. There might be some improvement come out of this.

COL. DEHNE: If there is a motion on the floor presently, I would move the motion be tabled in favor of an amended motion.

A MEMBER: I withdraw my motion.

CHAIRMAN COLEMAN: I would suggest that I appoint a subcommittee to work with the subcommittee in the back of the room, including our original resolution committee, plus yourself and Mr. Yaffe to make a revision of this for presentation before this meeting adjourns. There's a question up here, why me? So I will change that one appointment from Mr. Yaffe to Joe Flanagan.

MR. SCET: If you want to do that, why can't we reaffirm the resolution of last year?

MR. FLANAGAN: I would back up that suggestion, and if necessary, withdraw the remarks I made earlier. That last year's resolution is a highly specific resolution. It doesn't express a hope. I am in full accord with anything that would bring back into effect the meetings that we used to have and possibly with a broadening to some other organizations as Mr. Yaffe indicated.

MR. COLEMAN: You are in favor of reaffirmation of last year's resolution?

MR. FLANAGAN: Yes.

COL. DEHNE: There was that question of a single conference. I believe they are still debating that there be two conferences at the same place at probably the same time, so that the resolution could be amended slightly, last year's resolution, it wouldn't be reaffirming that resolution but should be amended. I second it.

CHAIRMAN COLEMAN: With the slight modifications.

DR. EINERT: Could we possibly take the resolution that the committee had and, instead of saying that we meet together and then saying, therefore be it resolved that this association affirms the intent of last year's resolution for coordination with other groups?

MR. SOET: It seems to me we are getting terrifically involved here, and if it is the intent of this organization to follow in the spirt of last year's resolution in the major part, I should think that we would just accept it as it was last year and reaffirm this whole thing and simplify it. What it really is, is an attempt to work towards a solution, apparently. to bring these organizations together in some way again. That's what this organization wants. I don't know how many people want this. If they want this, it would seem the best way to do it is just to reaffirm what was said last year.

CHAIRMAN COLEMAN: That's taken along with the other recommendations in this discussion. I think, first of all, we will have to act upon this resolution proposed here by vote. Following this discussion which has taken place we will put the present Resolution #5, which our Chairman has just read, to a vote. Those in favor please raise their hand.

MR. SOET: This is the first resolution that came up now?

CHAIRMAN COLEMAN: Which was read. Those in favor. Those opposed. The motion fails. It has been moved that we reaffirm last year's resolution with slight modification. We will have to put those modifications in if we wish any. Do we have a discussion on reaffirmation of last year's motion?

COL. DEHNE: I will so move.

MR. FLANAGAN: I will second the motion.

CHAIRMAN COLEMAN: Any discussion on that?

MR. TUBICH: Is this to be with modifications or as is?

CHAIRMAN COLEMAN: This is the discussion. We will decide that during the discussion.

A MEMBER: Do you want to make your amendment and changes now?

MR. YAFFE: Speaking as a member, could I suggest that we adopt the following resolution, that the first resolution which was adopted at last year's conference be reaffirmed by this year's conference and transmitted to all interested organizations. Let them know we are still interested in it.

A MEMBER: To all interested organizations and not just the ones that were listed last year.

MR. FLANAGAN: With or without modification?

CHAIRMAN COLEMAN: That's been moved. Is there a second to that proposal?

MR. SOET: I second it.

CHAIRMAN COLEMAN: Is there any discussion?

A MEMBER: Which motion are we considering now?

CHAIRMAN COLEMAN: Reaffirmation. The one Pete read.

A MEMBER: I'm confused. If Tubich made a motion, how can we have another motion up for consideration now?

CHAIRMAN COLEMAN: We are already voting on that.

MR. YAFFE: I just confirmed what George made the motion on.

MR. FLANAGAN: We will have two conferences at the same time at the same location.

CHAIRMAN COLEMAN: That is not in this motion. Is there any discussion on the straight affirmation and sending that to the interested agencies?

DR. WILSON: That's not just what he said. He said all interested organizations.

CHAIRMAN COLEMAN: That's what I said.

DR. WILSON: You said listed organizations.

CHAIRMAN COLEMAN: No, I said interested organizations.

We will take a vote. Those in favor. Opposed. The motion is carried.

MR. COUCHMAN: On behalf of the Resolutions Committee I would like to say that the membership body present here today did exactly what we thought would happen and what would liven the discussions up on the resolutions.

Is there some other resolution which should be considered in the light of the one that was just passed and suggested? It's a little late to consider such a thing, but we don't want anyone to go away from here without having voiced their opinion on it. If not, we should go to the next resolution.

Resolution #6

"WHEREAS the American Conference of Governmental Industrial Hygienists is now well into its third decade, and

"WHEREAS an increasing number of active members is arriving at an age where their retirement becomes mandatory, and

"WHEREAS these members may have a further contribution to make to the association and to the field of occupational health in their retirement years, therefore

"BE IT RESOLVED that the officers of the American Conference of Governmental Industrial Hygienists be instructed to consider developing method and criterion for a life membership to which retired members might be eligible."

I move that this resolution be adopted.

CHAIRMAN COLEMAN: Do we have a second to this resolution?

DR. REINDOLLAR: Second the motion.

CHAIRMAN COLEMAN: All in favor. Opposed. The motion is carried.

MR. COUCHMAN:

Resolution #7

"WHEREAS a Conference such as this entails tremendous effort and

"WHEREAS members of all local sections of the American Industrial Hygiene Association have spared no effort to make the Conference a pleasant and effective occasion, therefore

"BE IT RESOLVED that the American Conference of Governmental Industrial Hygienists tender to them a special token of appreciation for their outstanding achievements and that the Secretary be instructed to forward this resolution to the Chairmen of the respective local sections of the American Industrial Hygiene Association and to the Commissioner of Health of the State of Michigan and the City of Detroit."

I move that this resolution be adopted.

MR. SOET: What do you mean by special token?

MR. COUCHMAN: A letter of appreciation.

MR. SOET: A letter of appreciation?

MR. COUCHMAN: Yes.

CHAIRMAN COLEMAN: Is that an amendment? Do we have a second to the motion?

MR. FLEMING: Second the motion.

CHAIRMAN COLEMAN: Any discussion? All in favor. Opposed. The motion is carried.

MR. COUCHMAN: We have something else that was thrown in the hopper at the last minute.

Resolution #8

"WHEREAS the success of the American Conference of Governmental Industrial Hygienists depends very heavily upon the Public Health Service member elected to the office of Secretary-Treasurer, and

"WHEREAS this position has been largely responsible for the expansion of intersociety relationships and professional prestige of this association and

"WHEREAS there have been only three Secretary-Treasurers with multiple years of service in the organization's history and

"WHEREAS Mr. C. D. Yaffe, otherwise affectionally known as "Pete", has for the past six years carried this workload to the lasting benefit of the association, and

"WHEREAS his personal characteristics have endeared him to the membership and

"WHEREAS he is ineligible for re-election, therefore

"BE IT RESOLVED that the membership express its sincere thanks to Pete Yaffe for his dedicated and effective stewardship and extend its best wishes for happiness in his new assignment and

"FURTHER BE IT RESOLVED that at an early date the Chairman cause a plaque bearing a suitable inscription to be prepared and presented as a token of our lasting esteem and friendship."

I move that this be accepted.

CHAIRMAN COLEMAN: Do we have a second on that?

DR. FREDRICK: I second the motion.

CHAIRMAN COLEMAN: Let's have a rising vote of all those in favor.

(The motion was carried.)

MR. YAFFE: Mr. Chairman, I don't think the treasury can afford a plaque.

CHAIRMAN COLEMAN: We'll get that.

MR. COUCHMAN:

Resolution #9

"WHEREAS the success of the American Conference of Governmental Industrial Hygienists depends very heavily upon the Public Health Service member elected to the office of Secretary-Treasurer, and

"WHEREAS this position has been largely responsible for the expansion of intersociety relationships and professional prestige of this association and

"WHEREAS there have been only three Secretary-Treasurers with multiple years service in the organization's history, and

"WHEREAS for a period of five years Mr. J. E.Flanagan discharged with energy and enthusiasm the duties of this office until he became ineligible and

"WHEREAS on this occasion the association once more is aware of his long and continuing contribution, therefore

"BE IT RESOLVED that the membership again express its thanks and

"BE IT FURTHER RESOLVED that at an early date the Chairman cause a plaque bearing a suitable inscription be prepared and presented to Mr. Joseph Flanagan in appreciation of his outstanding services."

I move that this be accepted.

DR. COOPER: I second it.

CHAIRMAN COLEMAN: Any discussion? All in favor. Opposed. The motion is carried.

MR. COUCHMAN:

Resolution #10

"WHEREAS the success of the American Conference of Governmental Industrial Hygienists depends very heavily upon the Public Health Service member elected to the office of Secretary-Treasurer, and

"WHEREAS this position has been largely responsible for the expansion of intersociety relationships and professional prestige of this association and

"WHEREAS there have been only three Secretary-Treasurers with multiple years service in the organization's history and

"WHEREAS Mr. J. J. Bloomfield discharged these duties during the formative years of this association with exceptional vigor, devotion and vision, and

"WHEREAS the effect of his deep insight to the future horizons is still bearing fruit both within and outside the organization and

"WHEREAS through his many promotions he has steadfastly continued his interest in this association and

"WHEREAS on this occasion the association is once more aware of its obligation, therefore

"BE IT RESOLVED that the membership again express its thanks and

"BE IT FURTHER RESOLVED that at an early date the Chairman cause a plaque bearing a suitable inscription be prepared and presented to Mr. Jack Bloomfield in appreciation of his outstanding services."

I make a motion that this resolution be adopted.

DR. REINDOLLAR: I second the motion.

CHAIRMAN COLEMAN: Any discussion? Those in favor. Opposed. The motion is carried.

Make sure the applause and registered vote is recorded.

The second item on the agenda is our Program Chairman for next year, Mr. Schall, if he will step forward and name his committee.

MR. E. LYNN SCHALL: The Program Committee for next year will consist of Miss Irene Courtenay, Dr. Mitchell Zavon, Dr. Irma West, Mr. Jesse Lieberman, Mr. Norman Schell, Mr. Carl Jensen, Mr. Robert Keenan, and Dr. Ralph Smith.

I would like to ask that as many of those people that are present and can, will you please meet with me in the back of the room for a minute following this session. We would like to make arrangements for another meeting either late today or tomorrow when we can get started on next year's program.

CHAIRMAN COLEMAN: I guess the next thing on the program is old business. Is there any old business for discussion? Nothing old? Is there anything new? Any new business for discussion?

I am not going to prolong this. I can turn this chair over to the next year's Chairman just as soon as I am sure there is no new business. I thought there would be other things on the agenda. Other discussions have been so active at this year's meeting. If not, I want to express my feelings about being Chairman not only for one year but for two years. May be that's why I particularly enjoyed it, and especially this year, because I thought there couldn't be a third year, and at this time I am pleased to turn the chairmanship over to next year's Chairman, Dr. Wilson, who, as all of you know, has developed a magnificent program this year. It was largely attended and I think the enthusiasm of the audience, participation and discussion was outstanding, and I think if anybody has it in their mind that this idea is on a down trail trend they had better attend a few more meetings and see what's going on and get back into the spirit of things.

DR. WILSON: Mr. Chairman, I move we adjourn.

CHAIRMAN COLEMAN: From this moment on with pleasure I turn over the chairmanship to you.

DR. EINERT: If we are not adjourned, may we express our thanks to the ex-chairman?

MR. COUCHMAN: I would further suggest, Mr. Chairman, that we give a rising vote of appreciation for the two years that Al Coleman has served us so faithfully.

DR. WILSON: Ladies and gentlemen, there is no further business as far as the new Chairman is concerned. If anyone objects, just remain as the meeting now closes.

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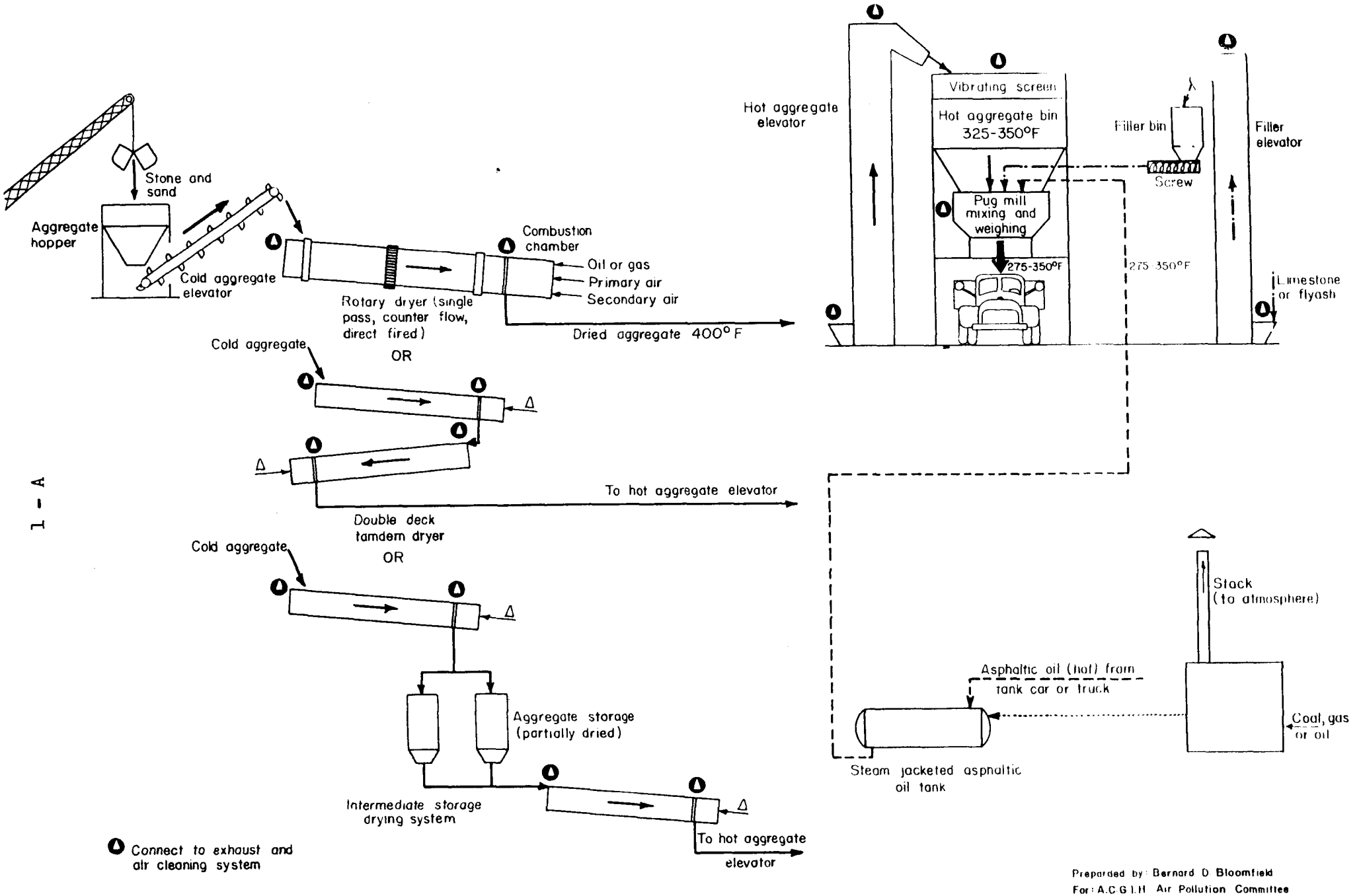

1 - A

Prepared by: Bernard D Bloomfield
For: A.C.G.I.H. Air Pollution Committee
Date: February 2, 1959

FLOW DIAGRAM OF ASPHALT (PAVING) PLANT OPERATIONS

ASPHALT PLANT FLOW SHEET

I. DESCRIPTION OF PROCESS

The aggregate components are dried in oil or gas fired rotary dryers. Single dryer capacities usually range from 60 to 160 tons per hour in batches of from 2500 to 6000 pounds (90 lbs. per cubic foot). Control of dryer is commonly limited to heat input, speed of rotation and exhaust rate being constant. The dried aggregate is elevated to screening equipment from where it is deposited into the hot aggregate bin and finally into the mixing unit where hot asphaltic oil is introduced.

COMPOSITION OF ASPHALTIC CONCRETE
(% by weight)

Materials	Binder Course	Wearing Surface	Low Grade Paving Mix
Stone, slag or gravel	45 - 75(1)	45 - 65(2)	45 - 70
Sand (#10 sieve)	20 - 40	20 - 40	20 - 55
Mineral filler (limestone, flyash or Portland Cement)		5 - 10	5 - 10
Asphaltic oil	4½ - 8	4½ - 8	4 - 6
Moisture	≤ 0.2	≤ 0.2	≤ 1.0

(1) To 1½" size
(2) To 3/4" size

II. EFFLUENTS FROM PROCESS--BEFORE AND AFTER CONTROL

Pollution sources include rotary dryers, transfer points, bucket elevators, screens, weighing-mixing operation and sometimes the boiler facility. Dust loading from plant function of many variables. Estimate for preliminary calculation purposes is 40 grains per cubic foot (s.c.f.) 30-40% from dryer. Flow rate to air cleaning equipment ranges from 75 to 225 SCFM per ton (production) per hour with about 75% of this flow from the rotary dryer.

Total dust loading from dryer (both ends) ranges from 7 - 25 grains per cubic foot. Use of a primary centrifugal cleaner cuts loading to secondary collector to 2 - 15 grains per cubic foot. Medium to high efficiency cyclone will limit this loading to a range of from 2 - 4 grains per cubic foot.

III. VENTILATION CONTROL POINTS

A. Dryer

Exhaust from combustion and charging end. Exhaust rate from latter is function of products of combustion and secondary air volume. The secondary air volume is not only for combustion purposes but for conveying dust from dryer. Temperature of exhaust gas usually 150-375° F.

B. Elevator

1. Hot aggregate unit

Exhaust from both take-off points indicated. Upper take-off should readily accommodate hot gas load so as to minimize possibility of condensation on aggregate.

2. Filler unit

Flyash or limestone fines easily captured. Can create severe pollution problem if exhaust not provided.

C. Screens

Require exhaust ventilation from top deck cover. Cover frequently flat type and not as satisfactory as enclosing hood type.

D. Weighing and Mixing

Complete enclosure of operation with exhaust volume based on net area of opening is most satisfactory control procedure.

IV. AIR CLEANING EQUIPMENT

Operation	Dry Centrifugal	Wet	Fabric
Dryer(1)	Preliminary cleaning only	Some types used successfully	Unsatisfactory due to condensation factor
Elevators	Unsatisfactory because of collection efficiency	Some types used successfully	Satisfactory, but temperature control may be required on hot aggregate exhaust
Screens	Unsatisfactory because of collection efficiency	Some types used successfully	Satisfactory
Weighing & Mixing	Unsatisfactory because of collection efficiency	Some types used successfully	Satisfactory

(1) Reverse jet fabric collector has been applied to third dryer system illustrated where two-stage drying and intermediate storage used. Applied to second dryer where high percentage of fines obviated use (by test) of wet collection equipment. Temperature control requirements extremely critical and considerable operational difficulties experienced due to plugging.

NOTE: Electrostatic precipitator not commonly used.

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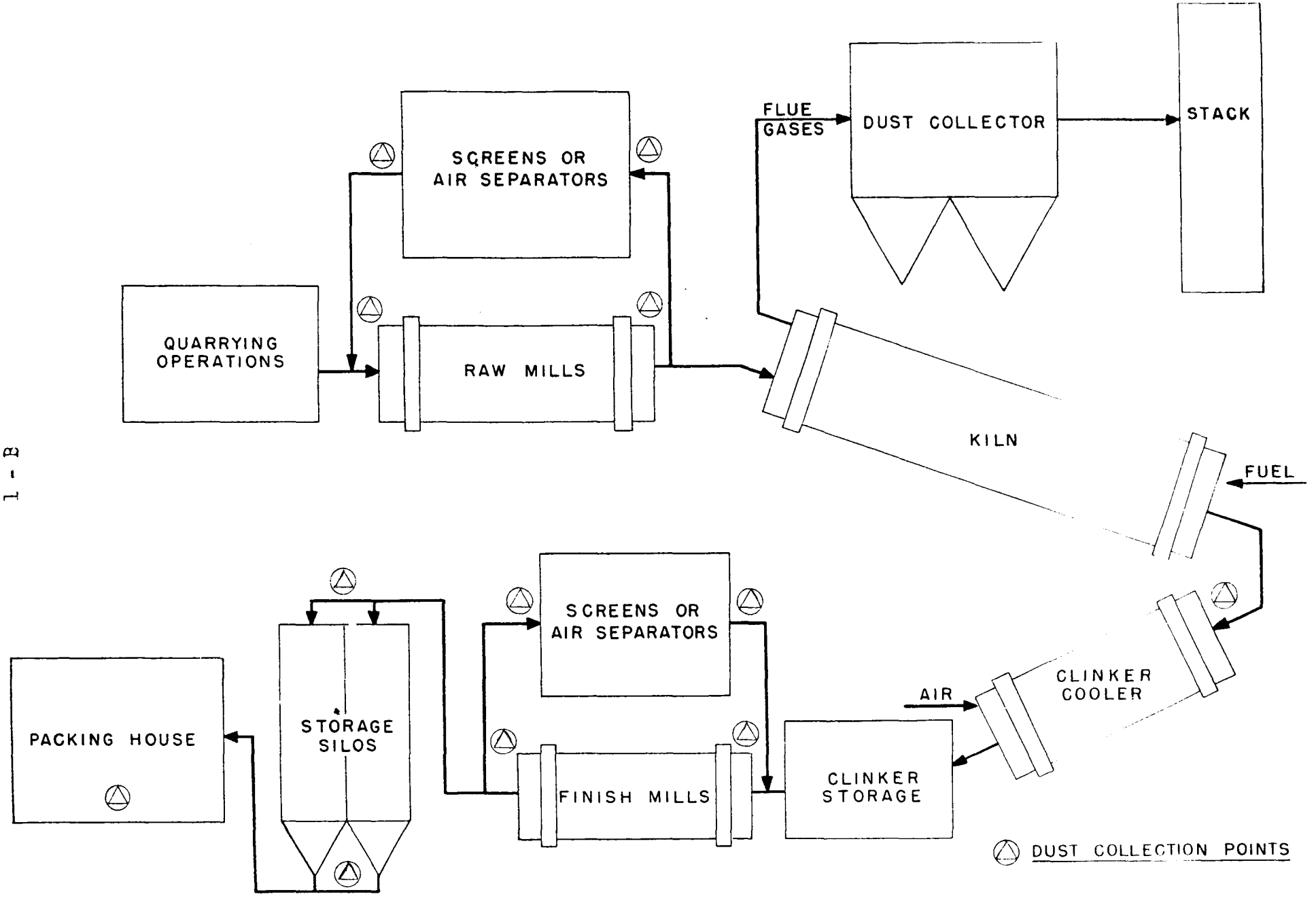

1 - B

FLOW DIAGRAM OF CEMENT PLANT OPERATIONS

Prepared by: George W. Walsh &
Arthur C. Stern
For: ACGIH Air Pollution Com.

Date: August 1960

CEMENT PLANT FLOW SHEET

I. DESCRIPTION OF PROCESS

Calcareous materials, such as limestone, and argillaceous materials, such as clay - both of which may occur together in nature as cement rock - are finely ground together to intimately mix them. In the wet process they are ground and stored as a slurry with water; in the dry process they are ground and stored dry. The slurry or dry powder is passed through a kiln having a maximum temperature of from 1400 to 1600°C., which fuses the mixture into balls generally under 1" in diameter, known as clinker. Clinker is mixed with up to 3 percent of gypsum, finely ground, stored and packed into bags or bulk shipping vehicles.

COMPOSITION OF CEMENT
(% by Weight)

Material	as	Range
Lime	CaO	60-65
Silica	SiO_2	20-25
Alumina	Al_2O_3	5-10
Iron	Fe_2O_3	1-5
Magnesia	MgO	1-5
Sulphur	SO_3	1-2

II. EFFLUENTS FROM PROCESS--BEFORE AND AFTER CONTROL

Kiln flue gases, the so-called "high level" source are generally discharged from a tall stack at high temperature (400-700°F.). They carry from 3 to 5 percent of raw material as dust. Dust loadings before control range from 2 to 12 grains per cubic foot at duct conditions. New plants are being designed for dust loadings after control below 0.1 grains per cubic foot at duct conditions.

Other so-called "low level" sources are generally discharged nearer ground level and at ambient or moderately elevated temperatures (150-200°F.). Low level sources are handled in separate exhaust systems for different materials and particle size ranges. Raw and finished materials, coarse and fine materials are segregated so that each may be returned to process at the appropriate point. Inlet loadings are in the following ranges:

	Temperature °F.	Dust Loading Grains/Cu.Ft.
Materials Handling Exhaust Systems	50-100	5-10
Air Separator Vents	150-200	75-250

III. VENTILATION CONTROL POINTS--LOW LEVEL SOURCES

1. Raw and Finish Mills

   Wet process requires dust control only at mill feeders; dry process requires hooding and exhaust ventilation at bins, mill inlets and outlets, screens, and all material transfer points. Air separators are vented to dust collectors. Vacuum cleaning systems needed for spills and leaks.

2. Storage Silos

   Pneumatic transport system air vented to dust collector. Silos under negative pressure. Vacuum cleaning system needed for spills and leaks.

3. Packing House

   Bag filling machines for self-closing bags and bag conveyor require special treatment.

4. Clinker Cooler

   Several designs in use. Advantage must be taken of thermal head of heated air in designing hoods and enclosures.

IV. AIR CLEANING EQUIPMENT

	Operation	Dry Centrifugal	Wet	Fabric	Electrostatic
1.	Kilns	Preliminary Cleaning Only	Impracticable	Siliconized Glass successfully used	Many successful installations
2.	Raw Mill-Dry Process	Unsatisfactory because of collection efficiency	Practicable	Many successful installations	Practicable
3.	Finish Mill	Unsatisfactory because of collection efficiency	Not applicable	Many successful installations	Practicable
4.	Storage Silos	Unsatisfactory because of collection efficiency	Not applicable	Many successful installations	Practicable
5.	Packing House	Unsatisfactory because of collection efficiency	Not applicable	Many successful installations	Practicable
6.	Clinker Cooler	Many successful installations	Not applicable	Practicable	Not commonly used

V. SUGGESTED REFERENCE SOURCES

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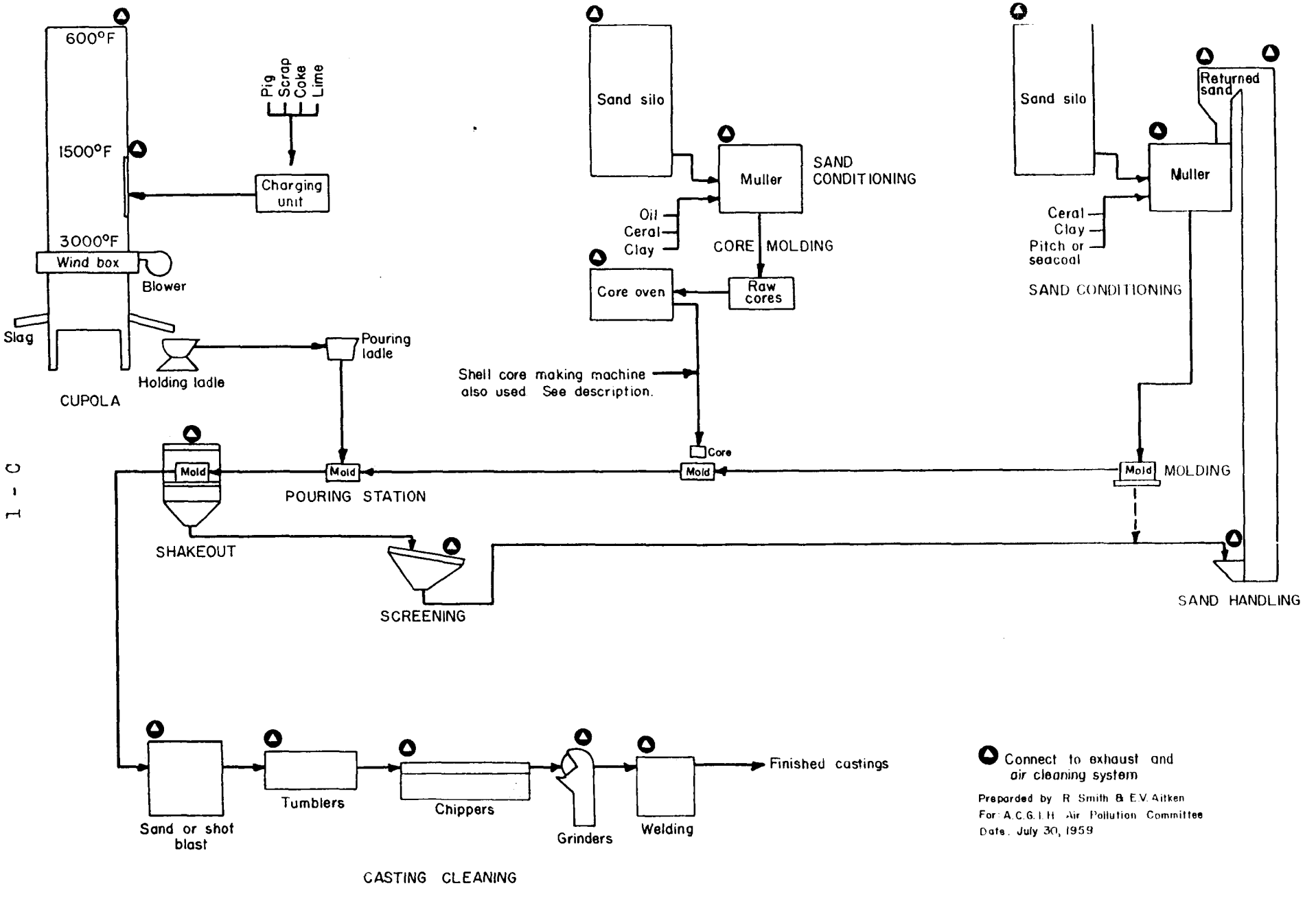
4. "Southwest Portland Filters Hot Kiln Gases in Glass Cloth Bags," Pit & Quarry, 51, No. 4, 80-83, October 1958.

5. Plass, R.J., and Haaland, H. H., "Electrostatic Precipitators," Rock Products, 61, July 1958, 104, 105, 108, 110, 136, 138, 140.

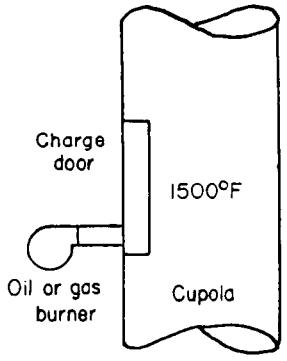


1 - C

FLOW DIAGRAM OF FERROUS FOUNDRY OPERATIONS

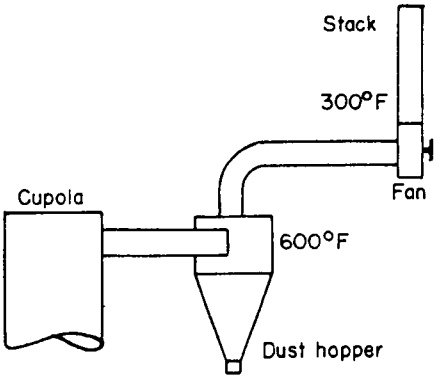
I LOW EFFICIENCY OR PRELIMINARY CONTROL EQUIPMENT

CARBON MONOXIDE GAS IGNITER



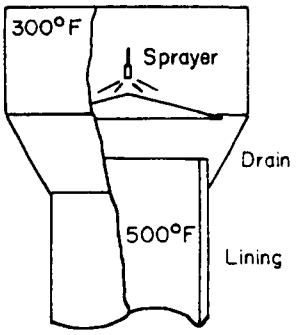
Offers more complete combustion but does not control particulates emitted.

SIMPLE CYCLONE



Efficient for large particles only

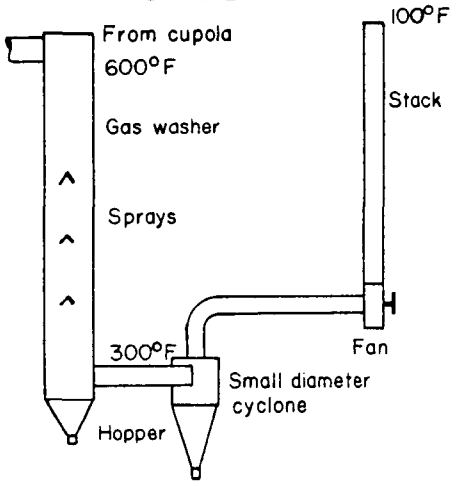
WET TOP STACK WASHER



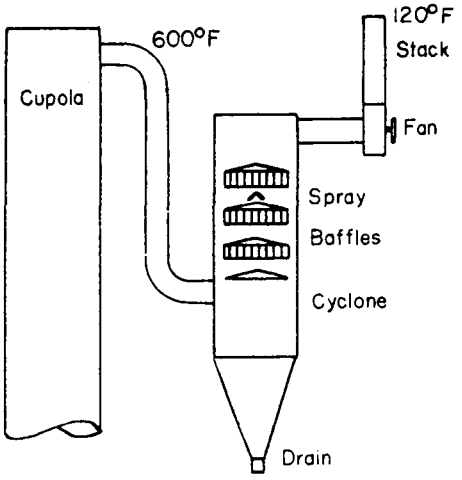
Positive pressure created may cause gases to escape through charge door. Heavy vapors emitted.

II WET OR DRY INERTIAL COLLECTORS

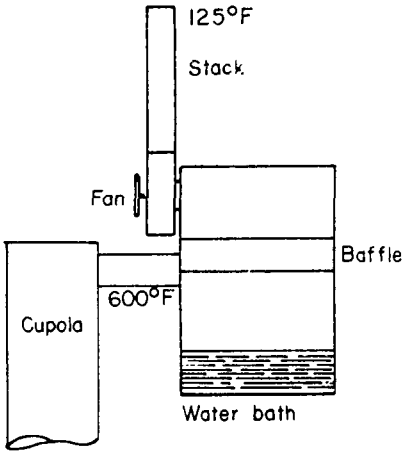
DRY INERTIAL



WET CENTRIFUGAL

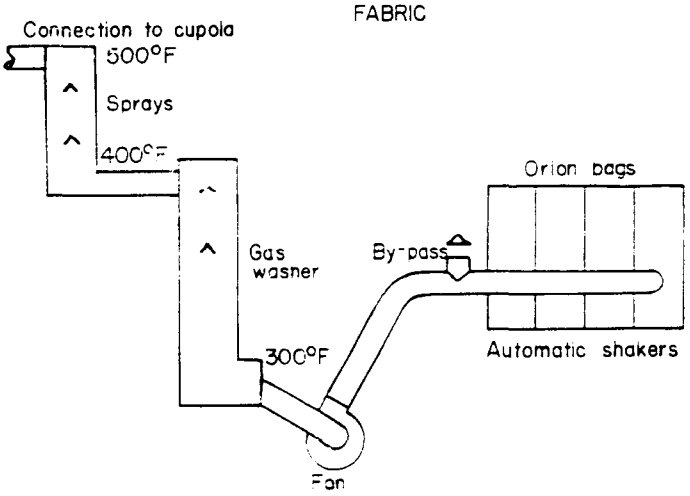


ORIFICE SCRUBBER

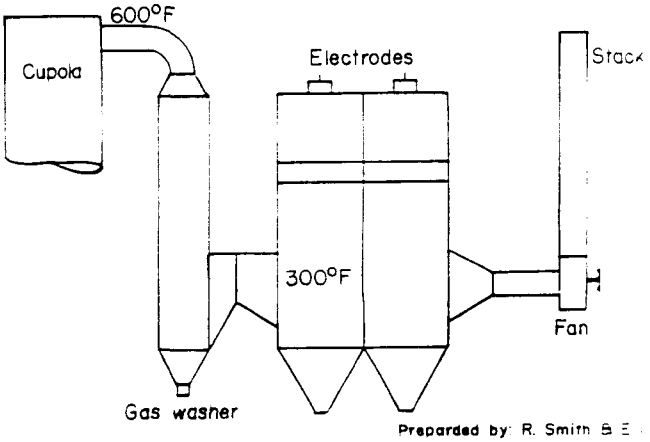


III HIGH EFFICIENCY OR ULTIMATE CONTROL EQUIPMENT

FABRIC



ELECTROSTATIC PRECIPITATOR



Prepared by: R. Smith & E. [illegible]xer
For: A.C.G.I.H. Air Pollution [illegible]ommittee
Date: July 30, 1959

CONTROL DEVICES FOR CUPOLAS

FLOW DIAGRAM OF GRAY IRON OR MALLEABLE FOUNDRY OPERATIONS

I. DESCRIPTION OF PROCESS

Raw materials consisting of scrap steel, pig iron, scrap iron, returns, sprues, risers, coke fuel, and limestone flux are weighed and charged into the cupola. The charging procedure varies dependent upon the plant size and layout. The loading is done through a charging door in the upper section of the cupola. Combustion is produced by blowing room temperature or preheated air through the tuyeres at the bottom of the furnace. The temperature of the charge is raised to about 3000 degrees F. and the molten metal drops to the bottom of the furnace where it is tapped out to a holding ladle. The slag, formed at the top of the molten metal is tapped at the rear of the furnace and is usually directed to a quenching tank. The molten metal is transferred from a holding ladle to a pouring ladle and is then poured into the sand molds.

Silica type sand, stored in bins, silos or on the floor, is transferred to mullers (mixers) where constituents such as water, clay, pitch, cereal and other binders are added to make the mold making sand. The sand is then conveyed to the mold making stations where manual or mechanical molding procedures are employed. Core sand is a similar mixture made up in a mixer and contains oil in place of water. The cores are baked in an oven where they harden.

Core baking is commonly done as a batch process and the core oil breakdown products consisting essentially of a crolein are emitted at a rate of about 6 lb. of core gas per gallon of core oil used. This is in addition to products of combustion of the fuel used.

An alternative core making procedure, the shell core process is being installed in many foundries. A resin such as phenol-formaldehyde is mixed with a pure silica type sand and made to coat the sand in either the hot or cold or dry coating process. The resin-sand mix is then blown into a hot metal mold, the resin polymerizes and a finished core or core segment is produced. Contaminants include resin and silica dusts inherent to the resin sand handling and mixing and phenol and formaldehyde. Another core making procedure, which like the shell core process obviates the need for a baking oven, is the CO_2 process.

The hot metal volatizes the remaining binder and the sand will crumble when the casting is shaken out. Molds and cores are made to compressing sand against a pattern. The pattern is removed and the molten metal is poured into the empty spaces between the mold and core.

After the castings are poured, they are shaken out, usually while hot on a vibrating grate by dumping or by hand to separate the sand from the casting. The steam emission together with the elevated temperature of the gas stream makes the use of fabric type air cleaning equipment extremely difficult because of the condensation and plugging problem. The sand is screened and then returned to the system for reconditioning. Core removal may occur during shakeout or may be accomplished by pneumatic drill or by hydroblast.

The castings are sent to an area where the sprues and risers are cut off. The surface of the castings are shot blasted or tumbled to remove the sand sticking to the castings. Rough spots are chipped and ground. The castings are then inspected and finally shipped out.

II. CONTROL OF OPERATIONS

A. Cupola

While stack discharges are dependent in part on furnace operation, the discharge cannot normally be brought within the satisfactory limits by ordinary operating procedures. The amount of particulates discharged has been found to be 1 - 2% of the combined process weight of coke, metal, and limestone, or 20 pounds per ton of metal melted, or 1 - 2 pounds per 1000 pounds of gases. The average cupola in the United States melts 5 tons per hour. Cupolas in the range of 5 - 6 feet in diameter, melting approximately 15 tons of metal per hour will require about 62,500 cubic feet per minute of air at an average temperature of 1200 degrees F. The air requirements of other cupolas will vary according to their size. This may be decreased by reducing the size of the charging door. The temperatures of the discharged gases vary from 500 - 1200 degrees F, depending upon the stack height and the amount of infiltered air.

B. Core Oven

Proper control of combustion for smoke. This may also be a potential odor source of a minor nature.

C. Sand Handling - Shakeout - Metal Cleaning

Local exhaust systems installed to handle in-plant problems can cause air pollution nuisance if local exhaust effluents are not controlled.

III. AIR CLEANING EQUIPMENT

Operation	Cyclone	High Efficiency Cyclone	Wet	Fabric
Shakeout Dusts, sand, & steam	Preliminary cleaning only	Not often used Plugging problem	Satisfactory	Possible plugging due to moisture
Sand Handling Dust	Preliminary cleaning only	Satisfactory occasional use	Satisfactory	Satisfactory Less common use
Mulling	Preliminary cleaning only	Satisfactory Occasional use	Satisfactory	Never
Casting Cleaning Fine abrasive dust	Preliminary cleaning only	Not often used	Satisfactory	Satisfactory Usual
Cupola Cinders, dust, smoke, oxides, carbon monoxide	Preliminary cleaning only	Occasional use Low Cost. 75% efficiency Will not meet rigid codes. Requires gas conditioning. May plug up.	Frequent Use % of control depends upon type or design. Maintenance problems. High cost for more efficient units.	Occasional use Ultimate control. Will meet L.A. Code. High bag life. High cost. Gas have to be conditioned to 500° F.
Electric Arc Furnace Oxides used mainly in steel foundries	Unsatisfactory	Preliminary cleaning only	High efficiency types successful	Satisfactory

Electrostatic Collectors - Practical for cupola operation. Not often used. Will meet L. A. and other rigid codes. Installations are expensive.

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5 - Kane, "Available Control Equipment for the Foundry Cupola and Their Performance, Operation, and System Characteristics", presented AFS Annual Meeting, May 7, 1956.
6 - Grindle, "The Cupola Emission Problem and Its Solution", presented Semi-Annual Meeting APCA, Harrisburg, Pennsylvania, September 25, 1953.