

FILE NAME: Oil Industry and American Petroleum Institute (API)

DATE: 1958 Nov 10

DOC#: API041

DOCUMENT DESCRIPTION: Minutes from API Medical Advisory
Committee Meeting with Attachments

FOR COMMITTEE USE ONLY

NOT FOR PUBLICATION

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

Twenty-Sixth Meeting
November 10, 1958
Parlor A, Conrad Hilton Hotel
Chicago, Illinois

MEMBERS PRESENT:

V. C. Baird, M. D., Chairman
J. W. Osborn, M. D., Vice Chairman
C. R. Miller, M. D., Secretary

F. F. Boys, M. D.
Richard Call, M. D.
L. E. Curtis, M. D.
Kieffer Davis, M. D.
R. E. Eckardt, M. D.
K. R. Fourcher, M. D.
T. M. Frank, M. D.
J. H. Hege, M. D.
C. H. Hine, M. D.
T. J. Kelly, M. D.

E. K. Linder, M. D.
T. H. Mitchell, M. D.
M. N. Newquist, M. D.
R. C. Page, M. D. (Represented
by Frank Born, M. D.)
B. B. Reeve, M. D.
J. C. Ruddock, M. D.
George M. Saunders, M. D.
Ralph Schneider, M. D.
Leo J. Wade, M. D.

TECHNICAL ADVISORS PRESENT:

R. D. Bent
C. T. Brown
H. W. Gerarde, M. D.
N. J. Gothard
P. D. Halley
J. W. Hammond
N. V. Hendricks
P. K. Kuhne

L. Mittelman
A. C. Pabst
T. B. Rendel
L. E. Renes
F. J. Sanders
Jack Spence
George Wilkening

MEMBERS ABSENT:

W. O. Armstrong, M. D.
Lamson Blaney, M. D.
J. W. Crookshank, M. D.
F. D. Gassaway, M. D.

R. Emmet Kelly, M. D.
E. P. Luongo, M. D.
B. S. Miller, M. D.
R. J. Potts, M. D.

OTHERS PRESENT:

R. G. Birrell, M. D.
Dr. Philip Drinker (Consultant)
E. O. Mattocks
Byron J. Olson, M. D.
John Post
R. L. Savage
D. T. Staples
D. V. Stroop

- Imperial Oil Limited
- Harvard University
- American Petroleum Institute
- Public Health Service
- Continental Oil Company API 07379
- Aramco
- Tidewater Oil Company
- American Petroleum Institute

I. OPENING REMARKS

The chairman welcomed all those present. He especially welcomed Mr. D. T. Staples, Chairman of the Medical and Health Committee of the Board of Directors. The chairman also introduced and welcomed R. G. Birrell, M. D., Imperial Oil Limited; Byron J. Olson, M. D., U. S. Public Health Service; John Post, Continental Oil Company; and Phillip Drinker, Harvard University. The chairman took this opportunity to welcome Mr. Stroop and to again thank him for his contribution to the Medical Advisory Committee and its work.

II. MINUTES OF TWENTY-FIFTH MEETING

The minutes of the twenty-fifth meeting, held in Haddon-Hall, Atlantic City, New Jersey, April 21, 1958, were distributed with a letter dated June 6, 1958.

ACTION: It was regularly moved, seconded, and unanimously passed that the minutes be approved as distributed.

III. PRESENTATION OF CERTIFICATE OF APPRECIATION

Mr. D. T. Staples, Chairman of the Medical and Health Committee, presented a Certificate of Appreciation to R. E. Eckardt, M. D. for his outstanding contributions to the Medical Advisory Committee.

IV. SUBCOMMITTEE REPORTS

A. Operating Subcommittee

V. C. Baird, M. D., Chairman of the Operating Subcommittee, reported the actions of this group at their meeting on November 8, 1958. The minutes of this meeting are attached as Appendix A.

ACTION: It was regularly moved, seconded, and unanimously passed that the report of the Operating Subcommittee be accepted and its actions approved.

B. Program Subcommittee

E. K. Linder, M. D., Chairman of the Program Subcommittee, reported that a round-table discussion was scheduled for the afternoon following the Medical Advisory Committee meeting. His report is attached as Appendix B.

ACTION: It was regularly moved, seconded, and unanimously passed that the Program Subcommittee's report be adopted.

C. Subcommittee on Atmospheric Pollutants

J. C. Ruddock, M. D., Chairman of the Subcommittee on Atmospheric Pollutants, reported on the activities of his group. Dr. Ruddock's report is included as Appendix C and the Minutes of the Subcommittee on Atmospheric Pollutants meeting, held November 8, 1958, is included as Appendix D.

Dr. Ruddock informed the group that the Los Angeles Air Pollution Control District had proposed order #62 which would reduce the maximum sulfur content in fuel to 0.5%. His subcommittee had prepared a statement which they hoped would be approved as the API's position in this matter. Dr. Ruddock indicated that

that this statement had been presented to the Smoke and Fumes Committee for their consideration. This group wholeheartedly endorsed the proposed statement. Several changes were suggested in the proposed statement. The proposed statement is shown as Appendix E.

ACTION: It was regularly moved, seconded, and unanimously passed that the modified statement presented by the Subcommittee on Atmospheric Pollutants be approved and submitted to the Medical and Health Committee for their consideration.

D. Subcommittee on C₉ - C₁₂ Aromatics

Kieffer Davis, M. D., Chairman of the Subcommittee on C₉ - C₁₂ Aromatics, reported on the activities of his group and the investigation being conducted by C. A. Nau, M. D., at the University of Texas. Dr. Davis' report is attached as Appendix F.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be approved.

E. Subcommittee on Carcinogenicity

R. E. Eckardt, M. D., Chairman of the Subcommittee on Carcinogenicity, reported on the activities of his Subcommittee. His report is given in Appendix G.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

F. Subcommittee on Dermatology

Leo J. Wade, M. D., Chairman of the Subcommittee on Dermatology, reported the activities of his Subcommittee. His report is given as Appendix H.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be adopted.

G. Subcommittee on Economic Poisons

J. W. Osborn, M. D., Chairman of the Subcommittee on Economic Poisons, reported on the activities of his Subcommittee. The minutes of the meeting of this subcommittee are given as Appendix I.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be adopted.

H. Subcommittee on Medical Policies and Practices

API 07381

Ralph Schneider, M. D., Chairman of the Subcommittee on Medical Policies and Practices, reported on the activities of his group. His report is attached as Appendix J. Attached to the report of this Subcommittee is a draft statement of "Guiding Principles in Regard to the Scope, Objectives, and Functions of Occupational Health Problems in Petroleum Operations." Chairman Schneider requested that each member of the Medical Advisory Committee review this carefully and submit their comments to him.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

I. Subcommittee on Physical Agents

C. H. Hine, M. D., Chairman of the Subcommittee on Physical Agents, reported on the activities of his group. A copy of his report is attached as Appendix K. The desirability of the API contributing to the work on noise research was reviewed carefully.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be adopted.

J. Subcommittee on Toxicological Reviews

H. W. Gerarde, M. D., Chairman of the Subcommittee on Toxicological Reviews, presented his report which is attached as Appendix L.

ACTION: It was regularly moved, seconded, and unanimously passed that the report of toxicological reviews be approved.

K. Subcommittee on Industrial Hygiene

Jack Spence, Chairman of the Subcommittee on Industrial Hygiene, reviewed the activities of his group. A copy of his report is attached as Appendix M.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be approved.

L. Special Ad Hoc Committee

G. M. Saunders, M. D. reported for the special ad hoc committee to determine the desirability of establishing a Subcommittee on Epidemiology. A copy of the report rendered by B. E. Bennison and G. M. Saunders is attached as Appendix N.

ACTION: It was regularly moved, seconded, and unanimously passed that the report of the ad hoc committee be accepted and that the decision as to the establishment of a Subcommittee on Epidemiology be left to the Operating Subcommittee.

V. REPORT OF LIAISON MEMBERS

A. Dermatitis Survey

No report except that covered by the report of the Subcommittee on Dermatology (Appendix H).

B. Asphalt Institute

R. E. Eckardt, M. D. reported that there was little he could do in his capacity as a liaison member with the Asphalt Institute. He requested that he be removed from this position. It was generally agreed that this problem will be left to the Operating Subcommittee.

C. Smoke and Fumes

API 07382

The report of J. C. Ruddock, M. D., liaison with the Division of Refining Smoke and Fumes Committee, is contained in Appendix O.

D. American Standards Association

Mr. Allan E. Dooley reported on the activities of ASA Z-4 (Committee on Industrial Sanitation) and ASA Z-37 (Committee on Maximum Acceptable Concentration of Toxic Dusts and Gases). His report is given in Appendix P.

Mr. N. V. Hendricks reported on the activities of ASA Z-62 (Industrial Hygiene Standards). His report is contained in Appendix Q.

E. American Medical Association

J. W. Osborn, M. D. included a report of his activities with the American Medical Association in the Subcommittee on Economic Poisons which is given in Appendix I.

F. Labeling

J. W. Osborn, M. D. has been working closely with M. D. Gjerd, Chairman of the Interdivisional Committee on Labeling, on the labeling bill proposed by the American Medical Association. There has been no meeting of this committee during the past year. A Labeling Committee meeting is scheduled during the Annual API Meeting.

G. First Aid Training

T. M. Frank, M. D. reported that the Subcommittee on First Aid of the Central Committee on Accident Prevention is working on another revision of its First Aid Manual.

H. Wax Committee

R. E. Eckardt, M. D., Chairman of the Advisory Committee to the Wax Research Project, reviewed the activities of this group. A copy of his report is attached as Appendix R.

I. Quarantine Service of U. S. Public Health Service

G. M. Saunders, M. D. was appointed recently as a liaison member of the Medical Advisory Committee to the Quarantine Service of the U. S. Public Health Service in Washington. This will provide for a quick channel for communications for rapid spread of medical intelligence which may be of great importance to those companies with international operations.

VI. 1959-1960 BUDGET

The following is a recap of the proposed budget for the 18 month period ending June 30, 1960:

Toxicology of C ₉ - C ₁₂ Aromatic Hydrocarbons	\$20,000
Treatment for kerosine ingestion in children	5,000
Research on noise in industry	7,500
Toxicological reviews	10,000
Consulting services	3,000
Administrative and meeting expense	1,500
	<u>\$47,000</u>

API 07383

ACTION: It was regularly moved, seconded, and unanimously passed that the proposed budget of \$47,000 be recommended to the Medical and Health Committee for their approval.

VII. TIME AND PLACE OF TWENTY-SEVENTH MEETING OF MEDICAL ADVISORY COMMITTEE AND ITS SUBCOMMITTEES

In accordance with the recommendations of the Operating Subcommittee, it was generally agreed that the 27th meeting of the Medical Advisory Committee and its subcommittees be held in conjunction with the meeting of the Industrial Medical Association at the Sherman Hotel in Chicago, Illinois, with the subcommittees meeting on April 24th and 25th and the main committee meeting on the 27th.

VIII. NEW BUSINESS

A. The chairman called upon G. M. Saunders, M. D. to introduce Byron J. Olson, M. D., of the Division of Epidemiology of the Quarantine Service of the United States Public Health Service, Washington, D. C.

Dr. Olson explained the operation of his department. He indicated that as a result of an International Sanitation Agreement, various countries have agreed to report the evidence of any quarantine disease of appreciable magnitude in their country. Dr. Olson hoped that by passing this information to the proper authorities in the various companies, it might be possible for them to take proper cognizance of the existence of such disease and warn their employees. Likewise, Dr. Olson hoped that any of the doctors who became acquainted with the existence of such diseases in foreign countries would report it to him immediately. The group was very appreciative of Dr. Olson's comments.

B. Report to Medical and Health Committee

A copy of the report presented to the Medical and Health Committee by V. C. Baird, M. D., Chairman of the Medical Advisory Committee, is attached as Appendix S.

E. O. Mattocks

Approved:
V. C. Baird, M. D., Chairman
1/20/59

MINUTES OF THE MEDICAL ADVISORY COMMITTEE
OPERATING SUBCOMMITTEE

November 8, 1958
Conrad Hilton Hotel
Chicago, Illinois

THOSE PRESENT:

V. C. Baird, M. D., Chairman
J. W. Osborn, M. D., Vice Chairman
C. R. Miller, M. D., Secretary
L. E. Curtis, M. D., (Past Chairman)

Members:

Kieffer Davis, M. D.
R. E. Eckardt, M. D.
H. W. Gerarde, M. D.
C. H. Hine, M. D.
E. K. Linder, M. D.

J. C. Ruddock, M. D.
Ralph Schneider, M. D.
Jack Spence
Leo J. Wade, M. D.

Visitors:

J. W. Hammond

E. O. Mattocks

D. V. Stroop

I. INTRODUCTORY REMARKS

Chairman Baird welcomed all members present and indicated that this was the first meeting of the enlarged Operating Subcommittee.

II. APPROVAL OF MINUTES

ACTION: The minutes of the April 19, 1958 meeting were approved, as distributed.

III. CONSULTANTS FEES

The desirability of establishing a standard consultants fee was reviewed.

ACTION: It was regularly moved, seconded, and unanimously passed that \$3,000 be set up in the 1959-60 budget to pay consultants fees covering a per diem and traveling expenses.

IV. EYE HAZARDS

A letter received from A. J. Pacini, M. D., relative to gathering information on the incidence of defective vision, was reviewed.

ACTION: It was regularly moved, seconded, and unanimously passed that since the API does not have, nor has it collected data on eye injury, they have nothing to offer.

V. PREPARATION OF MANUAL ON SAFE HANDLING PROCEDURES AND EMPLOYEE PROTECTION IN HANDLING RADIOACTIVE MATERIALS

The use of radioactive materials is becoming more commonplace. It appears that the Medical Advisory Committee should recognize this essential hazard.

ACTION: It was regularly moved, seconded, and unanimously passed that this subject be tabled until after the round table discussion, which is to cover this subject, is held on Monday, November 10.

VI. REPORT OF SUBCOMMITTEE

(a) Program

Some members thought it would be desirable to set up a special fund to pay top-notch speakers to come and speak to API audiences. After a great deal of discussion, it was decided that this would not be necessary at this time.

(b) Atmospheric Pollutants

A prepared statement was read relative to the application of proposed Rule #62, as applied in Los Angeles, to the maximum content of sulfur dioxide in the atmosphere. The Committee recommended that this statement be reworded, confining itself entirely to the medical aspects of the problem.

The expense account of Dr. Goldblatt has been received, but will require some deletions before it will be acceptable to the Auditing Committee. This will be worked out with the API staff, who will communicate with Dr. Goldblatt.

(c) Toxicological Reviews

It was recommended that \$10,000 be set up in the budget to pay for the work being done by Harvard University, in reviewing the revised toxicological materials. All expense statements are to be OK'd by the Chairman of this Committee and forwarded to the API staff for payment.

(d) C9 - C12 Aromatics

Chairman Davis requested that \$20,000 be placed in the budget to extend for another year the investigation for the year 1959-60.

(e) Economic Poisons

Dr. Osborn indicated that Dr. Daeschner, who was conducting the investigation, had no provision in his budget for travel. The Subcommittee on Economic Poisons would like to have Dr. Daeschner report to them in person at their next meeting.

ACTION: It was regularly moved, seconded, and unanimously passed that provision be made to provide travel funds for Dr. Daeschner.

Dr. Osborn reported that they requested \$2,500 to be given to Dr. Carl A. Nau to study the effect of kerosine on animals. This is another facet of the research in determining the best treatment for kerosine poisoning.

Dr. Osborn requested another \$2,500 item to be spent at some other institution yet to be determined, to conduct further investigation on the best treatment of kerosine poisoning cases. They would like data on at least 200 cases before drawing any conclusions.

ACTION: It was regularly moved, seconded, and unanimously passed to approve the addition of \$5,000 for further tests of kerosine poisoning.

(f) Physical Agents

Dr. Hine requested \$7,500 to support the Committee on Noise in its investigation. \$5,000 for the 1959-60 budget, and \$2,500 to be given to them as soon as possible.

ACTION: It was regularly moved, seconded, and unanimously passed to approve the addition of \$7,500 to the budget.

VII. 1959 OFFICERS

It was the concensus of those present that the current officers for the Medical Advisory Committee and its Subcommittees should be continued for 1959.

VIII. 1959 MID-YEAR MEETING

ACTION: It was regularly moved, seconded, and unanimously passed that the Mid-Year Meeting of the Medical Advisory Committee and its Subcommittees be held in conjunction with the Industrial Medical Association, Sherman Hotel, Chicago, Illinois, with the Subcommittees meeting on April 24 and 25 and the Main Committee meeting on the 27th.

IX. CERTIFICATE OF APPRECIATION

Chairman Baird announced that a Certificate of Appreciation would be awarded at the Monday meeting to Dr. R. E. Eckardt.

X. APPRECIATION

The group expressed their unanimous appreciation to the grand services rendered the Medical Advisory Committee and its Subcommittees by D. V. Stroop.

REPORT OF THE PROGRAM SUBCOMMITTEE
E. K. Linder, M. D., Chairman

The Program Subcommittee met in Private Dining Room #10, at 9:00 A. M., on November 8, 1958. The following members were present: Drs. Mitchell, Reeve, Wade, and Chairman Linder. By invitation, Mr. Mattocks joined this meeting as we wanted his views concerning any future open Medical and Health sessions at the general meetings of the API in November.

This Subcommittee recommends to the Medical Advisory Committee that we continue to hold round-table discussions for the members at every Fall meeting. We do not recommend any further open medical and health sessions for the API general meeting but suggest that we, as a subcommittee, stand ready to perform at the request of the Medical and Health Committee or the Medical Advisory Committee at any time in the future.

This Subcommittee requests the members of the Medical Advisory Committee to suggest topics as well as discussion leaders for future round-table meetings.

The round-table discussion this afternoon will be chair-manned by Dr. Schneider and his Policies and Practices Subcommittee. It is requested that all members make an effort to attend as this promises to be a very interesting discussional meeting.

REPORT OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS

J. C. Ruddock, M. D., Chairman

During the past year two meetings of your Subcommittee have taken place. The first was held in Atlantic City, New Jersey, on April 21, 1958, at which time it was announced that an agreement had been made with Dr. M. W. Goldblatt of London, England, to carry on Research Project MC-4 of the A.P.I. which carries a grant of \$20,000 allocated by the Board of Directors of the A.P.I.

In conformance with our agreement with Dr. Goldblatt, which had previously been reported to the Subcommittee, he was brought to America by this Subcommittee, arriving in New York on June 13, 1958, with his wife who acted as a secretary and co-researcher. A schedule was made up in which he was put in contact with Dr. Philip Drinker of Harvard, Mr. Scott of The Franklin Institute in Philadelphia, Dr. Fisher of the U. S. Public Health Service in Washington, D. C., Dr. Stern of the U. S. Public Health Service, and the Taft Engineering Center in Cincinnati, Dr. John Phair and Dr. Horton of the Kettering Laboratories in Cincinnati and on the West Coast he was put in contact with the Air Pollution Control Districts in both San Francisco and Los Angeles, the Stanford Research Institute, the additional work being done at the University of California under Dr. Hine, Dr. Kotin's and Dr. Middleton's works in Los Angeles, and he was briefed on the work of the Air Pollution Control Foundation in Los Angeles. Having completed this schedule, he left Los Angeles en route to England on July 14, 1958.

On October 13, 1958 there was received from Dr. Goldblatt a preliminary progress report on his work to date. This report concerns a summary of all technical data which he has been able to accumulate throughout the world on the constituents of smog that may or may not affect or become hazards to human beings or the community health. The Subcommittee unanimously approved Dr. Goldblatt's appointment to carry on Project MC-4 and are very pleased with the manner in which he intends to approach the project outlined to ultimate conclusion.

Respectfully submitted,

JOHN C. RUDDOCK, M.D.
CHAIRMAN
SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS

APPENDIX D

MINUTES OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS MEETING HELD NOVEMBER 8, 1958 IN
PRIVATE DINING ROOM 8, CONRAD HILTON HOTEL

There were present at the meeting four members of the committee with Professor Philip Drinker as a guest of the committee and also in attendance was Mr. E. O. Mattocks of the API Staff and six additional technical advisory members of the Medical Advisory Committee.

The meeting was called to order by the Chairman and the following business was conducted:

1. The minutes of the previous meeting were approved as distributed. (The previous meeting was held July 10, 1958.)
2. The Chairman submitted the first portion of Dr. Goldblatt's report on Project MC-4. The report consists of 114 pages and is a diary type of his views and impressions of his visit to the United States in June and July. Because of its length and because it is merely a recitation of mainly technical matters the committee felt that it was not ready for distribution to the Medical Advisory Committee and a motion to this effect was passed and the entire report will be circulated when received.
3. The Special Committee consisting of Dr. Clark Miller and Lee Curtis on review of Dr. Goldblatt's expense account to date reported that they now had the expense account of Dr. Goldblatt. Dr. Miller reported that there were areas of expenses that are wrongly included in this account and that they require further auditing, as well as reviews of the entire matter before a definite approval of a true account of expenses can be approved.
4. The Chairman outlined the proposed Rule 62 of the Air Pollution Control District of Los Angeles as submitted for adoption to the Board of Supervisors of Los Angeles County which would outlaw the burning of all fuel oil with exception of steamship lines, railroad lines and diesel motor vehicles which would contain more than 0.5%. It was argued that this change to fuel oil of less than 0.5% sulfur was necessary because any fuel containing more than 0.5% would be a health hazard to the citizens and plant life of the Los Angeles Basin.

The toxicity of sulfur dioxide was discussed fully by all members of the subcommittee, visitors and technical advisors and the conclusion was that a statement be prepared with regard to the health hazards which might become evident if Rule 62 is adopted by the Board of Supervisors of Los Angeles County, California.

This statement would be prepared with the help of Professor Drinker and the members of the committee and would be submitted to the Medical Advisory Committee for approval. However, prior to its approval the Subcommittee on Air Pollutants will ask the chairman to present this to the Technical and Research Division of the Smoke and Fumes Committee as a subcommittee statement. This was passed unanimously.

5. A motion was passed requesting the Medical Advisory Committee to have Report 32 (sulfur dioxide) of the Toxicological Reviews revised to date as it now contains many factual discrepancies.

6. Dr. Hine reported that the Automobile Manufacturers Association subcommittee on the effects of their pollution on health will institute steps to obtain funds for a research program on the effects of air pollutants on health.

Respectfully submitted,

API 07390

John C. Ruddock, M. D.

Chairman

Subcommittee on Atmospheric Pollutants

STATEMENT OF THE SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS ON PROPOSED RULE #62
SUBMITTED TO TECHNICAL AND RESEARCH SUBCOMMITTEE OF THE
SMOKE AND FUMES COMMITTEE OF API

The Subcommittee on Atmospheric Pollutants of the Medical Advisory Committee of the American Petroleum Institute has considered the hygienic implications of the proposed order #62 of the Los Angeles Air Pollution Control District and have studied carefully the testimony proposing its enactment as submitted by S. Smith Griswold dated October 30, 1958.

We hold that so-called fact number 5, namely that a "measured atmospheric concentration of oxide of sulfur now approaches levels which medical authorities of the board consider to be potentially harmful to the public health," is not correct, and that Dr. Chambers' supporting statements are not in keeping with medical facts. Examination of the record of SO₂ levels in the Los Angeles area over a period of years indicates that the average level rarely exceeds 0.1 ppm, a quantity so medically insignificant that it can neither be recognized by the senses nor shown to produce any medical or physiological change whatsoever.

With regard to maximum SO₂ levels which have been determined it should be realized that no first alert stage warning has been reached nor is there evidence to indicate that in any populated area this level will be attained in the future. Moreover, medical experience has shown that men have worked for years in concentrations of SO₂ above a first or second stage level with no recognized deleterious effect on health.

In the statement by Dr. Leslie A. Chambers, pages 32-38 of Griswold's proposal, there is no implication whatever that there are any data indicating adverse health conditions from present or past SO₂ concentrations in the air. The vital statistics of Los Angeles County are up to the best standards of California and of the U. S. at large, and show no disease which can be justifiably attributed directly or indirectly to SO₂ concentrations in the air.

We are thoroughly aware of Los Angeles' smog problem, but submit that all present knowledge indicates that the proposed change to fuel oil with less than 0.5% sulfur would not produce a change measurable either on mammals or on plants.

We do not feel, therefore, that the proposal on grounds of health, or comfort, is justified.

John C. Ruddock, M. D.
Chairman

APPENDIX F

REPORT OF THE SUBCOMMITTEE ON C₉-C₁₂ AROMATICS
Kieffer Davis, M. D., Chairman

The annual meeting of the API-MAC subcommittee on C₉-C₁₂ aromatics convened at 9:00 A. M., November 7, 1958, Conrad Hilton Hotel, Chicago, Illinois.

Six of the ten subcommittee members were present. Those not in attendance were Drs. Armstrong, Crookshank, Beard, and Potts. Seven visitors were present.

Dr. Carl Nau, chief investigator, reviewed in some detail the report of work accomplished since the interim meeting last April.

Highlights of the report included:

1. Acute toxicity data revealed that the comparative toxicity in the order of decreasing potency of the fractions studied are C₁₁-C₁₂, C₉-C₁₀, Benzene, and n-decane.
2. Effects on Blood. (1) Depression of total WBC and a shift in the differential count was obtained in mice and rats by exposure to benzene. (2) This effect occurred consistently only upon prolonged daily exposures to benzene. (3) No consistent change in blood pictures was produced in mice or rats exposed to C₉-C₁₀ fractions, even upon prolonged daily exposures. (4) An increase in circulating WBC and a relative increase in polymorphonuclear leukocytes was obtained by repeated skin painting with C₁₁-C₁₂ fractions.
3. Pathological Findings. (1) Quantitatively and qualitatively the visceral changes produced by C₉-C₁₀ and C₁₁-C₁₂ differed from both benzene and n-decane. (2) Evidence of lung, kidney, and liver damage was more severe and occurred much earlier with the C₉-C₁₀ and C₁₁-C₁₂ fractions. (3) As previously noted, amyloidosis in the liver and spleen is produced in mice by painting exposure to C₉-C₁₀ and C₁₁-C₁₂ fractions.

It was the recommendation of the Subcommittee that the project be continued to July 1960 along the following lines:

1. Completion of the vapor exposure experiments in rats using C₁₁-C₁₂ fraction.
2. Determination of LC-50 values on rats.
3. Experiments to evaluate possible delayed effects of C₉-C₁₂ fractions and benzene on test animals.
4. Extension of the inhalation experiments to include monkeys or dogs.
5. Determination of sub-acute toxicity at low levels (50-200 ppm) of C₉-C₁₀ and C₁₁-C₁₂ fractions.
6. Determination of sensory threshold values in man.

The subcommittee recommends that the project continue at the same tempo and that an additional \$20,000 be made available to carry on this work through the fiscal year 1959-1960.

It was the consensus of the subcommittee that, unless some unusual circumstance occurs, this project will be completed by July 1960.

This report is respectfully submitted.

API 07392

Kieffer Davis, M. D.
Chairman

REPORT OF THE SUBCOMMITTEE ON CARCINOGENICITY

R. E. Eckardt, M. D., Chairman

The Subcommittee on Carcinogenicity met on November 7 at 2:00 P. M., in Private Dining Room 8 of the Conrad Hilton Hotel, Chicago. In attendance were Dr. Hine, Dr. Newquist, Dr. Adams, and the chairman, with Dr. Horton representing the Kettering Laboratory. Twelve guests were present.

The committee heard a progress report from Dr. Horton. Dr. Horton's principal activities since the last meeting of the subcommittee have consisted of preparing the final report of the work of the Kettering Laboratory. It is anticipated that this report will be completed in advance of the July 1, 1959 deadline.

The important points in Dr. Horton's progress report are:

1. A method, utilizing trinitrobenzene, has been developed to permit the separation of benzphenanthrenes from petroleum oils. In one fraction of API-8 oil, (API 8-26-86) as much as 6% of such compounds have been found. The method will be described in full in the final report.
2. Using nickel-catalyzed hydrodesulfurization, most of the very marked promoting activities of API-89 has been demonstrated to be present in sulfur containing compounds.
3. Certain weak organic acids, constituting 3.5% of API-89, may inhibit the carcinogenic activity of the oil. These are not carboxylic acids, but may be phenolics, carbonyls, or carbazoles. They have not yet been identified.
4. Suggestive evidence has been developed linking the mechanism of action of accelerators to the properdin system. It is also possible that inhibitors of carcinogenesis may work through this system.

The Subcommittee makes the following recommendations to the Medical Advisory Committee:

1. No funds are requested for the period July 1, 1959 to June 30, 1960.
2. Dr. Kehoe be allowed to use his own discretion in providing a copy of Dr. Phair's final report to Dr. Snegineff at Harvard University. The subcommittee does not believe the report will be particularly useful to Dr. Snegineff, but if its pitfalls and limitations are pointed out, the subcommittee has no objection to Dr. Kehoe providing Dr. Snegineff a copy of it if it will be a useful teaching tool to Dr. Snegineff.

REPORT OF SUBCOMMITTEE ON DERMATOLOGY
Leo J. Wade, M. D., Chairman

Members Present:

Leo Wade, M. D.

Members Absent:

Allan Dooley

Guests:

W. L. Avrett
K. R. Fourcher, M. D.
K. G. Mackenzie
M. N. Newquist, M. D.

Attention is called to the resignation of Lamson Blaney, M. D. and Leslie Beard.

The first item of business concerned the proposed brochure and placard prepared by the staff of the Industrial Hygiene Foundation in collaboration with the API members of the joint committee (Hygiene Panel of the Lubrications Committee and the Subcommittee on Dermatology of the MAC). These two items have now the approval of this committee and the entire MAC. It is our understanding that they will be recommended to the Marketing Division by the Lubrications Committee.

Attention is called to the true magnitude of this accomplishment, assuming that it does go on to fruition. The information properly distributed should be of great value in reducing the incidence of occupational skin lesions and be of considerable public relations value to the API.

In June, a statement of Purposes and Functions of the Subcommittee on Dermatology was submitted to Dr. Val. C. Baird. A copy of this statement is attached. Unless advised to the contrary, we shall operate along the lines outlined.

The Subcommittee on Dermatology has completed previous assignments and is at the service of the MAC for any additional assignments. The present depleted membership is unaware of any profitable avenues of activity to be initiated at this time.

We request that our membership be reconstituted with four (4) physicians and two (2) technical advisors.

Whether or not the liaison committee should be continued we leave to your discretion. If desired by the Hygiene Panel of the Lubrications Subcommittee, it might remain on the organization chart for easy communication between that Subcommittee and the MAC in matters of mutual concern.

Medical Advisory Committee
of the American Petroleum Institute

Subcommittee on Dermatology

Statement of Purposes and Functions

It is the function of the Subcommittee on Dermatology to:

1. Bring to the attention of the Medical Advisory Committee as a whole any new or previously neglected information pertaining to the role of petroleum products in the causation or aggravation of skin disease, or any new information regarding skin structure and function which might be pertinent to such problems;
2. Accept such assignments as the Medical Advisory Committee may see fit to give the Subcommittee. These might include:
 - a) Collaboration with other Divisions, Committees, or Subcommittees on projects of mutual concern;
 - b) Supervision of any projected research activities pertinent to skin anatomy, physiology, or pathology;
 - c) Coordination and/or evaluation of any data regarding skin disease provided by or collected by the members of the Medical Advisory Committee.
3. Recommend to the Medical Advisory Committee as a whole any new venture or research project which the Subcommittee thinks to be of potential value to the petroleum industry in the prevention or treatment of skin lesions associated with the use of petroleum products.

REPORT OF SUBCOMMITTEE ON ECONOMIC POISONS

J. W. Osborn, M. D., Chairman

The Subcommittee met in Chicago, Saturday, November 8, from 9 A. M. to 1 P. M. with the following members and guests registered:

Members

H. W. Gerarde, M. D.
 M. N. Newquist, M. D.
 Kieffer Davis, M. D. for R. C. Cole
 J. W. Hammond
 Ralph F. Schneider, M. D.
 J. W. Osborn, M. D., - Chairman

Guests

T. M. Frank, M. D.
 L. J. Wade, M. D.
 B. B. Reeve, M. D.
 J. C. Ruddock, M. D.
 T. H. Mitchell, M. D.
 C. R. Miller, M. D.

From a prepared agenda outline, the following subjects were discussed and recommendations, requests and comments made:

I. Status of Kerosine Research Program by Dr. Daeschner at Baylor University

A. Minutes of Subcommittee Meeting with Dr. Daeschner in Houston on October 30, 1958 together with Dr. Daeschner's initial progress report dated October 26 were discussed and unanimously approved. Each subcommittee member including V. C. Baird, C. R. Miller, and E. O. Mattocks has a complete copy.

1. In summary, 19 cases in 4 months have been studied with 76 blood specimens forwarded to Dr. Gerarde's laboratory for analysis. A bibliography of 35 articles on Kerosine Poisoning has been prepared. A summary and critical evaluation of these articles plus 6 to 8 others including Dr. Gerarde's recent article submitted to, but not accepted yet by the Journal of the AMA, will be prepared. This will be available as an annotated bibliography on hydrocarbon poisoning about September, 1959 in a manner and form yet to be determined.
2. We and Dr. Daeschner expect an average of 50 cases of Kerosine Poisoning each year on which Dr. Gerarde will have significant blood samples. In order to speed up the accumulation of at least 200 such significant cases, the Subcommittee requests the sum of \$2500 for the year 1959-60 for the following purpose: To interest some other qualified clinical research group to adopt Dr. Daeschner's Protocol and submit blood samples to Dr. Gerarde.
3. The Subcommittee also requests that \$1000 from the MAC's unrestricted balance be ear-marked for travel and per diem funds immediately so that Dr. Daeschner can attend our next subcommittee meeting in Linden and Brunswick, New Jersey, and probably one or both of the 1959 MAC Spring and Fall meetings. No funds were set aside in his current 2 year grant of \$5000 for such purposes.

II. Experimental Laboratory Research on the Toxic Action of Ingested Kerosine

A. Proposal of Dr. Carl A. Nau, University of Texas, Galveston Branch

1. Dr. Nau presented to the Subcommittee in writing the results of some laboratory work he has done which concludes that Kerosine is absorbed from the gastro-intestinal tract to some degree and gets to the lungs and other tissues. The Subcommittee is well aware of this and that proponents of the "Hemotogenous Spread" theory are of the opinion that

this may be of some importance in human clinical cases. Dr. Nau proposes to complete his laboratory experiments using Kerosine with a radioactive tagged component in an attempt to determine where Kerosine is distributed after absorption from the gastro-intestinal tract.

2. The Subcommittee unanimously requests the sum of \$2500 for the fiscal year 1959-60 to support Dr. Nau's studies which he wants to start next summer (1959).

III. First Aid Measures for Persons Swallowing Petroleum Distillates

- A. The AMA Committee on Toxicology specifically advises against induction of vomiting and gastric lavage as a first aid measure. Most other organizations and publications both lay and professional disagree. This Subcommittee again advises that the MAC is not in a position to recommend any official advice in this controversy at this time, but will make another statement if and when it deems advisable.

IV. Petroleum Products Used by Themselves Alone as Economic Poisons

- A. The Subcommittee knows of no way to compile a list of such products since the API Committee on Agriculture in January, 1958 expressed its disinterest. Subcommittee members voted unanimously to drop this subject from the agenda.

V. Cooperative Clinical Project for Evaluation of Kerosine and Related Petroleum Distillate Ingestion

- A. Dr. Edward Press reputedly reported about 500 cases at American Public Health Service Meeting, week of October 27, in St. Louis. The Subcommittee chairman will try to get this report for distribution and study.

VI. National Clearing House for Poison Control Centers

- A. Medical Advisory Board...A recent monthly Bulletin of N.C.H.P.C.C. announced meeting in Chicago in October, 1958 to organize such a Board, but announcement came too late for anyone on the Subcommittee to attend. Membership can be had on this Board by writing to its chairman, a doctor in Florida. The Subcommittee authorized the chairman, Dr. Osborn, to write for more information for distribution.

VII. Subcommittee's Scope and Functions, Short and Long Range Goals

- A. Change in Name of the Subcommittee...After much discussion on what are "economic poisons", the members decided that this expression cannot be exactly defined and is too narrow in scope for our name. We unanimously voted to request the MAC to change our name from "Subcommittee on Economic Poisons" to "Subcommittee on Specialty Petroleum Products."
- B. A Preliminary Draft of the Scope and Functions, Short and Long Range Goals of the Subcommittee including its initial organizational history was discussed and revised. The final draft will be re-typed and submitted promptly to Dr. V. C. Baird. This will incorporate the new name, if approved.

VIII. Status of Hazardous Substances Labeling Legislation

- A. Since the reports contained in the 25th Meeting of the MAC, April 21, 1958, almost constant activity and numerous meetings have occurred. The Subcommittee reviewed and discussed the following with emphasis on the

latest conference held November 5, 1958 in Cleveland:

List of Conferences and Reports:

1. Summary of Proceedings of the First AMA Conference on Labeling of Hazardous Substances - May 9, 1958.
2. Minutes of the Second AMA Conference on Labeling of Hazardous Substances - July 25, 1958
 - a. J. W. Osborn's report of this meeting - August 1st
 - b. M. D. Gjerde's report of this meeting - August 25th
 - c. AMA's 101 pages of minutes and subsequently prepared Questions and Answers (15 pages)
 - d. J. W. Osborn's letter of comments on the above (Oct. 13)
 - e. M. D. Gjerde's letter of comments on the above (Oct. 20)
3. Inter-Industries Association (informal) Meeting in Philadelphia - October 21
 - a. M. D. Gjerde's report on this meeting - Oct. 23 (Dr. Osborn made no report of his own)
 - b. Mr. George Hopper's Minutes of October 21 meeting (Inter-Industries Association)
4. Industrial Hygiene Foundation Conference on AMA Proposed Act - Pittsburgh - October 29
 - a. J. W. Osborn's notes on this meeting with impressions.
5. Report on Oklahoma Hearing on AMA Proposed Act - Mr. J. D. Kittelton, Secretary for L.A.P.I. Committee, MCA
6. J. W. Osborn's notes on Joint Conference Report - November 5

Minutes of the Nov. 5th Meeting of the Joint Conference (between Inter-Industries Association and the AMA Committee on Toxicology) will be available within the next week. Also a small subcommittee will issue a re-draft of legislation proposed bills, probably to be known as The Joint Conference Report Bill, within the next two weeks. Further conferences will be called promptly if agreement is not reached on the new proposed bill by November 26. There is good reason for all interested parties to reach agreement prior to January 1, 1959 in order to avoid a rash of diverse, non-uniform laws being passed at the Federal and State levels in 1959.

B. After thorough discussion, the Subcommittee reached the following conclusions for submission to the MAC.

1. We endorse the principle of labeling.
2. We doubt that signal words such as "Danger" and "Poison", etc. can be strictly defined for legal purposes by toxicity testing.
3. We recognize, however, that forces are strong for legislation which will define these and other terms into laws. The MAC will, we are sure, be asked to advise the A.P.I. through the Medical and Health Committee on these matters. It is the Subcommittee's recommendation that the MAC "recommend and help work toward laws at the national (federal) level in the hope of preventing multiple diverse laws at the state and local levels which would be most difficult to live with."

REPORT OF SUBCOMMITTEE ON MEDICAL POLICIES AND PRACTICES

Ralph F. Schneider, M. D., Chairman

Since the last meeting of the Medical Advisory Committee in April 1958 this Subcommittee has reviewed and made a summary of its past scope, activities and accomplishments. A copy of this summary is on file in the office of the Secretary as a source of reference for all members of the Medical Advisory Committee.

As a result of this review the Subcommittee makes the following proposals:

1. That the name of the Subcommittee be changed to "Subcommittee on Medical Policies and Administrative Practices" in order to delineate more specifically its scope.
2. That the future function, scope, and goal of the Subcommittee be as follows:

I. Function and Scope

To accept assignments made by the chairman of the Medical Advisory Committee relevant to medical policies and administrative practices in the field of health as applied to the petroleum industry. All such assignments to either be made by or approved by the chairman of the Medical Advisory Committee.

To receive any information offered by component members of the Medical Advisory Committee relative to their medical policies and administrative practices.

To accumulate and file all such information to act as source material in carrying out the responsibilities of the Subcommittee

II. Short Range Goal

To have circulated by the chairman of the Medical Advisory Committee to all members of the Medical Advisory Committee a draft statement of "Guiding Principles in Regard to the Scope, Objectives, and Functions of Occupational Health Programs in Petroleum Operations" (Attachment #1) with the expectation that each member would study, edit, and return it with suitable comments to the chairman of the Subcommittee on Medical Policies and Administrative Practices. With this information thus available the Subcommittee intends to present a final statement to the chairman of the Medical Advisory Committee at a subsequent regular meeting.

III. Long Range Objectives

To be in a position to study and analyze all requests relative to Medical Policies and Administrative Practices made by the chairman of the Medical Advisory Committee and make suitable reports and recommendations.

GUIDING PRINCIPLES IN REGARD TO THE
SCOPE, OBJECTIVES, AND FUNCTIONS OF
OCCUPATIONAL HEALTH PROGRAMS IN PETROLEUM OPERATIONS

Introduction

The term "occupational health program" means a program provided by management to deal constructively with the health requirements of employees and employers in relationship to employment.

The term "occupational medicine" is that branch of medicine which deals with the relationship of man to his occupation, for the purpose of the prevention of disease and injury and the promotion of optimal health, productivity, and social adjustment.

Occupational Health Programs

Although a person's health is primarily the responsibility of the individual himself, an occupational health program represents management's recognition of its obligation to provide a safe work environment and its opportunity to assist in promoting optimum health among its employees. While circumstances may affect the extent of certain services which may enter into a comprehensive health program, a high quality of performance must be preserved at all times.

Cooperation between physicians, nurses, industrial hygienists, technicians and other personnel of the occupational health program and management personnel responsible for the employment, safety and well-being of employees is essential. Occupational health personnel should cooperate also with private and official community agencies providing health, safety, employment and welfare services.

Through the years many forms of occupational health programs have been developed from which has emerged an acceptable basic pattern. Experience indicates that success can best be assured when:

1. The program
 - a. Observes the basic principle of service to the individual by a physician and conforms to medical customs in the community.
 - b. Complies with existing laws.
 - c. Emphasizes prevention and health maintenance.
 - d. Utilizes community medical resources when adequate or when they can be developed reasonably.
2. The physicians participating in the program
 - a. Maintain high standards of professional service and conduct for the benefit of employee and employer alike.
 - b. Cooperate and maintain proper liaison with other physicians in the community and with the local medical society.

- c. Are engaged and compensated in accordance with the Principles of Medical Ethics of the American Medical Association.
- d. Do not use their occupational health affiliations as a means of gaining or enlarging a private practice among employees.

From time to time, problems arise out of a misunderstanding of the proper scope of occupational health programs as contrasted with medical programs for personal (nonoccupational) illness of employees. It is, therefore, essential that employers, employees, and physicians recognize the fundamental distinction between these two types of programs.

The occupational health programs must be oriented to the work environment and to the health of the employee in relation to his job. On the other hand, when service rendered by physicians under occupational health programs exceeds the limits described hereafter, the occupational health program becomes to that extent a medical program for personal illness and should be so recognized by all concerned.

Medical Programs for Personal (Nonoccupational) Illness

These programs owe their existence to certain factors and circumstances in the employer-employee relationship not directly related to occupational health considerations. A major objective of such programs is to distribute the cost of medical service so as to lighten the economic burden on the employee. Some programs include dependents and/or retired employees as well as the employed group. They are usually designed to provide medical, surgical, and hospital care.

Such personal medical services may be diagnostic, therapeutic or rehabilitative, and may be limited or comprehensive in scope. These programs are separate and distinct from occupational health programs, the objectives, activities, facilities and personnel of which are described in the remainder of this statement.

Objectives of Occupational Health Programs

The objectives of an occupational health program are:

1. To protect individuals against health hazards in their work environment.
2. To insure and facilitate the placement and suitability of individuals according to their physical capacities and their emotional make-up in work which they can reasonably perform with an acceptable degree of efficiency and without endangering their own health and safety or that of their fellow employees, and
3. To encourage personal health maintenance.

The achievement of these objectives benefits both employers and employees in terms of improved employee health, morale, and productivity.

Activities to Attain Objectives

API 07401

In order to attain these objectives the following activities (and the maintenance of appropriate records) are essential:

1. Supervision of the work environment from a health standpoint. This requires periodic inspections by physicians of the entire premises used by employees, including provision for, and appropriate participation in, the procedures and tests required to detect and appraise health hazards. Such inspections and appraisals provide current

information on health aspects of work conditions, processes and substances used. This information, including those relating to stress and mental health, will aid in evaluating any health hazards that may exist and in making appropriate recommendations for preventive or corrective measures.

2. Health examinations. Unrealistic and needlessly stringent standards of physical fitness defeat the purposes of health examinations and of maximum utilization of the available work force.

Health examinations should consist of:

- a. An initial examination to determine the health status of the individual in order to facilitate suitable placement in employment. This examination should include (1) his family and personal medical history; (2) his occupational history; (3) a physical examination, and (4) other procedures to help determine the individual's employability and his capacity for work.
- b. Subsequent examinations carried out at suitable intervals and designed to detect any sign or symptom of ill health related to employment conditions and to evaluate the health status of the individual in order to determine whether his health is compatible with his job assignment.

All examinations must be conducted by physicians with such assistance from ancillary personnel as may be required. Prior to each examination, the individual should be advised as to its constructive purpose and value. At the conclusion of an examination, the physician should discuss his findings meaningfully with the individual. When health defects are found, the physician should explain to the individual the importance of obtaining further medical attention, and encourage him to consult his personal physician.

3. Medical records. The maintenance of accurate and complete medical records of every individual from the time of his first examination or treatment is a basic requirement. Except when otherwise required by law, the confidential character of these records, including the results of health examinations, must be rigidly observed by all members of the occupational health staff, and such records must remain in the exclusive custody and control of the medical personnel. The patient should be informed of all pertinent health findings except when such disclosures would have an adverse effect on his health and well-being. A private physician or other agency may be provided with a report of health findings when the patient so designates. Disclosure of health information should not be made without the approval of the patient except when essential to fulfill the legal obligations to the third party or to the public, and then, only to the extent necessary to fulfill such obligations.
4. Medical treatment. Every employee should be encouraged to have a personal physician.
 - a. Medical care required by workmen's compensation laws for occupational injury or illness should be directed toward optimum rehabilitation of the employee. The right of the employee to select his attending physician should be maintained. The attending physician may be a member of the occupational health staff or any physician in the community willing and qualified to perform the essential services.

- b. Medical care in case of nonoccupational injury or illness is not a responsibility of an occupational health program, with the limited exceptions noted below.

Emergency cases should be given the attention required to prevent loss of life or limb or to relieve suffering until the patient is placed under the care of a personal physician.

For minor disorders, first aid or palliative treatment may be given if the condition is one for which the individual would not reasonably be expected to seek the attention of a personal physician, or to enable the individual to complete his current work shift before consulting a personal physician.

In occupational health programs, requests for treatment of repetitive personal disorders should be discouraged, and such individuals should be referred to their personal physicians.

- c. The best interests of a patient are served by cooperation and communication between attending physicians and physicians in charge of occupational health programs. In this way, prompt restoration of employees to suitable employment can be assured.
5. Health and safety education. A high standard of occupational health cannot be achieved without familiarity with, and the observance of, fundamental health rules. The development of an understanding of these rules and the promotion of their observance is an essential task in which an occupational health staff can render very valuable assistance.

An occupational health program should promote the education of employees in matters of personal hygiene and health and encourage the use of safeguards provided to protect against any hazards to health which may be inherent in their jobs. The most favorable opportunities for carrying on health education and counseling will be afforded during visits to health facilities and through periodic inspections of the employee's place of work.

Health and safety education involves the cooperative efforts of health, safety, and operating personnel. Such education should include not only the encouragement of habits of cleanliness and orderliness but also instruction, in collaboration with the employee's immediate supervisor in safe work practices, in the use and maintenance of available personal protective clothing and equipment.

Experience has shown that health education is unlikely to be successful unless the employer demonstrates his sincere and continuing interest in the health of his employees. This entails participation by health personnel in health and safety meetings. Likewise, employees should be encouraged to participate in the planning and conduct of health education activities and to make full and effective use of occupational health services and facilities available to them.

An occupational health program to be effective and acceptable to the employee, must be staffed by objective and competent personnel who create an atmosphere of warm, sincere, and positive personal helpfulness.

Facilities

The facilities of an occupational health program may be available at the place of employment or in the community. When provided on the employment premises, facilities should:

1. Be located in a quiet area, readily accessible to employees;
2. Be sufficiently spacious, well lighted, ventilated and heated;
3. Include waiting, consultation, examining and treatment rooms, and toilet facilities, to insure adequate privacy and comfort; and
4. Have appropriate medical and laboratory equipment.

It may also be desirable to provide a rest or recovery room, dressing rooms and facilities for laboratory and radiological examinations.

Conclusion

Specific and detailed recommendations as to facilities, personnel and other aspects of individual occupational health programs obviously are beyond the scope of this statement. It is recommended that the local medical society be consulted to assure that a given program is in agreement with the objectives of this statement and with established community practices.

REPORT OF THE SUBCOMMITTEE ON PHYSICAL AGENTS

C. H. Hine, M. D., Chairman

The Subcommittee has continued to discharge its assignment along the following lines:

1. Several summaries have been prepared for the information of the members of the Medical Advisory Committee which list selected periodicals, articles, and reports covering the field of radiation effects, temperature extremes, noise, repeated motion and ultrasonics. These are attached.
2. The following information and new developments are called to the attention of the Medical Advisory Committee:
 - A. Record Keeping: Rule 38, Radiation Protection, Industrial Code of New York State Department of Labor.
 - B. Changes in maximum permissible exposures to ionizing radiation (letter of P.D. Halley, October 23, 1958).
 - C. Attempts being made to establish a uniform radiation protection code at state level.
 - D. Availability of a summary of existing and proposed state codes regarding radiation protection of the State of Oklahoma.

The Committee commends the attention given to employee education regarding radiation protection by the use of articles such as those which have appeared in the house organs of the Humble and Carter Oil Companies.

3. The Subcommittee has reviewed a research project which has been submitted by the Subcommittee on Noise in Industry of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology.

This project is a basic research problem which has for its broad objective determination of hearing loss related to noise exposure and in addition involves six specific areas which include:

1. The functional relation of hearing loss to years of noise exposure as well as to age.
2. Nature of temporary threshed shifts.
3. Effective ways of evaluating noise exposure.
4. Technical procedure for field testing of hearing loss.
5. Effectiveness of ear protective devices.
6. Ranges in susceptibility to permanent hearing loss.

The Subcommittee approves the philosophy of support of this research problem feeling that both direct and indirect benefits will accrue to the Petroleum Industry. The following recommendations are made:

- a. That \$2500 be appropriated for the support of the project for the period of 1 January, 1959 to 30 June, 1959.

- b. That an additional \$5000 be granted from the period of 1 July, 1959 to 30 June, 1960.
- c. The Medical Advisory Committee cooperate through submission of data on hearing loss to Dr. Glorig's research project when feasible.

SUMMARY OF HEALTH ASPECTS OF HIGH TEMPERATURES

1. Hazards:

These have been studied over a period of many years and are generally understood. Nothing has been noted in recent literature which appears to introduce any new basic concepts.

2. Standards:

Several mathematical expressions have been suggested to express environmental heat loads in a quantitative manner. Some of the more popular ones include:

- a. Effective temperature.
- b. Effective temperature corrected for radiation.
- c. Haines and Hatch formulas.
- d. Yaglou's index.

These indices take into account the important factors influencing heat loadings such as (a) air temperature, (b) humidity, (c) air movement and (d) radiation. While each of the indices has its particular application, the Haines and Hatch expressions and the Yaglou index are attractive tools for refinery evaluations where radiation is a factor.

More work ought to be done in the development and application of standards under a variety of conditions found in industry. Work also should be done in developing realistic schedules for short term exposures to conditions of high heat loadings.

3. Sources:

In the refineries, mechanical and maintenance work generally offers greatest opportunity for heat exposures. These may be associated with work inside furnaces, vessels, tanks and the like. Operating personnel may also be exposed at certain locations in power houses, near hot pumps, exchangers, etc.

4. Measurement:

Instrumentation is available for measuring the various parameters required for use in the heat indices. The construction and use of a blackglobe thermocouple is suggested, however, because of its utility in areas where radiant heat is important.

5. Control:

For a heat exposure, the selection of a control method will depend on which parameter is the controlling factor. In one case, it may be humidity and in another it may be radiation. There are so many variables that each heat problem should be treated on its own merits. It becomes obvious that no blanket recommendation can be made with reference to control procedures.

B I B L I O G R A P H YO NH E A T

1. Adolph, E. F.: Tolerance of Man Toward Hot Atmospheres. PUB. HEALTH REPTS. Suppl. 192, 38 pp. (1946).
2. Anon: Analysis and Control of Hot Environments. Technical Information Circular No. 3. Industrial Hygiene Foundation. (Aug. 1950).
3. Anon: Discussion on Radiative Balance in the Atmosphere. PROC. ROY. SOC. Ser. A.:145 (1956).
4. Anon: Selecting an Insulation. MATERIALS IN DES. ENG. 47:120-121 (March 1958).
5. Anon: Shielded Psychrometer for Measuring Environmental Temperatures in the Presence of Radiant Heat. A.M.A. ARCH. INDUST. HEALTH 15:261-263 (March 1957).
6. Anon: Temperature and Climate. GERMAN AVIATION MEDICINE (World War II) 1:30-33, U. S. Dept. of Air Force.
7. Archbold, E.: An Evaporated Gold Bolometer. J. SCI. INSTR. 34:240 (1957).
8. Ballantyne, E. R., and Spencer, J. W.: White Paint on Bituminous Roofs Cuts Summer Temperature Peaks. A.S.T.M. BULL. (July 1957); abstr. AIR COND. HEAT. & VENT. 54:74 (Nov. 1957).
9. Badger, A. E.: Method of Reducing Heat Losses from Furnace Parts. THE GLASS INDUSTRY 18:83-84 (March 1937).
10. _____, Fugman, and Vormelker: Heat Balance of a Glass Tank. Ibid. 16, No. 1 (Jan. 1935).
11. Bedford, T.: Equivalent Temperature - What It Is - How It's Measured. HEAT. PIPING & AIR COND. 23:87-91 (Aug. 1951).
12. _____: Skin Temperature in Relation to the Warmth of the Environment. THE JOURNAL OF HYGIENE 35:307-317 (Aug. 30, 1935).
13. _____: Basic Principles of Ventilating and Heating. H. K. Lewis & Co., London (1948).
14. _____, and Tredre, B. E.: Heat Stress in Industry. TRANS. INSTIT. MINING ENGRS. 115:209-240 (1955-1956).

15. _____, and Warner, C. J.: The Influence of Radiant Heat and Air Movement on Cooling of the Kata Thermometer. MEDICAL RESEARCH COUNCIL. SPECIAL REPORT SERIES 73. H.M.S.O., London, (1923).
16. Belding, H. S., and Hatch, T. F.: Index for Evaluating Heat Stress in Terms of Resulting Physiological Strains. HEAT. PIPING & AIR COND. 27:129-136 (Aug. 1955).
17. Benford, F.: The Blackbody...Part I. Its Physical Theory and Its Spectral Distribution and Other Radiation Characteristics. GEN. ELEC. REV. 46:377-382 (July 1943).
18. _____: The Blackbody...Part II. Summation of Radiation, Brightness and Color Temperatures, Pressure of Radiation, Blackbody as Quanta Generator, and Efficiency of Radiation. Ibid. pp. 433-440.
19. Blockley, W. V., and Taylor, C. L.: Studies in Tolerance for Extreme Heat. Second Summary Report. A.F. TECH. REPT. No. 5831 84 pp. (July 1949).
20. _____: Human Tolerance Limits for Extreme Heat. HEAT. PIPING & AIR COND. 21:111-116 (May 1949).
21. Blum, H. F.: The Solar Heat Load: Its Relationship to Total Heat Load and Its Relative Importance in the Design of Clothing. J. CLIN. INVEST. 24:712-721 (Sept. 1945).
22. Chasmar, R. P., et al: Theory and Performance of Metal Bolometers. J. OPT. SOC. AMER. 46:469 (1956).
23. Christie, G. S., Gleason, J. P., Jowett, W. G., and Wright, A. S.: Ventilation of Impermeable Clothing. The Effectiveness of the Ambient Atmosphere in Ventilating Coveralls Worn in Hot and Humid Conditions. BRIT. J. IND. MED. 14:258-265 (Oct. 1957).
24. De Corso, S. M., and Coit, R. L.: Measurement of Total Emissivities of Gas-Turbine Combustor Materials. A.S.M.E. TRANS. 77:1189 (1955).
25. Dunkle, R. V., et al: Emissivity of Ice, Snow, and Frozen Ground. REFRIG. ENG. 65:33 (1957)
26. Dunn, K.: The Man in the Copper Mask. CORNING GLASS WORKS GAFFER 6:6-7;18 (Dec. 1948).
27. _____: Shielding for Radiant Heat in a Glass Plant. TRANS. 39th NAT. SAFETY COUNCIL 12:8-10 (1951).
28. Eckert, E. R. G., et al: Measurement of Total Emissivity of Porous Materials in Use for Transportation Cooling. JET PROPULSION 26:280 (1956).

29. Eichna, L. W., Ashe, W. F., Bean, W. B., and W. B. Shelley: The Upper Limits of Environmental Heat and Humidity Tolerated by Acclimatized Men Working in Hot Environments. J. INDUST. HYG. & TOX. 27:59-84 (March 1945).
30. Eppley, M., Karoli, A. R.: Absolute Radiometry Based on a Change in Electrical Resistance. J. OPT. SOC. AM. 47:748 (1957).
31. Farber, E. A.: Methods and Systems Used for Temperature Measurement. AIR COND. HEAT & VENT. 55:76-78 (July 1958).
32. Fishenden, M., and Saunders, O. A.: The Calculation of Heat Transmission. H.M.S.O. pp. 17-22 (1932).
33. Forsythe, W. E.: Measurement of Radiant Energy. McGraw-Hill (1937).
34. Gardon, R.: The Emissivity of Transparent Materials. J. AM. CERAM. SOC. 39:278 (1956).
35. Gergen, J. L.: "Black Ball": A Device for Measuring Atmospheric Infrared Radiation. REV. SCI. INSTR. 27:453 (1956).
36. Gilham, E. J.: A Semi-Conducting Antimony Bolometer. J. SCI. INSTR. 33:338 (1956).
37. Giovanelli, R. G.: Radiative Transfer in Discontinuous Media. AUSTRALIAN J. PHYS. 10:227 (1957).
38. Goodman, S.: Radiant-Heat Transfer Between Nongrey Parallel Plates. J. RES. NATL. BUR. STAND. 58:37 (1957).
39. Goody, R. M.: The Influence of Radiative Transfer on Cellular Convection. J. FLUID MECHANICS 1:424 (1956).
40. Greyson, M., Mazie, G. P., et al: Evaluation of Factors Affecting Heat Transfer in Furnaces. TRANS. AM. SOC. MECH. ENGRS. 78:1741 (1956)
41. Haines, G. F., and Hatch T.: Industrial Heat Exposures Evaluation and Control. HEATING AND VENTILATING 49:93-104 (Nov. 1952).
42. Hasunuma, H., and Nara, J.: The Scattering of Light from Metal Aventurine Surface and Their Statistical Models. J. PHYS. SOC. JAPAN 12:1117 (1957).
43. Hatch, T. F.: Upper Limits of Tolerance to Heat and Humidity. TRANS. IND. HYGIENE FOUNDATION, Bull. No. 3:24-31 (Nov. 15-16, 1944).

44. Hawkins, G. A.: Heat Transfer by Radiation. INDUST. POWER (Aug. 1939).
45. Hellon, R. F.: The Reactions of Men to a Hot Environment with Particular Reference to Age and Physique. PH.D THESIS. U. of Oxford. (1957).
46. _____, Jones, R. M., MacPherson, R. K., and Weiner, J. S.: Natural and Artificial Acclimatization to Hot Environments. J. PHYSIOL. 132:559-576 (1956).
47. _____, Lind, A. R., and Weiner, J. S.: The Physiological Reactions of Men of Two Age Groups to a Hot Environment. Ibid. 133:118-131 (1956).
48. Hill: Medical Research Council Special Report Series 32. H.M.S.O. London.
49. Hottel, H. C.: Radiant Heat Transmission. MECH. ENG. 52:699-704 (Jan.-Dec. 1930).
50. Houghten, F. C., Teague, W. W., and Miller, W. E.: Effective Temperature for Persons Lightly Clothed and Working in Still Air. J. ASHVE 32:473-486 (1926).
51. Hulbert, J. A., and Jones, G. O.: The Superconducting Bolometer as a Detector of Thermal Radiation from Low-Temperature Sources (Section B). PROC. PHYS. SOC. (London) 68:801 (1955).
52. Jefferies, J. T.: Radiative Transfer with Central Sources of Non-Uniform Directional Intensity (Section B). Ibid. 69:577 (1956).
53. Johnson, N. R., Weinstein, A. S., and Osterle, F.: The Influence of Gradient Temperature Fields on Thermocouple Measurements. A.S.M.E. Paper No. 57-HT--18 (1957).
54. Keck, J., et al: Heat Transfer Fluid Mechanics Inst. Proc. 1957 Heat Transfer Fluid Mechanics Inst., pp. 279, Stanford Univ. Press, Palo Alto, California.
55. Koller, L. R.: Infrared. Production and Transmission, Reflection and Measurement. GEN. ELEC. REV. 44:167-173 (March 1941).
56. Lind, A. R., and Hellon, R. F.: Assessment of Physiological Severity of Hot Climates. J. APPL. PHYSIOL. 11:35-40 (1957).
57. _____, Weiner, J. S., and Jones, R. M.: Tolerance of Men to Work in Hot, Saturated Environments with Reference to Mines Rescue Operations. BRIT. J. INDUST. MED. 12:296-303 (1955).

58. _____, and Frazer, D. C.: Reactions of Mines-Rescue Personnel to Work in Hot Environments. MEDICAL RESEARCH MEMORANDUM No. 1. National Coal Board Medical Service 68 pp. (1956).
59. Mankiker, N. S., Chief Adviser Factories, Ministry of Labour and Employment, Gov't. of India: Thermal Stress in the Textile Industry. New Delhi, India.
60. McConnell, W. J., Houghten, F. C., and Yagloglou, C. P.: Air Motion -- High Temperatures and Various Humidities -- Reactions on Human Beings. J. AM. SOC. HEAT. & VENT. ENGRS. 30:199-224 (March 1924).
61. Mumma, A. G., Chief of Bureau, Navy Department: Chapter 38, Ventilating, Heating, and Air Conditioning. Bureau of Ships Manual pp. 1,2,3,6,7,16,17,33,34 (Feb. 1, 1956).
62. Nagata, H., Yoneda, S., Kodowaki, I., and Yamada, M.: Aluminized Clothing as a Working Suit in Hot Environment. J. SCI. LABOUR 34:69-78 (February 1958), Japanese.
63. Newburgh, L. H.: Physiology of Heat Regulation and the Science of Clothing. Saunders, (1939 and 1949).
64. Nielson, M. and Pedersen, L.: Studies on the Heat Loss by Radiation and Convection from the Clothed Human Body. ACTA PHYSIOL. SCANDINAV. 27:272-294 (Jan. 25, 1953).
65. Nottage, H. B.: A Simple Heated-Thermocouple Anemometer. J. AM. SOC. HEAT. & VENT. ENGRS. 56:431-440 (1950).
66. Payne, F. W., Hinshaw, J. R., and Pearse, H. E.: Protection from Radiant Thermal Energy by Fabrics Used as a Shield. The University of Rochester, Atomic Energy Project, Rochester, N. Y. UR-489, 10 pp. (June 5, 1957).
67. Priestley, C. H. B.: Convection from the Earth's Surface. PROC. ROY. SOC. 238:287-304 (Jan. 8, 1957).
68. Rice, C. W.: Free Convection of Heat in Gases and Liquids-II. TRANS. A.I.E.E. 43:131-144 (1924).
69. Roberts, L. M., and Fray, S. J.: A Simple Theory for Solid-Backed Bolometers. J. SCI. INSTR. 33:115 (1956).
70. Robinson, S., Turrell, E. S. and Gerking, S. D.: Physiologically Equivalent Conditions of Air Temperature and Humidity. AM. J. PHYSIOL. 143:21-32 (Jan. 1945).

71. Rose, H. E.: Determination of the Mean Particle Size of the Fine Black Powders by the Measurement of Reflectivity. J. APPL. CHEM. 7:244 (1957).
72. Russell, A.: LXII. The Convection of Heat from a Body Cooled by a Stream of Fluid. PHIL. MAG. 20:591-610 (1910).
73. Sancetta, S. M., Kramer, J. D. and Husni, E.: General Hemodynamic Responses of Man to Dry Heat Exposure. J. LAB. CLIN. MED. 50:947-948 (Dec. 1957).
74. Schulz, L. G.: Experimental Study of the Optical Properties of Liquid Hg and Liquid Ga in the Wavelength Range of 0.23 μ to 13 μ . J. OPT. SOC. AM. 47:64 (1957).
75. ____: Comparison of Calculated and Experimental Values for the Optical Reflectivity of the Liquid Alloys Hg-In, Hg-Tl, Ga-In at 25°C. Ibid. pp. 70.
76. Shibata, K.: Simple Absolute Method for Measuring Diffuse Reflectance Spectra. Ibid. pp. 172.
77. Sihvonen, Y. T.: Spectroheliometer for Continuously Monitoring Solar Radiation in Five Wavelength Bands. REV. SCI. INSTR. 28:628 (1957).
78. Skeib, G.: On the Behavior of Radiation Measuring Devices in Transient State. Z. METEOROL. 10:97-101 (April 1956).
79. Small, B. R.: Heat Relief in Industry. IRON AND STEEL ENGINEER 29:14 (April 1952).
80. Smit, R.: Influence of Humidity on Measurements with Radiation Pyrometers. APPL. SCI. RES. 5:428 (1956).
81. Stern, S. C., Hill, C. W.: Simple Ultraviolet Radiometer. REV. SCI. INSTR. 26:1122 (1955).
82. Stokinger, H. F.: Standards for Safeguarding the Health of Industrial Workers. PUB. HEALTH REPTS. 70:1-11 (Jan. 1955).
83. Stoll, A. M., and Hardy, J. D.: A Method for Measuring Radiant Temperature of the Environment. J. APPL. PHYSIOL. 5:3 (Sept. 1952).
84. Straub, W.: Regulation of Body Temperature, Lane Lectures on Pharmacology, Stanford Univ. Publication, University Series, Medical Sciences. 3:372-404 (1937).
85. Tabor, H., Steinberger, I. T.: An Instrument for Measuring Absorptivities for Solar Radiation. J. SCI. INSTR. 33:356 (1956).

86. Taylor, C. L.: Environmental Biotechnology. University of California Department of Engineering, Los Angeles. Syllabus - Engineering 130A. pp. I-1 to I-35 (February 1951).
87. Tea, P. L., Jr., and Baker, H. D.: A Model Method for Determining Geometric Factors in Solid-to-Solid Radiation Heat Transfer. TRANS. A.S.M.E. 80:367-372 (Feb. 1958).
88. Theissing, H. H., and Caplan, P. J.: Atmospheric Attenuation of Solar Millimeter Wave Radiation. J. APPL. PHYS. 27:538 (1956).
89. Van Heyningen, R., and Weiner, J. S.: A Comparison of Arm-Bag Sweat and Body Sweat. J. PHYSIOL. 116:395-403 (1952) a. The Effect of Arterial Occlusion on Sweat Composition. Ibid. 404-413 b.
90. Vernon, H. M.: The Radiation Experienced in Factories and Houses. J. IND. HYG. & TOX. 19:498-505 (Nov. 1957).
91. Vollmer, J.: Study of the Effective Thermal Emittance of Cylindrical Cavities. J. OPT. SOC. AM. 47:926 (1957).
92. Wallach, A.: Protection Against Radiant Heat. NAT. SAFETY NEWS pp. 30 (June 1953).
93. Ward, L.: The Variation Transfer with Central Sources of Non-Uniform Directional Intensity (Section B). PROC. PHYS. SOC. 69:339 (1956).
94. Ward, W. H.: Two Portable Thermistor Radiometers. J. SCI. INSTR. (London) 34:317 (1957).
95. Weiner, J. S.: Physiological Studies of the Effects of Heat. Proc. of a conference held from 29-31, March, 1950. The application of Scientific Methods to Industrial and Service Medicine. Privy Council M.R.C. (1950).
96. _____, and Horne, G. O.: A Classification of Heat Illness. BRIT. MED. J. No. 5086:1533-1537 (1958).
97. _____, and Lind, A. R.: Working Capacity in Hot and Humid Conditions. MANAGER 23:853-859 (1955).
98. Williams, F., and Fuhs, A. E.: Apparent Emission Intensities from a Turbulent Flame Composed of Wrinkled Laminar Flames. JET PROPULSION 27:1099 (1957).
99. Winslow, C. E. A., and Herrington, L. P.: Temperature and Human Life. Princeton, N. J., Princeton University Press, (1949).
100. _____, and Gagge, A. P.: Physiological Reactions of the Human Body to Various Atmospheric Humidities. AM. J. PHYSIOL. 120:288-299 (Oct., 1937).

101. Woodcock, A. H., Breckenridge, J. R., Pratt, R. L. and Powers, J. J., Jr.: Analysis of Energy Exchange Between Man and His Environment. A.S.M.E. Paper No. 57-SA--64. 5 pp. (1957).
102. Worthing, A. G.: Temperature Radiation Emissivities and Emittances. J. APPL. PHYS. 11:421-437 (June 1940).
103. Wyndham, C. H.: Effect of Acclimatization on Circulatory Responses to High Environmental Temperatures. J. APPL. PHYSIOL. 4:383-395 (1951).
104. _____, Bouwer, W., Devien, M. G., Patterson, H. E., and MacDonald, D. K. C.: Correction of Use of Heat Exchange Equations for Determining Changes in Body Temperature. J. APPL. PHYSIOL. 5:299-307 (Dec. 1952).
105. _____, Strydom, J. B., and Morrison, F. D.: Responses of Unacclimatized Man Under Stress of Heat and Work. Ibid. 6:681-686 (May 1954).
106. _____: Thermal Responses of Man at High Initial Temperatures to Stresses of Heat and Work. Ibid. pp. 687-690.
107. Yaglou, C. P.: Abnormal Air Conditions in Industry, Their Effects on Workers and Methods of Control. J. INDUST. HYG. & TOX. 19:12-43 (1937).
108. _____: Thermal Standards in Industry. AM. PUB. HEALTH YEARBOOK pp. 131-141 (1949-1950).
109. _____: How's Your Plant Climate? Here are the Thermal Standards You Need for Good Working Conditions in Your Plant -- Plus 26 Ways to Beat both the Heat and the Humidity. FACTORY MANAGEMENT 113:104-107 (June 1955).

BIBLIOGRAPHY OF PUBLICATIONS ON THE HEALTH
EFFECTS AND SAFE USE OF IONIZING RADIATION

K-12

The application of ionizing radiation in the petroleum industry has increased markedly in recent years; from the early use of X-rays and radium for radiographing welds and other metal structures to the more recent use of sealed and unsealed radioactive isotopes in laboratory, manufacturing, production, and transportation operations.

Published information in the field of ionizing radiation is quite voluminous and much of this is not applicable to the petroleum industry.

This bibliography, therefore, is not all-inclusive but contains only those periodicals, handbooks, and special reports believed to be of direct interest to the petroleum industry together with selected literature references either having direct application or of general background interest.

Periodicals and Trade Publications

NUCLEONICS (published monthly)
Fulfillment Manager, Nucleonics
330 West 42nd Street
New York 36, New York
(\$8.00 per year)

TRACERLOG
Tracerlab, Inc.
1601 Trapelo Road
Waltham 54, Massachusetts
(no charge)

HEALTH PHYSICS (published quarterly)
Official J. of the Health Physics Society
Pergamon Press, Inc.
122 East 55th Street
New York 22, New York
(members - \$6.00 per year)
(non-members - \$17.00 per year)

AMERICAN JOURNAL OF ROENTGENOLOGY
Charles T. Thomas, publisher
301-327 Lawrence Avenue
Springfield, Illinois

RADIOLOGY
Radiological Society of North America
713 East Genessee Street
Syracuse, New York

MEDICAL RADIOGRAPHY AND PHOTOGRAPHY
Eastman Kodak Company
Rochester 4, New York

ATOMIC ENERGY CLEARING HOUSE
Congressional Information Bureau, Inc.
Mills Building
17th Street at Pennsylvania Ave., N.W.
Washington 6, D. C.
(\$100.00 per year)

INTERNATIONAL J. OF APPLIED RADIATION
AND ISOTOPES (published quarterly)
Pergamon Press, Inc.
122 East 55th Street
New York 22, New York
(institutions - \$14.00 per year)
(individuals - \$9.80 per year)

ATOMIC ENERGY NEWSLETTER
Atomic Energy News Company
1000 Sixth Avenue
New York 18, New York
(\$18.00 per year)

BROOKHAVEN NATIONAL LABORATORY
QUARTERLY PROGRESS REPORT
Associated Universities, Inc.
Upton, New York

CANADIAN ISOTOPE NEWSLETTER
Isotopes Products, Ltd.
Oakville, Ontario, Canada

NUCLEAR SCIENCE ABSTRACTS
Superintendent of Documents
U. S. Government Printing Office
Washington 25, D. C.

J. OF PHYSICS IN MEDICINE AND BIOLOGY
Taylor and Francis, Ltd.
London, England

ATOMIC INDUSTRY REPORTER (published
Bureau of National Affairs, Inc. weekly)
1231 24th Street, N.W.
Washington 7, D. C.

ATOMIC INDUSTRIAL FORUM, INC.
3 East 54th Street
New York 22, New York

API 07416

Handbooks and Special Reports

Radiological Health Handbook. PB 12184. Compiled and edited by S. Kinsman, U. S. Department of Health, Education and Welfare, Public Health Service, January, 1957. Available from the Office of Technical Services, U. S. Department of Commerce. \$3.75

Radiation Safety Guide ANL-5574, Health and Biology, Industrial Hygiene and Safety Division, Argonne National Laboratory, June 1956. Available from the Office of Technical Services, Department of Commerce. \$.75

Sanitary Engineering Aspects of the Atomic Energy Industry. (A seminar sponsored by the A.E.C. and the Public Health Service, 1955.) Two parts - TID-7517 (part Ia) and TID-7517 (part Ib). Available from the Office of Technical Services, Department of Commerce. Total price is \$3.10.

General Handbook for Radiation Monitoring, LA-1835. Los Alamos Scientific Laboratory, Health and Biology.

The following Handbooks issued by the National Bureau of Standards are available by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at the prices indicated:

<u>No.</u>	<u>Title</u>	<u>Price</u>
48	Control and Removal of Radioactive Contamination in Laboratories	15¢
49	Recommendations for Waste Disposal of Phosphorus-32 and Iodine-131	15¢
50	X-Ray Protection Design	20¢
51	Radiological Monitoring Methods and Instruments	20¢
52	Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water	25¢
53	Recommendations for the Disposal of Carbon-14 Wastes	15¢
54	Protection Against Radiations from Radium, Cobalt-60, and Cesium-137	25¢
55	Protection Against Betatron-Synchrotron Radiations up to 100 Million Electron Volts	25¢
57	Photographic Dosimetry of X- and Gamma Rays	15¢
58	Radioactive-Waste Disposal in the Ocean	20¢
59	Permissible Dose from External Sources of Ionizing Radiation	30¢
60	X-Ray Protection	20¢
61	Regulation of Radiation Exposure by Legislative Means	25¢
62	Report of the International Commission on Radiological Units and Measurements (ICRU) 1956	40¢
63	Protection Against Neutron Radiation up to 30 Million Electron Volts	40¢
65	Safe Handling of Bodies Containing Radioactive Isotopes	15¢

Report of the United Nations Scientific Committee on the Effects of Atomic Radiation. General Assembly, Official Records: Thirteenth Session Supplement No. 17 (A/3838), New York, 1958.

Report of the Committee on Pathologic Effects of Atomic Radiation. From a study of the Biological Effects of Atomic Radiation. Publication 452, National Academy of Sciences - National Research Council, Washington, 1956. \$1.00

The Biological Effects of Atomic Radiation. Summary reports from a study by the National Academy of Sciences. National Academy of Sciences - National Research Council, Washington, 1956.

The Nature of Radioactive Fallout and Its Effects on Man. Hearings Before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy, Congress of the United States, 85th Congress, June 4, 5, 6, and 7, 1957, Parts 1 and 2. U. S. Government Printing Office, Washington, 1957.

The Nature of Radioactive Fallout and Its Effects on Man. Summary--Analysis of Hearings May 27-29 and June 3-7, 1957, Joint Committee on Atomic Energy, 85th Congress, 1st Session, Joint Committee Print. U. S. Government Printing Office, Washington. August 1957.

Action of Radiation on Tissues. An Introduction to Radiotherapy. A. Lacassagne and G. Gricoureff. Translation by C. L. Lushbaugh and G. R. Riese, Los Alamos, New Mexico - 1956.

Some Effects of Ionizing Radiation on Human Beings. (A report on the Marshallese and Americans accidentally exposed to radiation from fallout and a discussion of radiation injury in the human being.) U. S. Atomic Energy Commission, TDI 5358, July 1956. Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25 D. C. \$1.25

Procedures of Bio-Assay and Analytical Chemistry Meeting - October 1955. Analytical Laboratory Department, Health and Safety Division, National Lead Company of Ohio, Cincinnati. Available from the Office of Technical Services, Department of Commerce, Washington 25, D. C. \$.75

An evaluation of Laundering Agents and Techniques Used in the Decontamination of Cotton Clothing. U. S. Atomic Energy Commission, NYO-4990, March 1954. Available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. \$.80

Federal Register, Title 10, Part 20, Standards for Protection Against Radiation; Part 30, Licensing of Byproduct Material; Part 40, Control of Source Material; Part 50, Licensing of Production and Utilization Facilities; Part 70, Special Nuclear Material; and Amendments. Available from the Atomic Energy Commission, Division of Licensing and Regulations, Washington 25, D. C.

Sealed Sources Containing Beta and/or Gamma-Emitting Radioisotopes - Testing for Leakage. Available from the U. S. Atomic Energy Commission, Division of Licensing and Regulations, Washington 25, D. C.

Selected Articles from Various Publications

"An Approach to Radiation Health Problems in Industry," by Charles T. Disney, M.D. INDUSTRIAL MEDICINE AND SURGERY, July, 1957, page 343.

"Dosage and Biological Effects of External Radiation Sources," by John S. Laughlin. AMA ARCHIVES OF INDUSTRIAL HEALTH, August, 1958, volume 18, number 2, page 102.

"Health Problems Associated with the Use of Radioisotopes in Industry," by George C. Manov. AMA ARCHIVES OF INDUSTRIAL HEALTH, May, 1956, volume 13, number 5, page 448.

"Longevity and Causes of Death from Irradiation in Physicians," by S. Warren. JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, September 29, 1956, page 464.

"Personnel Protection in Industrial Radiography," by F. A. Van Atta, AIHA QUARTERLY, September, 1947, volume 8, number 3, page 61.

"Radiological Health. Report of the 58th annual meeting of the American Roentgen Ray Society." PUBLIC HEALTH REPORTS, December, 1957, volume 72, number 12, page 1113.

"Gamma Radiography in Industry," by J. P. W. Hughes and O. Shaw. BRITISH JOURNAL OF INDUSTRIAL MEDICINE, July, 1957, page 183.

"Dosage and Biological Effects of Internal Radioactivity," by J. N. Stannard. AMA ARCHIVES OF INDUSTRIAL HEALTH, August, 1958, volume 18, number 2, page 95.

"Radioactive Waste Disposal for the Small Isotope User," by Herman Cember. AIHA QUARTERLY, March, 1956.

"Open Field Burning of Low Level Radioactive Contaminated Combustible Wastes," by W. B. Harris and M. S. Weinstein. AIHA QUARTERLY, December 1956, volume 17, number 4, page 388.

"Estimating Airborne Radioactive Particulate Hazards - A Review of Sampling Criteria," by T. J. Burnett and T. F. Hatch. AIHA QUARTERLY, March, 1956.

"Determination of Internally Deposited Radioactive Isotopes from Excretion Analyses," by Wright H. Langham. AIHA QUARTERLY, September, 1956, volume 17, number 3, page 305.

"Radiation Injury and the Present Status of Therapeutics - A Bibliographic Review" by Thomas J. Haley, Ph.D. INDUSTRIAL MEDICINE AND SURGERY, December, 1953, page 569.

"Safe Hot Lab Procedure." Occupational Health News. AMA ARCHIVES OF INDUSTRIAL HEALTH, July, 1956, volume 14, number 1, page 98.

"Recent Changes in Maximum Permissible Exposure Values," by K. Z. Morgan, Ph.D. AMA ARCHIVES OF INDUSTRIAL HEALTH, November, 1957, volume 16, number 5, page 357.

"Maximum Permissible Radiation Exposures to Man." AIHA QUARTERLY, March, 1957, Volume 18, number 5, page 73.

"Radiation Protection - Insurance and Industrial Relations Aspects," by Charles R. Williams, Ph.D. AIHA QUARTERLY, June, 1956, volume 17, number 2, page 214.

"Protection Afforded by Clothing Against Radiation Hazards," by F. R. Holden, Ph.D. and A. F. Owings, B.S. AMA ARCHIVES OF INDUSTRIAL HYGIENE & OCCUPATIONAL MEDICINE, volume 6, number 1, page 67.

"Problems Associated with the Application of External and Internal Radiation Exposure Limits," by Karl Z. Morgan, Ph.D. AIHA QUARTERLY, December, 1955, page 307.

"Health Hazards in the Diagnostic Use of X-Ray," by Dr. Paul D. Hodges. THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, February 8, 1958, volume 166, number 6, page 577.

"Decreasing Radiation in Photofluorography," by Edward L. Ernsberger. PUBLIC HEALTH REPORTS, July, 1958, volume 73, number 7, page 596.

"Background Radiation Exposures of the General Population," by Simon Kinsman. AIHA JOURNAL, February, 1958, volume 19, number 1, page 8.

"Developments in Internal Dose Determinations," by K. Z. Morgan and M. R. Ford. NUCLEONICS, June, 1954.

"The Quantitative Determination of Gamma-Ray Emitting Elements in Living Persons," by L. D. Marinelli, et al. AMERICAN JOURNAL OF ROENTGENOLOGY, RADIUM THERAPY, AND NUCLEAR MEDICINE, volume LXXIII, number 4, April, 1955.

"Estimating Radioelements in Exposed Individuals" (Radiation Dosage and Permissible Levels) by J. Schubert. Three articles appearing consecutively in February, March, and April, 1951 issues of NUCLEONICS.

"Is the Concept of 'Critical Organ' Valid in Determining the Maximum Permissible Level for Exposure to Radioactive Material?" by J. N. Stannard. AMA ARCHIVES OF INDUSTRIAL HEALTH, page 198, volume 14, number 2.

"Electrodeposition Method for the Determination of Uranium Alpha Activity in Urine," by T. C. Whitson and T. Kwasnowski. Report K-1101, Carbide & Carbon Chemicals Company, June 16, 1954.

HAZARDOUS PROPERTIES OF MICROWAVES

A. Definition:

The term "microwave" usually refers to electromagnetic radiation in the radio frequency area of the spectrum. Microwaves are considered to have wave lengths in the range of 0.3 to 3000 cm. This corresponds to a frequency range of 10 to 100,000 megacycles per second.

B. Hazardous Properties:

1. Microwaves produce localized heating in matter. This heating effect can cause damage to certain human organs. There have been reports of injury to the eye, kidneys, brain and testes of animals.
2. Biological damage is related to both the wave length and power density. In general, the longer wave lengths (>10 cm) are more effective in heating deep tissue and the shorter wave lengths are more effective in raising the temperature of superficial tissue. The longer wave lengths produce a greater temperature rise in a significant volume of tissue than the shorter wave lengths, but with less subjective awareness to the heat for a given power density.
3. The band 2-25 cm. is important in body heat production and the main site of heating is below the sensory nerves. Skin and body fat offer some protection, but an intolerable temperature rise in body tissue can result from exposure of 100 cm^2 or more of the body to microwaves of wave lengths 10 to 30 cm.
4. Recent information points directly to the production of cumulative effects by exposure to repeated low doses of microwaves. Although a power density of 0.28 watts/cm^2 on the eye for four minutes or less has not produced lens opacity in rabbits, repeated exposures of this power density do.

C. Sources of Microwaves:

No information is at hand suggesting the existing use of microwaves in refineries. Electronic devices emitting microwaves may be used as research tools. The common sources of this type radiation are radar installations. Power levels for future radar installations have been estimated to reach a peak value of 100,000,000 watts with an average approaching 1,000,000 watts.

D. Permissible Exposures:

Experimental studies on animals have shown that a safe power density for individual exposure would be 0.01 watts/cm^2 . This maximum safe exposure level includes a 10 to 20 times safety factor.

E. Measurement:

Microwave power fields may be surveyed by a "search" meter recently developed by Sperry Microwave Electronics Company, Clearwater, Florida.

F. Bibliography:

1. Carpenter, R. L., Tufts University, Professor of Zoology. Letter to Smith, M. K., Librarian, Med. Res. Div., Esso Res. & Eng. Co., June 6, 1958.
2. Carpenter, R. L.: Progress Report - Lenticular Opacities Resulting From Exposure of Rabbit Eyes to Microwave Radiation, Project No. 7783-1. Tufts University, June, 1957.
3. Knauf, G. M.: Industrial Medical Problems in an Electronic Research Center. A.M.A. ARCH. INDUST. HEALTH 17(5):383-388 (May 1958).
4. Knauf, G. M.: The Biological Effects of Microwave Radiation on Air Force Personnel. A.M.A. ARCH. INDUST. HEALTH 17(1):48-52 (Jan. 1958).
5. Williams, D. B., and Fixott, R. S.: A Summary of SAMUSAF Program for Research on the Biological Aspects of Microwave Radiation. Presentation at Tri-Service Conference on Biological Hazards of Microwave Radiation, Rome, N. Y., July 1957.
6. Occupational Health Newsletter 7(5) University of Washington, Seattle, Washington (May 1958).
7. Gordon, Z. W.: Hygiene-Probleme der Arbeit mit Zentimeterwellen-Generatoren. J. HYG. EPIDEMIOL. MICROBIOL & IMMUNOL. 1(4):472-3 Prague (1957).
8. McMurray, L. C.: Microwave Radiation Hazards. Presentation at the Annual A.I.H.A. Meeting, Atlantic City, April 1958.
9. Murray, R.: Anticipating and Planning for New Developments that Affect Industrial Health. Presentation at 28th Annual Safety Convention and Exposition, N. Y., April 1958.
10. Williams, C. R.: Industrial Hygiene Aspects of Microwaves. 20th Annual Meeting Industrial Hygiene Foundation Transactions 135-138 (1956).

DEVELOPMENTS IN THE FIELD OF NOISE

A. General

Industrial noise problems from the standpoint of both hearing loss and nuisance will be affected by the growing awareness of the public of need for noise control. More legislation seems in sight for control of community noises created by industrial installations, jet aircraft and traffic.

B. Legal

New laws on hearing loss for New York State make the last employer liable for compensation for all of an employee's loss of hearing unless liability has been transferred back to a previous employer by written notice within 90 days of a preplacement examination.

C. Damage Risk Criteria

At the Engineering Conference of the Industrial Hygiene Foundation Meeting held on October 29, Mr. Floyd E. Frazier, Director Industrial Division, National Association of Mutual Casualty Companies, reviewed the Current Trends in Criteria for Noise Levels in Industry. He gave a DRC currently proposed by the American Foundrymen's Association and modified by Dr. Aram Glorig, Subcommittee on Noise in Industry, AA00:

<u>Frequency, CPS</u>	<u>Db Re 0.002 Microbars</u>
20 - 75	102
75 - 150	97
150 - 300	92
300 - 600	85
600 - 1200	85
1200 - 2400	85
2800 - 4800	90
4800 - 10,000	90

D. Instrumentation

General Radio Company has announced that they are now offering the new Type 1551-B Sound Level Meter. Among the advantages of the new instrument are, lighter weight, improved calibration features, increased sound level range and new microphone positioning. The instrument will sell for \$395.00.

E. Noise Control

1. Engineering - An article entitled, "Oil Wells Make Good Neighbors" appeared in the May, 1958, issue of Noise Control. Written by a consulting engineer in Los Angeles, the article describes how well pumping machinery noise was controlled in semi-residential areas.

- 2 -

2. Personnel Protection - Two manufacturers of ear muffs have announced improved models in recent months. Willson Products Division of Ray-O-Vac, has come out with their Model No. 258, which has improved head band construction and new type liquid filled cushions. Mine Safety Appliances Company offers a new Noisefoe, Mark II, with new type headband and a choice of foam filled or grease filled vinyl seal pads for maximum comfort.

NOISE BIBLIOGRAPHY

Handbooks and Manuals

Harris, C. M., Handbook of Noise Control, McGraw-Hill, New York. 1957.
Price \$16.50

Noise Control Manual, American Industrial Hygiene Association, Order from
George D. Clayton, Executive Secretary. 14125 Prevost, Detroit 27, Michigan.
Price: \$4.50 to members of AIIHA, \$7.50 to non-members.

Peterson, A. G. and Beranek, L. L. Handbook of Noise Measurement, General
Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass. Price \$1.00

Bolt, R. H., Beranek, L. L. and Newman, R. B. Handbook of Acoustic Noise
Control. Volume I. Physical Acoustics, (WADC Technical Report 52-204)
Wright Air Development Center, Air Research and Development Command, USAF,
Wright Patterson AFB, Ohio, December 1952.

Rosenblith, W. A. and Stevens, K. N., Handbook of Acoustic Noise Control,
Volume II, Noise and Man, (WADC Technical Report 52-204) Wright Air
Development Center, Air Research and Development Command, USAF, Wright-
Patterson AFB, Ohio. June 1953, \$3.00.

The Relation of Hearing Loss to Noise Exposure Report of Exploratory Sub-
committee Z24-X-2. American Standards Association, Inc. 70 East 45th Street
New York 17, New York.

Watson, L. A., and Tolen, T. L., Hearing Tests and Hearing Instruments,
Williams and Wilkins Co., Baltimore, 1949.

Magazines

Noise Control, Published Bi-monthly by the American Institute of Physics
for the Acoustical Society of America. Subscription Department, 57 East
55th Street, New York 22, New York. \$8.00 per year.

A.M.A. Archives of Industrial Medicine, December 1957.

Bibliographies

Noise, Its Measurement, Effects and Control, Industrial Hygiene Foundation
of America, Inc., 4400 Fifth Avenue, Pittsburgh 13, Pa., 1955.

Other PublicationsA. General

The Acoustical Spectrum, University of Michigan, School of Public Health,
The University of Michigan Press, Ann Arbor, Michigan. 1952.

Guide for Conservation of Hearing in Noise, Subcommittee on Noise in
Industry, Research Center, 111 North Bonnie Brae Street, Los Angeles 26, Calif.

"Hearing Conservation" A booklet for employee orientation. North American Aircraft.

Lewis, D. K., "Recent Contributions to the Study of Deafness," New England J. of Med. 259, 169-178, 1958.

Hearing Aids, NBS Circular #534, U. S. Dept. of Commerce, March 1953.

Occupational Impairment of Hearing - A Legal Survey Industrial Hygiene Foundation of America, Inc. 4400 Fifth Avenue, Pittsburgh 13, Penn. (1955)

Benox Report - An Exploratory Study of the Biological Effects of Noise. ONR Project NR 144079. The University of Chicago (1953)

Variability of the Auditory Threshold with Time. Medical Research Laboratory Report No. 165, 1950. Medical Research Laboratory. U. S. Naval Submarine Base, New London.

Ear Defenders (An Investigation Into Their Attenuating Properties) Flying Personnel Research Committee, Report No. 884. Air Ministry - Royal Air Force - 1954. Available from: British Joint Services Mission Air Force Staff, 1800 K Street, Washington, D. C.

B. Audiometry

Sataloff, J., Industrial Deafness. McGraw-Hill, New York. 1957. \$8.00.

"Principles for Evaluating Hearing Loss," Council on Physical Medicine and Rehabilitation, A.M.A., 1955.

Films

Training Films on High Intensity Noise Problems. Obtainable from Bureau of Medicine and Surgery, Department of the Navy, Washington 25, D.C.

MN-9318a - Medical Aspects of High Intensity Noise, General Effects. (Black and White sound, 20 min.)

MN-9318b - Medical Aspects of High Intensity Noise -- Prevention of Hearing Losses (black and white, sound, 20 min.)

MN-9318c - Medical Aspects of High Intensity Noise, Ear Deafness. (black and white, sound, 20 min.)

REPETITIVE MOTION

Repetitive motion has been studied by various investigators to determine what factors cause physical and mental fatigue. It has been determined that the design of the machinery, working space and the posture of the individual will largely govern the degree of fatigue. Ideally, each machine and work area should be designed according to the anthropometric measurements of the individual operating the machine. The problem of repetitive motion has been studied from the standpoint of fatigue measurement and included measurement of psychophysiological functions such as the flicker fusion frequency, the equilibrium movements in orthostatic position, the optical reaction time, the capacity to calculate, the vigilance (test of Bourdon), the manual skill and the tremor of the fingers.

The majority of the investigators have concluded that proper human engineering will materially reduce fatigue. Reduction of fatigue in turn reduces the number of chronic musculo-skeletal conditions arising therefrom.

REPETITIVE MOTIONBibliography

E. E. Ghiselli and C. W. Brown, Personnel and Industrial Psychology. McGraw-Hill, New York, 1948.

J. C. Flanagan, The critical incident technique in the study of individuals. Modern Educational Problems, Report of the 17th Educational Conference. American Council on Education, Washington, 1952.

B. G. King, Measurements of man for making machinery, Am. J. Phys. Anthropol. 6. No. 3, 341-351 (1948).

J. H. Ely, R. M. Thomson, and J. Orlansky, "Layout of Workplaces," in Joint Services Human Engineering Guide to Equipment Design, Wright-Patterson Air Force Base, Ohio, 1956, Ch. V.

R. M. Barnes, Work Methods Manual. Wiley, New York. 1944. See also P. C. Squires, The shape of the normal work area, U. S. Naval Medical Research Laboratory, Report No. 275, New London, Conn., 1956.

H. L. Lipschultz and K. O. W. Sandberg, Maximum limits of working areas on vertical surfaces, Office of Naval Research, Special Devices Center, Report No. 166-1-8, 1947.

A. Chapanis, W. R. Garner, and C. T. Morgan, Applied Experimental Psychology, Human Factors in Engineering Design. Wiley, New York, 1949.

J. R. Garner, Posture in its relation to industrial fatigue, Med. J. and Record, 138, 73-77 (1933)

A. E. Javitz, ed., Human Engineering in equipment design. Electrical Manufacturing Combined Reprint. Gage Publishing Company, New York, 1956.

J. H. Ely, R. M. Thomson, and J. Orlansky, "Design of Controls," in Joint Services Human Engineering Guide to Equipment Design, Wright-Patterson Air Force Base, Ohio, 1956.

A. D. Glanville and G. Kreezer, the maximum amplitude and velocity of joint movements in normal male adults, Human Biology, 9, 197-211 (1937)

A. T. Slater-Hammel and J. S. Brown, Discrete movements in the horizontal plane as a function of their length and direction, Rept. No. 2 on Project 2, Contract N5ori-57, Special Devices Center, October, 1947.

J. S. Brown and E. B. Knauff, Positioning reactions of uniform length executed at various distances from the body, Rept. No. 4 on Project 2, Contract N5ori-57, July, 1948.

J. S. Brown and A. T. Slater-Hammel, The effect of speed-up instructions upon the performance of discrete movements in the horizontal plane, Rept. No. 3 on Project 2, Contract N5ori-57, January, 1948.

Handbook of human engineering data for design engineers, Tuft's College Institute for Applied Experimental Psychology, Tech. Rept. SDC 199-1-, NavExos p-643, Special Devices Center, Office of Naval Research, Dept. of the Navy, 1949.

M. B. Fisher and J. E. Birren, Standardization of a test of hand strength, Research Project X-293, Report No. 5, Naval Medical Research Institute, National Naval Medical Center, April, 1945.

W. W. Tuttle, C. D. Janney, and C. W. Thompson, Relation of Maximum Grip strength to grip strength endurance, J. Appl. Physiol., 2, 663-670 (1950).

P. M. Fitts, "A Study of Location Discrimination Ability," in P. M. Fitts, ed., Psychological Research in Equipment Design, Rept. No. 19, USAAF Aviation psychology Program. U. S. Government Printing Office, Washington, 1947, Ch. 15.

L. G. Clark and G. M. Weddell, The pressure which can be exerted by the foot of a seated operator with the leg in various positions, R. N. P. 44/153 Royal Naval Personnel Research Committee, Med. Research Council, Cambridge University, England, 1944.

Singleton, W. J.: The Application of Experimental Psychology to Man/Machine Systems; Transactions of the Twelfth International Congress on Occupational Health, Vol. I, pp 63-64; Vol. II, pp 20-21; Vol. II, p. 100.

Grandjean, Etienne and Egli Robert: Physiological and Medical investigations on Occupational Fatigue; Transactions of the Twelfth International Congress on Occupational Health, Vol. III, p. 45.

VASCULAR VIBRATORY SPASM

During the past ten years there has been an increase in the manifestations of "Raynaud's phenomena of occupational origin." This has been defined as "intermittent pallor or cyanosis of the extremities precipitated by exposure to cold without clinical evidence of blockage of the large peripheral vessels," and has been caused by the use of vibrating tools in industry.

It has been determined that frequencies of 2400 to 7500 cycles per minute are concerned with producing this occupational disease with the most common range between 3000 to 3500 cycles per minute.

Several hypotheses have been advanced for the mechanism of production of vascular vibratory spasm and it would appear that a future laboratory study under controlled conditions would aid in helping to clarify this purely theoretical knowledge of the disease.

VASCULAR VIBRATORY SPASMBibliography

Loriga, of Rome, 1911, cited by Barker, N. W., and Hines, E. A.: Arterial Occlusion in the Hands and Fingers Associated with Repeated Occupational Trauma. Proc. Staff Meet. Mayo Clin., 19:345, 1944.

Cottingham, C. C.: cited, The President Monthly Report. Stone Cutters J., 32:5 (May) 1917.

Hamilton, A.: A Study of Spastic Anemia in the Hands of Stonecutters. In Bull. 236, U. S. Department of Labour, Bureau of Labour Statistics, Industrial Accidents and Hygiene Series 19:53, 1918.

Middleton, E. I., Am. Rep. H. M. Chief Insp. Fact., 119, (1930), cited by Agate, J. N.: An Outbreak of Cases of Raynaud's Phenomenon of Occupational Origin. British J. Indust. Med., 6, 144, 1949.

Leake, J. P.: Health Hazards from the Use of the Air Hammer in Cutting Indiana Limestone. Pub. Health Rep., 33:379 (March 22) 1918.

Telford, E. D., McCann, M. B., and MacCormack, D. H.: Lancet, 2:359, 1945.

Agate, J. N., Druett, H. A., and Tombleson, J. B. L.: Raynaud's Phenomenon in Grinders of Small Metal Castings. Brit. J. Indust. Med., 3:167 (July) 1946.

Gurdjian, E. S., and Walker, L. W.: Traumatic Basospastic Disease of the Hand (White Fingers) with Particular Reference to Biopsy Findings. J.A.M.A., 129:668 (November 3) 1945.

Agate, H. N., and Druett, H. A.: A study of Portable Vibrating Tools in Relation to the Clinical Effects They Produce. Brit. J. Indust. Med., 4:141, 1947.

Walker, L. W., and Gurdjian, E. S.: Types and Pathogenesis of Disease Produced by Vibrating Tools. The Grace Hospital Bulletin, p. 87 (July) 1948.

Agate, J. N.: An Outbreak of Cases of Raynaud's Phenomenon of Occupational Origin. Brit. J. Indust. Med., 6:144, 1949.

Dart, E. E.: Effects of High-Speed Vibrating Tools on Operators Engaged in the Airplane Industry. Occup. Med., 1:515 (June) 1946.

Barker, N. W., and Hines, E. A.: Arterial Occlusion in the Hands and Fingers Associated with Repeated Occupational Trauma. Proc. Staff Meet. Mayo Clin., 19:345, 1944.

UltrasonicsAbstract of Literature

Ultrasonics is the general subject of sound in the frequency range above about 15 kilocycles per second (15,000 cycles per second). With the exception of certain jet and rocket engines, few if any of the present day machines and equipment employed in industry are capable of producing such frequencies with any appreciable degree of intensity. The human ear does not respond to airborne frequencies in the ultrasonic range and there appears to be no danger from long term fatiguing effects which might result in the suppression of hearing acuity. The problem of ultrasonic frequencies, especially those above 100 kilocycles, seems to lie in the generation of heat in the tissue cells subjected to such frequencies. Fortunately, propagation of ultrasonic frequencies through the air becomes poorer with an increase in frequency due to the attenuation by the air medium. In addition, the absorption of energy at such high frequencies is relatively low for human beings, permitting the determination of permissible limits of exposure as in the application to therapeutic medicine.

Bibliography

a. Biological Effects

1. Biological and Psychological Effects of Ultrasonics
H. Davis
J. Acoust. Soc. Am. 20:605, 1948
2. Hazards of Intense Sound and Ultrasound
H. Davis, et al
Ann. Otol., Rhin. and Laryng. 58:732, 1949
3. Some Biological Effects of Intense High Frequency Airborne Sound
C. W. Allen, et al
J. Acoust. Soc. Am. 20:62, 1948
4. Noise Safety Criteria
Kryter, K. D.
Arch. Ind. Hyg. and Occ. Med. 5:117, 1952
5. Investigation of the Uses of Ultrasound in Experimental Medicine
J. F. Herrick
Ind. Hyg. Quart. 14:168, 1953
(A condensation of results of many investigations by the author and colleagues. List of original publications.)
6. Biological Aspects of Ultrasonic Waves: A General Survey
E. N. Horrey
Biol. Bull. 59:306, 1930
7. See also 5 in Section C. Industrial Uses and Control

b. Medical Applications

1. An Experimental Study of the Effects of Ultrasonic Energy on the Lower Part of the Spinal Cord and Peripheral Nerve
T. P. Anderson, et al
Arch. Phys. Med. 32:71-83, 1951
2. Temperatures Produced in Bone Marrow, Bone and Adjacent Tissue by Ultrasonic Diathermy
P. A. Nelson, et al
Arch. Phys. Med. 31:687-695, 1950
3. Histology of Cerebral Lesions Produced by Ultrasound
J. G. Lynn, et al
Am. Jour. Path. 20:637, 1944

c. Industrial Uses and Control

1. Ultrasonics and Their Scientific and Technical Applications
L. Bergmann
John Wiley & Sons, Inc., N. Y., 1938
2. Measurement of the Acoustic Impedence and the Acoustic
Absorption Coefficient of the Surface of the Human Body
USAF Technical Report #6010
USAF Air Material Command, Dayton, Ohio, 1950
3. Ultrasonics
B. Carlin
McGraw Hill Book Co., Inc., N.Y., 1949
4. A Survey of the Aircraft Noise Problem with Special
Reference to Its Physical Aspects
E. H. Hubbard
NACA Tech. Note 2701, 1952
5. Clinical Effects of Noise and Mechanical Vibrations of a
Turbo Jet Engine on Man
A. L. Finkel, et al
J. Appl. Physiol. 1:183, 1948

ULTRAVIOLET RADIATION

- A. The health aspects of ultraviolet radiation have been known for many years. Therefore, this summary will cover only a new and significant source of ultraviolet radiation associated with welding.
- B. Ultraviolet radiation from shielded arc welding is usually 20-30 times as intense as from conventional arc welding. The industrial hygiene implications are as follows:
 1. This is capable of producing erythema in a few seconds and actual skin burns with a few minutes of exposure.
 2. This very strong ultraviolet has the ability to decompose certain chlorinated hydrocarbons with the formation of phosgene. For example, measurement of trichloroethylene vapors around a degreaser indicated a concentration of 30 ppm. After shielded arc welding was done in this area, the phosgene level in the air was 35-40 ppm.
 3. Oxides of nitrogen may be formed with a range up to 6.0 ppm, with most values in the order of 1-2 ppm.
 4. Ozone may be produced. Concentrations in the air around this type welding are reported up to a maximum of 12 ppm, with most values in the range 1/10 to 1.0 ppm.

APPENDIX L

REPORT OF THE SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS
H. W. Gerarde, M. D., Chairman

1. Since the April meeting, two drafts on butadiene, naphthalene, naphthenic acids and copper naphthenate have been circulated to the members of the Medical Advisory Committee for review.
2. A number of excellent suggestions received from the members have been incorporated in the third draft which will be circulated for final review.
3. If approval is obtained, these reviews will be submitted to the Medical and Health Committee with a recommendation that they be published. The Medical Advisory Committee has already accepted Dr. Drinker's invitation to publish the Toxicological Reviews in the A.M.A. Archives of Industrial Health.
4. The next group of reviews to be submitted to the members of the Medical Advisory Committee will include:
 - a. Toluene
 - b. Benzene
 - c. Cumene
 - d. Xylene
 - e. Cyclohexane
 - f. Aromatic Solvent Naphtha
 - g. Kerosine
5. First drafts are in preparation on ten additional reviews.
6. The committee requests that \$10,000 be allocated to cover the cost of the proposed work.

I move the adoption of this report.

APPENDIX M

REPORT OF THE SUBCOMMITTEE ON INDUSTRIAL HYGIENE

J. A. Spence, Chairman

The Subcommittee on Industrial Hygiene met on November 8, 1958 with eight (8) members and three (3) guests present. Members absent were Dr. Blaney and Messrs. Daniels and Dooley.

Liaison members reported on the activities of the American Standards Association committees Z-37 Toxic Dusts and Gases, Z-4 Industrial Sanitation, Z-62 Industrial Hygiene Standards. Mr. Hendricks reported the Z-62 committee has been activated and will develop industrial hygiene standards for work places using chemical, physical and biological agents. It is believed the first draft of the standards will be ready by about mid-1959. Liaison member with the American Conference of Governmental Industrial Hygienists reported no recent activities.

The Subcommittee continued work on the catalyst project. Mr. Halley presented the first draft compiling all the information provided by the subcommittee members on catalysts used in petroleum refining. These include alkylation, reforming, isomerization, hydroforming, catalytic cracking, hydro-desulfurizing, and polymerization. Suggested changes are to be made and a second draft circulated for approval by the subcommittee. It is anticipated this will be presented to the Medical Advisory Committee at the November 1959 meeting along with a summary of the findings with suggestions for action if indicated.

At the request of Dr. Gerarde, the Subcommittee on Industrial Hygiene is preparing information on the MANUFACTURE, USES AND POSSIBILITIES OF EXPOSURE to be included in the TOXICOLOGICAL REVIEWS. Work has been completed on ten (10) of the twenty-five (25) chemicals requested.

It was brought to the attention of the Subcommittee that there may be need to study the potential hazard related to cobalt, nickel and other metallic carbonyls related to certain refining operations. Mr. Hendricks is to develop additional information indicating the seriousness of the problem and its importance to the petroleum industry. This is to be discussed at the April 1959 meeting and, if indicated, suggestions for action will be prepared.

Report of Special ad hoc Subcommittee on Epidemiology

A report was made to the M.A.C. on 18 March 1958. That report recommended that a standing subcommittee on epidemiology be formed and described some of the possible objectives and listed a few specific examples of subjects which might be suitable for study. General discussion of the report indicated some lack of understanding of the epidemiologic approach and some skepticism about the possibility of collecting data and about the willingness of member companies to cooperate. The ad hoc subcommittee was asked to make a more "elaborate and formal" presentation at this meeting.

It is the opinion of the subcommittee that its function has been to study the need for and the possible usefulness and success of a subcommittee on epidemiology and to make appropriate recommendations to the M.A.C. It is not believed that it is a function of this subcommittee to make a detailed or elaborate report dealing with methods of operation and subject matter. That should be the duty of a subcommittee on epidemiology if one is formed. After further deliberations and discussions with other members of the M.A.C. the ad hoc subcommittee again recommends that the M.A.C. create a standing subcommittee on epidemiology.

To elaborate on this recommendation, a definition of epidemiology is required. The derivation of the word itself is clarifying. "Epi" means "upon"; "demos" means the "people" or the population at risk; and "logy" refers to a "study" of or the "logic" of. Hence, epidemiology is the study of the occurrences of qualities, conditions, diseases and deaths as mass phenomena among groups of people.

It is a descriptive as well as an analytic discipline by which an attempt is made to make meaningful deductions from observations. It is concerned not only with diseases, infections, degenerative, and other types, but also with qualities and characteristics of groups and with events which may occur in those groups. But in order to be of significance, a record of the occurrences of the disease, conditions, qualities or events must be related to a finite, limited group. In other words, the denominator, the population at risk, must be known as well as the numerator, the observed occurrence.

There are many conditions, occurrences or events which might be subjects for useful studies among groups of petroleum industry employees. However, it is the opinion of the subcommittee that objectives be limited to those subjects felt to be of significant interest to the A.P.I., and for which adequate data could be collected without undue effort from known population groups. Subjects for possible consideration might include, to cite two examples, age specific death rates by cause, or a study of the health status of truck drivers in relation to age.

To enlarge upon the study of death rates, it would seem to be of value to know at what rate employees are dying in the various age groups, and from what causes, in order to compare the mortality experience in the petroleum industry with other industries, or to compare rates for different groups within the industry. It is felt that information on deaths could be readily gathered from various units among our member companies, where such information is already being tabulated and where the populations at risk are defined.

The health status of truck drivers in relation to age is important. Truck drivers comprise one of the largest job categories in our industry. A survey conducted on a large sample of drivers in one large company several years ago revealed certain characteristics. One of the most important was that a large proportion of drivers past the age of 50 or 55 years had one or more conditions which should exclude them from truck driving according to I.C.C. regulations.

B. E. Bennison, M. D.
G. M. Saunders, M. D.

Report of Liaison with Smoke and Fumes Committee

Your Chairman has met twice with this committee - the first time on May 9, 1958 in Los Angeles at which time, in accordance with the minutes of our Subcommittee meeting of April 21, 1958, I submitted the report which had been prepared by Dr. Eckardt of Esso entitled "Sulfur Oxides and the Air Pollution Health Problem" as our official report to the Smoke and Fumes Committee. Our Subcommittee felt it had no means of doing research on the toxicity of sulfur oxides and we supported all statements made by Dr. Eckardt in this regard and therefore adopted his report. This was accepted by the Smoke and Fumes Committee.

On November 10, 1958 your Chairman as liaison to the Smoke and Fumes Committee and accompanied by Doctor Phillip Drinker attended the meeting of the Technical and Research Division of the Smoke and Fumes Committee and submitted to them a statement (statement - Appendix E) prepared by the Subcommittee on Atmospheric Pollutants on Proposed Rule No. 62. The Committee accepted this statement and adopted this statement and your Chairman was advised to carry to the Medical Advisory Committee their respects. They also wished to compliment us on refuting, from the medical standpoint, evidence which is being submitted under the guise of Rule 62 to the Board of Supervisors of Los Angeles County which would outlaw the burning of fuel oil with a sulfuric content exceeding 0.5%.

Your Chairman stated informally that this statement would be presented to the Medical Advisory Committee for their adoption on the medical facts that it contained and that this statement should be used by the Smoke and Fumes Committee in their attempt to refute statements which are not based on factual data.

COPY

APPENDIX P

November 5, 1958

Mr. J. A. Spence, Chairman
Subcommittee on Industrial Hygiene
Standard Oil Company of California
220 Bush Street
San Francisco 20, California

Dear Mr. Spence:

Herewith is my report on the activities of the ASA
Committees on which I serve as the API representative.

Z-37 Committee on Maximum Acceptable Concentrations of
Toxic Dusts and Gases

Letter Balloting by the Committee has been completed on
3 standards. They are now being processed by the ASA for release.

Methyl chloride	- 100 ppm				
Styrene monomer	- 400 ppm	(slight discomfort at 100 ppm)			
Toluene	- 200 ppm	"	"	"	"

Balloting by the Z-37 Committee will get under way soon on
7 standards:

Formaldehyde	- 10 ppm
Xylene	- 200 ppm
Trichloroethylene	- 200 ppm
Tetrachloroethylene	- 200 ppm
Ethylene dichloride	- 200 ppm
Benzene	- 25 ppm
Methyl bromide	- 20 ppm

Z-4 COMMITTEE ON INDUSTRIAL SANITATION

The Subcommittee on Specifications for Drinking Fountains
is still drafting a proposed standard. The Subcommittee on
Specifications for the Sanitary Privy and on Sanitation Standards
for Temporary Labor Camps and Construction Operations have been
inactive.

Yours very truly,

AED:AG
cc: E. O. Mattocks

ALLAN E. DOOLEY

API 07440

APPENDIX Q-1

ESSO RESEARCH AND ENGINEERING COMPANY
(Formerly Standard Oil Development Company)

P. O. Box 45, Linden, N. J.

MEDICAL RESEARCH DIVISION

R. E. Eckardt, Ph.D., M.D.

Director

B. E. Benninon, M. D.

Assistant Director

N. V. Hendricks, Ch. E.

Sr. Eng. Assoc.

H. W. Gerarde, Ph.D., M.D.

Res. Assoc.

Telephone: WAbash 5-1600

November 24, 1958

Mr. Elmer O. Mattocks
American Petroleum Institute
50 West 50th Street
New York 20, New York

Dear Mr. Mattocks:

On September 25, I wrote you about a meeting of the American Standards Association's Uniform Industrial Hygiene Standards Z62 Committee. The following will provide you with more detailed information on the constitution and background of this committee.

In April of 1949, the American Conference of Governmental Industrial Hygienists issued a uniform industrial hygiene code. This was to serve as a model for legislative bodies or administrative agencies having powers to regulate working conditions in industrial and other locations. It was an effort to promote some uniformity in the coverage and administration of such codes.

This proposed code received wide circulation and comments were invited. Many of the comments suggested that standards for conditions in working places ought to be developed rather than codes. This concept was acceptable to the American Conference of Governmental Industrial Hygienists, and it was further endorsed by the American Industrial Hygiene Association. At that time, it was agreed that both of these organizations would be willing to sponsor the preparation of such standards within the general frame-work of the American Standards Association. A standard in this area seemed reasonable to the American Standards Association, and accordingly, a sectional committee known as Z62 was established by ASA.

The next step was the selection of people who would actually do the writing of the proposed standards. The thinking, at the time, was to have a carefully selected group of people qualified in industrial hygiene and related matters to prepare these standards, but this was to be a restricted group. There were some ASA members who objected to this procedure as they felt the preparation of this material ought to be done along the established procedures already set up with ASA. According to these procedures, any interested body could have representation on the Z62 Committee. After some discussion, the decision was made to proceed according to established ASA policies, and it has taken several years for the

Mr. Elmer O. Mattocks

- 2 -

November 24, 1958

Z62 Committee to finally become active. Attached is a list of the people who are now on the Z62 Committee, and the groups which they represent.

My letter of September 25 reports to you the results of the first meeting of this committee which was held on September 23.

Very truly yours,

/s/ N. V. Hendricks

N. V. HENDRICKS

NVH:mew

Enc.: Corres. from American Standards Association of April 1, 1958 re.:
Personnel of ASA Sectional Committee on Uniform Industrial Hygiene
Standards, Z62

cc. w/attach.: Dr. V. C. Baird

AMERICAN STANDARDS ASSOCIATION
Incorporated
70 East Forty-fifth Street New York 17, N.Y.

ASA

Q-3

Z62/9
April 1, 1958

Personnel of ASA Sectional Committee
on
Uniform Industrial Hygiene Standards, Z62

Scope of Project: Good practice standards for the prevention and control of those conditions in industry which may deleteriously affect the health or well-being of the employees.

Sponsors: American Conference of Governmental Industrial Hygienists
American Industrial Hygiene Association

Officers: C. D. Yaffe, Chairman
Norman G. White, Secretary

<u>Organization Represented</u>	<u>Name and Business Affiliation</u>
American Conference of Governmental Industrial Hygienists	C. D. Yaffe, Sanitary Engineering Director Chief, Program Services Occupational Health Field Headquarters U.S. Public Health Service 1014 Broadway Cincinnati 2, Ohio
American Foundrymen's Society	Herbert J. Weber, Director Safety, Hygiene & Air Pollution Control American Foundrymen's Society Golf and Wolf Roads Des Plaines, Illinois
American Industrial Hygiene Association	Norman G. White (Dr) Shell Chemical Corporation 50 West 50th Street New York 20, New York
American Medical Association	John N. Gallivan (Dr) 400 Main Street East Hartford, Connecticut
alternate	Melvin N. Newquist (Dr) The Texas Company 135 East 42nd Street New York 17, New York
American Petroleum Institute	N. V. Hendricks Medical Research Division Esso Research and Engineering Company P.O. Box 121 Linden, New Jersey

April 1, 1958

- 2 -

Organization RepresentedName and Business Affiliation

API continued

alternate

P. D. Halley
Standard Oil Company (Indiana)
910 South Michigan Avenue
Chicago 80, Illinois

American Public Health Association

Herbert T. Walworth
Director of Industrial Hygiene
Lumbermens Mutual Casualty Company
4750 Sheridan Road, North
Chicago 40, Illinois

American Society of Heating and Air-
Conditioning Engineers

Allen D. Brandt (Dr)
Chief Industrial Hygiene Engineer
Bethlehem Steel Company, Inc.
Bethlehem, Pennsylvania

American Society of Mechanical Engineers

John V. Grimaldi (Dr)
Consultant - Safety and Plant Protection
General Electric Company
570 Lexington Avenue
New York 22, New York

American Society of Safety Engineers

Robert H. Albisser, Safety Director
Merck and Company, Inc.
Rahway, New Jersey

alternate

S. F. Spence, Director
Safety and Loss-Prevention
American Cyanamid Company
30 Rockefeller Plaza
New York 20, New York

American Welding Society

H. F. Reinhard, Secretary
International Acetylene Association
30 East 42nd Street
New York 17, New York

Frederick C. Saacke, Safety Director
Air Reduction Company, Inc.
150 East 42nd Street
New York 17, New York

Association of Casualty and Surety Cos.

James F. Van Namee, Director
Engineering and Research Division
Association of Casualty and Surety Cos.
60 John Street
New York 38, New York

alternate

Robert Hagopian, Assistant Manager
Accident Prevention Department
Association of Casualty and Surety Cos.
60 John Street
New York 38, New York

April 1, 1958

<u>Organization Represented</u>	<u>Name and Business Affiliation</u>
Illuminating Engineering Society	Leonard G. Parks, Jr. Ebasco Services, Inc. 2 Rector Street New York, New York
alternate	C. L. Crouch, Technical Director Illuminating Engineering Society 1860 Broadway New York 23, New York
Industrial Medical Association	John H. Foulger (Dr) Director of Medical Research E. I. du Pont de Nemours and Company, Inc. Wilmington 98, Delaware
alternate	A. Gerard Cranch (Dr) One Highview Avenue Norwalk, Connecticut
International Association of Govern- mental Labor Officials	Jack Baliff Associate Industrial Hygiene Engineer New York Department of Labor 80 Centre Street New York 13, New York
Manufacturing Chemists' Association	C. U. Dernehl (Dr) Union Carbide and Carbon Corporation 30 East 42nd Street New York 17, New York
National Association of Mutual Casualty Companies	Joseph A. Houghton, Supervisor Industrial Field Service Liberty Mutual Insurance Company Research Center - Frankland Road Hopkinton, Massachusetts
alternate	James W. Lake, Industrial Hygiene Engineer Michigan Mutual Liability Company 28 West Adams Avenue Detroit 26, Michigan
National Safety Council	Elmer P. Wheeler, Assistant Director Medical Department Monsanto Chemical Company St. Louis 4, Missouri
alternate	Edwin L. Alpaugh Director, Industrial Hygiene National Safety Council 425 North Michigan Avenue Chicago 11, Illinois

April 1, 1958

Organization Represented

Name and Business Affiliation

U.S. Bureau of Mines, Department of
the Interior

Robert H. Flinn (Dr)
Chief, Division of Health
Bureau of Mines
U.S. Department of the Interior
Interior Building
Washington 25, D.C.

alternate

L. B. Berger, Chief
Branch of Health Research
Bureau of Mines
U.S. Department of the Interior
4800 Forbes Street
Pittsburgh 13, Pennsylvania

U.S. Department of the Air Force

Jack C. Carmichael (Col), USAF (MSC)
Chief, Engineering Branch
Office of the Surgeon
Air Material Command
Wright-Patterson Air Force Base, Ohio

alternate

Robert W. Gehrig (1/Lt), USAF (MSC)
ATTN: Office of the Surgeon, MCDPE
Air Material Command
Wright-Patterson Air Force Base, Ohio

U.S. Department of Labor, Bureau of
Labor Standards

William G. Griffin, Assistant Chief
Division of Safety Standards and Services
Bureau of Labor Standards
U.S. Department of Labor
Washington 25, D.C.

U.S. Department of Labor, Bureau of
Labor Statistics

George R. McCormack, Chief
Branch of Special Studies
Division of Industrial Hazards
Bureau of Labor Statistics
U.S. Department of Labor
Washington 25, D.C.

alternate

Frank S. McElroy, Chief
Division of Industrial Hazards
Bureau of Labor Statistics
U.S. Department of Labor
Washington 25, D.C.

U.S. Department of the Navy

* V. B. Johnson
Safety Branch
Bureau of Ships, Code 350
U. S. Department of the Navy
Washington 25, D.C.

* At the March 18, 1958 meeting of the Z62 Sectional Committee the Department of the Navy was represented by J. Siegel of the Bureau of Medicine and Surgery.

Q-7
Z62/9

- 5 -

April 1, 1958

Organization Represented

Name and Business Affiliation

USN continued

alternate

Morris Alpert
Bureau of Ships, Code 350
U.S. Department of the Navy
Washington 25, D.C.

U.S. Public Health Service, Department
of Health, Education and Welfare

Lewis J. Cralley (Dr), Assistant Chief
Occupational Health Field Headquarters
U.S. Public Health Service
1014 Broadway
Cincinnati 2, Ohio

alternate

Henry N. Doyle, Assistant Chief
Occupational Health Program
U.S. Public Health Service
Washington 25, D.C.

ESSO RESEARCH AND ENGINEERING COMPANY
(Formerly Standard Oil Development Company)

P. C. Box 45, Linden, N. J.

MEDICAL RESEARCH DIVISION
Robert E. Eckardt, Ph.D., M.D.
Director
Bertrand E. Bennison M.D.
Assistant Director
N. V. Hendricks, Ch. E.
Head Industrial Hygienist
Horace W. Gerarde, Ph.D., M.D.
Head Toxicologist

September 25, 1958

Mr. Elmer O. Mattocks
American Petroleum Institute
50 West 50th Street
New York 20, New York

Dear Mr. Mattocks:

As a representative of the American Petroleum Institute, I attended on Tuesday, September 23 a meeting of the American Standards Association's Uniform Industrial Hygiene Standards Z62 Committee. The following summarizes the action taken at this meeting.

1. The Subcommittee on Scope recommended that the standards to be prepared cover the following areas.
 - a. A definition of the exposure or hazard.
 - b. Nature of the exposure.
 - c. Criteria for evaluating hazard or exposure.
 - d. Instrumentation techniques and facilities for exposure study and evaluation.
 - e. Suggested control procedures.
 - f. Sources of additional information or services.
2. Employing the procedures outlined above, the following subjects are to be reviewed.
 - a. A brief introduction giving philosophies, background and the like.
 - b. Chemical agents.
 - c. Biological agents.
 - d. Physical agents.
 - e. Personal facilities--sanitation and housekeeping.

Mr. Elmer C. Mattocks

- 2 -

September 25, 1958

3. Groups from the over-all committee are to be selected and assigned to the task of writing the various sections of the standards. After appointment of the writing groups, the first draft of the material will be expected within six (6) months.

Very truly yours,

/s/ N. V. Hendricks

N. V. HENDRICKS

NVH/mew

cc.: Dr. V. C. Baird, Humble Oil & Refining Company

SUMMARY OF WAX RESEARCH PROJECT

Presented by R.E. Eckardt, M.D.,
Chairman Advisory Committee to Wax Research Project

In August 1956 at a meeting of the Carcinogens in Food Committee of the International Union Against Cancer, Dr. W. C. Hueper of the U.S. National Cancer Institute, U.S. Department of Health, Education and Welfare, stated that coating waxes were suspected of containing carcinogens. This was widely heralded in the lay press and led to a number of inquiries being made of petroleum companies.

Upon his return to the United States, Dr. Hueper requested Mr. E. Kellogg, of the Milk Industry Foundation, to collect dairy carton wax samples from a series of dairies in the United States. A total of about 40 such samples were collected. Twenty-four of these were sent by Dr. Hueper to Dr. Philippe Shubik of the Chicago Medical School.

In the Fall of 1957, Dr. Shubik made known to the petroleum industry the results of his investigations of these samples. The ultraviolet (U-V) absorption spectrum of a chromatographed sample from one of the waxes indicated the presence of 1,2,5,6-dibenzanthracene at a concentration of 0.4 microgram per gram of wax. The U-V absorption spectra of 2 other samples suggested the presence of this compound, but the data were not conclusive. As a result of these preliminary studies, the API signed a contract with Dr. Shubik to study waxes which might come in contact with food. This contract called for work by Dr. Shubik at a level of \$100,000 per year. The Wax Research Advisory Committee was established by the API to assist and guide Dr. Shubik in the technical phases of wax and to collect samples for him.

To date, some 18 paraffin (macrocrystalline) and 8 microcrystalline waxes have been made available to Dr. Shubik in 100 pound lots for his testing program. No carcinogenic hydrocarbon has been identified to date in any of these 26 wax samples. Chromatography and subsequent U-V absorption spectra of the aromatic fractions have disclosed wide variability, presumably in purity, of the 26 waxes.

Biological tests have been started on several waxes. The one wax sample in which 1,2,5,6-dibenzanthracene was demonstrated has been painted on the skin of mice as a 15% solution in benzene 3 times a week for 43-48 weeks. Although 3 benign tumors have developed, they did not develop in the painted area and are believed by Dr. Shubik to be of no significance. In 3 groups of mice, 0.05, 0.1 or 0.5 gm of this wax has been implanted subcutaneously. No tumors have appeared after 46 weeks.

Five waxes of the 26 supplied by the committee (3 paraffin and 2 microcrystalline) selected on the basis of a wide range of U-V absorption are being subjected to the following biological tests.

1. Mouse skin painting as a 15% solution in benzene.
2. Rabbit skin painting.
3. Mouse subcutaneous implantation.
4. Rat feeding.

All tests to date are negative, but it is much too soon to draw any conclusions.

(CONTINUED)

- 2 -

The plan of Dr. Shubik's experiments has been discussed with the Food and Drug Administration of the U.S. Department of Health, Education and Welfare, who have found them to be satisfactory.

In the meantime, Dr. Hueper has sent all 40 samples collected by Mr. Kellogg to Dr. Paul Kotin of the University of Southern California. Rumor has it that Dr. Kotin, in a paper dealing with the extraction, by milk protein, of carcinogen added to waxes, states that some dairy waxes contain a known carcinogen. This paper is believed to have been submitted to SCIENCE for publication. The statement is presumably based on his confirmation of Dr. Shubik's preliminary observations on one of the wax samples collected by Mr. Kellogg. The Wax Research Advisory Committee has reason, based on chemical examination of other samples of a wax similar to this one, to believe that this one sample is somehow unusual and not truly representative of milk carton waxes.

SUMMARY OF WAX RESEARCH PROJECT

In summary, the Wax Research Advisory Committee believes it essential that the wax research being sponsored by the API under the direction of Dr. Shubik at the Chicago Medical School be pursued for another year at the present level. It, therefore, respectfully requests the Medical and Health Committee of the Board to budget \$100,000 for the Wax Research Project for the year July 1, 1959 to June 30, 1960.

REE:mew/rf

November 10, 1958.

REPORT OF THE MEDICAL ADVISORY COMMITTEE
TO
MEDICAL AND HEALTH COMMITTEE

November 10, 1958
V. C. Baird, M.D., Chairman

The Medical Advisory Committee has completed another very successful year. As in the past, the Medical Advisory Committee and most of the Subcommittees met at a mid-year meeting, in the spring, at the time of the Industrial Medical Association meeting.

In 1946 the API was authorized to enter into an agreement with the Kettering Laboratory of Applied Physiology of the University of Cincinnati to investigate the toxicology and mode of action of certain petroleum products. Kettering has continuously pursued this investigation since that time. Extensive chemical and biological tests have been conducted on a large number of petroleum streams. It is planned, and Kettering has been so informed, that the work is to be completed and the contract will terminate on June 30, 1959. In addition to accumulating a considerable amount of very worthwhile information, the industry believes that this investigation has been extremely worthwhile in determining the possible toxic nature of a large number of critical streams of products.

Since there was need for additional information about physiological effect of smog from petroleum sources on human beings, approval was obtained to secure the services of an expert in this field to investigate this problem. M. W. Goldblatt, M.D., of Pollards Wood Research Station, England, agreed to undertake the desired study. Dr. Goldblatt visited the United States during the past summer and contacted a number of authorities in this country. He spent some time with the chairman and members of the subcommittee on Air Pollution. It is expected that he will submit his report in the spring of 1959.

The Medical Advisory Subcommittee on Atmospheric Pollutants has worked very closely with the Division of Refining Committee on Smoke and Fumes on this problem.

After receiving approval of the Medical and Health Committee, the API entered into a contract in June, 1955 with the Medical Branch of the University of Texas to investigate the toxicology of C₉ - C₁₂ aromatic hydrocarbons. This investigation has been going on continuously. Extensive biological tests have been run. Upon reviewing the literature, it was found that there was not enough known about the toxicology of the aromatics under investigation. This study is progressing nicely. It is believed that considerable worthwhile information will be obtained from the investigation concerning the toxicology of aromatics. It is believed that this information is very desirable, especially with the increased aromatic content of petroleum products.

Upon approval of the Medical and Health Committee, the API entered into an agreement with D. W. Daeschner, Jr., M.D., Assistant Professor of Pediatrics, Baylor University, to study the treatment of kerosine poisoning. Dr. Daeschner

sees a relatively large number of kerosine poisoning cases each year. It is planned that his study will be augmented by tests made by one or more of the members of the Medical Advisory Committee. It is expected that this study may continue into 1960.

The Toxicological Reviews which were published by the API, the first series in 1948 and the second series in 1953, are currently undergoing revision. It is expected that some of these may be available for approval for publication sometime next year. These reviews have become valuable sources of information on Problems of Toxicology related to the Petroleum Industry.

The Medical Advisory Committee and its Subcommittee on Dermatology were requested by the Lubrication Committee of the Division of Marketing to review and approve a proposed pamphlet entitled "Good Plant Practices for Workers Using Petroleum Products" and a proposed wall chart on this subject. This was prepared by the Industrial Hygiene Association. Our group thought this was a very good piece of work.

The effect of noise on employees, especially in our refineries, is being studied by the Subcommittee on Noise in Industry of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology. Through financial assistance to this group, we have been able to secure information on the effect of industrial noise. This is an increasingly important problem for all industries.

For the first time in more than ten years the Medical Advisory Committee is not requesting any new money to carry on its work. An unobligated balance of approximately \$48,000 will be on deposit January 1, 1959. This amount should be sufficient to carry on the committee's work until June 30, 1960.

The committee requests authorization to allocate this money for the following projects for the eighteen month period ending June 30, 1960:

Toxicology of C9-C12 Aromatic Hydrocarbons	\$20,000
Treatment for kerosine ingestions in children	5,000
Research on noise in industry	7,500
Toxicological reviews	10,000
Consulting services	3,000
Administrative and meeting expense	<u>1,500</u>
	\$47,000