

PLAINTIFF'S EXHIBIT

API-93

MEDICAL ADVISORY COMMITTEE MEETINGS
AND MINUTES THEREFROM 1952-1955

SC-API-2222

True. (Because Dr. L's letter hasn't already confirmed you enough)
Horton

ESSO RESEARCH AND ENGINEERING COMPANY

(FORMERLY STANDARD OIL DEVELOPMENT COMPANY)

P. O. Box 51, LINDEN, N. J.

MEDICAL RESEARCH DIVISION

ROBERT E. ECKARDT, PH.D., M.D.
DIRECTOR

NATHAN V. HENDRICKS, CH.E.
HEAD INDUSTRIAL HYGIENIST

MORACE W. GERARDE, PH.D., M.D.
HEAD TOXICOLOGIST

BERTRAND E. BENNISON, M.D.
CHIEF CLINICAL RESEARCH PHYSICIAN

April 10, 1956

Drs. L. E. Curtis
V. C. Baird
F. D. Gassaway
W. O. Armstrong
L. Blaney
F. F. Boys
M. Clinton
J. W. Crookshank
K. Davis
K. R. Fourcher
T. M. Frank
C. H. Hine
W. F. Kahle
T. J. Kelly

E. K. Linder
E. P. Luongo
C. R. Miller
M. N. Newquist
J. W. Osborn
R. C. Page
R. J. Potts
B. B. Reeve
J. C. Ruddock
G. M. Saunders
R. F. Schneider
L. J. Wade
E. R. Ware

Dear Doctors:

By the time you have received this letter or very shortly thereafter, each of you will have received from Mr. Stroop a copy of a manuscript entitled, "Carcinogenesis of the Skin. II. The Accelerating, Promoting, and Preconditioning Effects of Aliphatic and Related Hydrocarbons", by Dr. Horton and his associates at the Kettering Laboratory. It is the plan of the Kettering Laboratory to submit this manuscript for publication probably in the journal, *CANCER RESEARCH* as soon as it has been through the API mill. The Subcommittee has reviewed the manuscript and has already introduced into it certain changes which it feels now make this manuscript o.k. for publication. It should be understood that the Subcommittee is in no position to "approve" the Kettering Laboratory's manuscript for publication, but rather simply serve in the capacity of reviewing such manuscripts in order to be sure that nothing inimical to the petroleum industry is said without bringing this to the attention of the Kettering Laboratory prior to publication. With this in mind, the Subcommittee believes the manuscript suitable for submission for publication in its present form and will so submit it to the total Medical Advisory Committee at its meeting in Philadelphia on Monday, April 23, 1956.

It is essential that the MAC be prepared to pass on this manuscript at the time of its meeting on April 23 and be prepared to ask Dr. Curtis, Chairman of the MAC, to forward it to the Medical and Health Committee of the Board for their perusal, prior to submission for publication. The total procedure, that is, review by the Subcommittee (which is now accomplished), review and o.k. by the MAC, review and o.k. by the Medical and Health Committee of the Board, should take no longer than 60 days. Since the date of the letter of transmittal of the manuscript to the Subcommittee is March 31, 1956 this means that Dr. Curtis should be able to inform Dr. Horton that it will be all right to submit this manuscript for publication to the journal of Dr. Horton's choice by May 30, 1956.

To Members of the
Medical Advisory Committee

- 2 -

April 10, 1956

I, therefore, suggest that each of you review this article in detail prior to the meeting of the MAC on April 23 and come to that meeting prepared to offer any suggestions for changes in the manuscript which you think are necessary. It will then be necessary for the MAC either to agree upon the changes or to decide that the changes are not necessary, in order that this review procedure may be expedited and the necessary word sent to the Kettering Laboratory by May 30, 1956.

I would like to point out once again that it is not our prerogative to change the context of the Kettering Laboratory thinking. Constructive suggestions for improvement for the strength of the language would be appreciated by the Kettering Laboratory, but it must always be remembered that the manuscript represents the Kettering Laboratory conclusions in the ways that the Kettering Laboratory wishes to say it, and not a manuscript of the MAC.

I am looking forward to seeing each of you in Philadelphia during the Industrial Health Conference.

Sincerely yours,

R. E. Eckardt

R. E. ECKARDT, II. D.

REE:mak

cc: Mr. D. V. Stroop
Dr. A. W. Horton
Dr. R. A. Kehoe

May 2, 1956

Dr. Leo Wade, Medical Director,
EssoStandard Oil Company,
15 West 51st Street,
New York 19, N. Y.

Dear Doctor Wade:

Thank you for your comments regarding our paper
on accelerators.

Some day when you have time, I should like to
discuss the possible role of such materials in the
induction of tumors of the upper respiratory tract
in certain workers engaged in the synthesis of iso-
propyl alcohol. You may recall that the research
at Carbide and Carbon showed that one of the main
by-products of the commercial process was a long
chain olefin. The average molecular length of this
polymer was such that one would expect it to be an
active accelerator of carcinogenesis of the skin.
Why not the ethmoid sinus?

Cordially,

A. Wesley Horton

AWH:fe

ESSO STANDARD OIL COMPANY

15 WEST 51ST STREET, NEW YORK 19, N. Y.

April 13, 1956

LEO WADE, M. D.
MEDICAL DIRECTOR
JOHN J. THORPE, M. D.
ROBERT P. SIM, M. D.
ASSISTANT MEDICAL DIRECTORS
GEORGE E. BOCK, M. D.
THOMAS O. ELIAS, M. D.
PHYSICIANS
CLYDE M. BERRY, PH. D.
INDUSTRIAL HYGIENIST

Dr. A. Wesley Horton
University of Cincinnati
Cincinnati, Ohio

The paper concerning accelerators is of great interest to me, and I think represents a valuable contribution. I see nothing in the paper which would render it objectionable from the standpoint of this Company.

My only comment has to do with a slight ambiguity in the first sentence of the paragraph at the bottom of page 13. I think it would be clear if you said ".....occurred among certain workers engaged in the process of....".

LWade:oh

copy to Dr. R. E. Eckardt
Mr. D. V. Stroop



MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON CARCINOGENICITY

Held at the Blackstone Hotel, Chicago

Friday, September 27, 1957

A meeting of the Subcommittee on Carcinogenicity of the Medical Advisory Committee of the American Petroleum Institute was convened in Dr. R. E. Eckardt's suite at the Blackstone Hotel at 9:30 a.m. on September 27, 1957. The full Subcommittee was in attendance, plus Mr. Paul Halley of the Standard Oil Company (Indiana) as a guest.

The Subcommittee discussed preliminarily the work at the Kettering Laboratory and wishes to point out that work now being performed by Dr. Horton is far more fundamental in nature (than was originally anticipated by the Subcommittee.) For this reason the Subcommittee believes that its decision to discontinue sponsoring this research under its direction has been a correct one, and the Subcommittee plans to continue with the recommendation that this work be discontinued as of July 1, 1959. However, the Subcommittee does wish to point out that there are fundamental aspects in the petroleum chemistry now being conducted by Dr. Horton, which might warrant a continuation of this type of research, either at Kettering Laboratory or some other laboratory, under the sponsorship of the Committee for Fundamental Research of the API. The methodology now being pursued by Dr. Horton is primarily chemical in nature rather than biological and might therefore well be considered by the Committee for Fundamental Research. In addition, the Subcommittee discussed in a preliminary fashion, the possibility of suggesting to the MAC that Dr. Kehoe be put on a retainer fee at the conclusion of the work at the Kettering Laboratory on July 1, 1959, in order that Dr. Kehoe might attend all meetings of the MAC and offer us his advice and guidance in some of the problems which the petroleum industry is facing now and might face in the future. It is the Subcommittee's belief that Dr. Drinker's attendance at and participation in the affairs of the MAC have been highly worthwhile and if Dr. Kehoe were willing to accept such a retainer agreement, his participation in the affairs of the MAC would also be worthwhile.

At 11 a.m. the group was joined by Dr. R. A. Kehoe, Dr. A. W. Horton and Dr. J. J. Phair of the Kettering Laboratory. Dr. Horton began by presenting a progress report of the work at the Kettering Laboratory during the past five months. He indicated that all the experimental work for the past five months has been (in the field of analytical methods.) He divided this work into two sections: that work done on carcinogens and that work done on accelerators.

Carcinogens

To date the work of the Kettering Laboratory suggests that the most significant carcinogens in petroleum oils are polycyclic aromatic compounds, most hydrocarbons.

directed towards the goal of a reliable, quick, chemical method for estimating carcinogenic potency of petroleum oils for the skin.

He emphasized the difference in concept between the basic carcinogenic potency of an oil, which is that due to the presence of carcinogens vs. the actual carcinogenic potential of the oil, which is the carcinogenic activity resulting from both the presence of carcinogens and of accelerators and inhibitors. He indicated that certain data developed at the Kettering Laboratory have suggested that some sulfur compounds may act as accelerators but that they only do so in the presence of other accelerators. Thus, if there are sulfur-containing accelerators they would not be active as accelerators in the absence of hydrocarbon accelerators. Present data at the Kettering Laboratory indicated that the accelerators are probably long-chained hydrocarbons.

Suggestive evidence at the Kettering Laboratory indicates that there may be inhibitors present in petroleum oils. These inhibitors do not inhibit the carcinogens, but rather inhibit only the accelerators. This evidence has arisen from some work done by the Kettering Laboratory with two different white mineral oils which were used as diluents of accelerators. It is important to emphasize that these inhibitors are inhibitors of the accelerating action, rather than inhibitors of the basic carcinogenic activity due to the carcinogens.

In the past five months almost all of the work done by the Kettering Laboratory on carcinogens has been done on what they have previously identified in the April 1957 report, as 3 1/2-ring aromatics. These consist of pyrenes, fluoranthrenes, cyclopentanophenanthrenes, and benzfluorenes. Dr. Horton believes that these 3 1/2-ring aromatics are probably the most important class of carcinogens in most petroleum oils.

The work has been done principally on API-8 and fractions of API-8, as diagrammatically indicated in the attached diagram. Descriptively, API-8 was subjected to a theoretical 80 plate distillation. Examination of the 660°F fraction suggested that only 0.001% of carcinogens was present in this fraction but that it contained a very high concentration of accelerators. This evidence is supported in part by the fact that tumors appear rapidly but only at a very low total incidence of tumors.

Following the work on this fraction, Dr. Horton next concentrated his attention on three fractions which boiled in the range of 730°F to 760°F. These fractions contain very little accelerators. These three fractions were subjected to maleic anhydride treatment in order to remove the anthracenes and their derivatives. Testing suggested that .03 out of .21 of the carcinogens present in this fraction was due to carcinogens of this type. Roughly, therefore, 1/7 of the basic carcinogenic activity of these three fractions is due to anthracenes and their derivatives. The raffinate from the maleic anhydride treatment of these three fractions was next combined and chromatographed, and two fractions were obtained, one of which contained the benzfluorenes and experimental work has suggested

that these are unimportant in the total carcinogenicity of these three fractions. The other fraction contains the remaining three classes of carcinogens, namely, pyrenes (and their methyl and dimethyl derivatives) cyclopentanophenanthrenes, and fluoranthrenes (principally the dimethyl derivatives). At the present time, Dr. Horton is working on the separation of these three types of aromatic hydrocarbons in the raffinate from the maleic anhydride treatment of the 730°F to 760°F cuts of API-8. This is being done by liquid-liquid partition between 99% sulfuric acid and iso-octane at -30°F. Dr. Horton says that this treatment will separate the pyrenes from the other two classes of compounds. The raffinate of this extraction then is chromatographed and treated with picric acid which may lead to the separation of the cyclopentanophenanthrenes from the fluoranthrenes.

Dr. Horton did indicate that of seven oils carried through the maleic anhydride extraction step, only one was found to have much benzanthrane which contributed to carcinogenic activity. This one oil was from a coker gas oil (API-33) in which 7/11 of the basic carcinogenicity was due to benzanthrane-type compounds. This contrasted with other types of oils in which only 1/7 of the basic carcinogenicity is due to this type of compound.

In work which Dr. Horton did with a thermally cracked, cat cracked, oil he found that the benzpyrene and 4-ring carcinogens almost doubled in concentration but the activity of the oil decreased. This result might be due to the destruction of accelerators or to the destruction of the 3 1/2-ring carcinogens. It is Dr. Horton's belief that possibly this reduction in activity is most likely due to the destruction of the accelerators rather than to the destruction of the 3 1/2-ring carcinogens.

Accelerators

At the present time, Dr. Horton is following clues which have been provided for the presence of inhibition of accelerators in petroleum oils. He believes that these inhibitors probably fall into a class of compounds referred to as polycycloparaffins. These have essentially the same structure as the aromatic carcinogens except that they are saturated compounds. In partial support of this, Dr. Horton pointed out that Zechmeister and Kotin reported about a year ago in SCIENCE, that hydrogenated aromatics inhibit sarcoma production when injected subcutaneously. However, they used ethyl laurate as a solvent for their carcinogens and ethyl laurate would be expected to be a highly accelerating solvent. Therefore it was not clear from their work whether they were inhibiting carcinogens or inhibiting accelerators. It is Dr. Horton's belief that the inhibition they observed is most likely the inhibition of the ethyl laurate as an accelerator rather than true inhibition of the carcinogens.

In discussing the so-called preconditioning of an animal by accelerators, it is Dr. Horton's belief that this occurs through an accelerator "setting up" the animal for other accelerators. In other words, preconditioning does not precondition the animal for carcinogenic activity but only for accelerating activity. Support for this belief is contained in the fact that if the animal is painted with an oil essentially free of accelerators following preconditioning it is not possible to demonstrate the preconditioning effects, but if an oil high in accelerators is used after the preconditioning treatment, the preconditioning effect can be demonstrated.

The white oils being studied by Dr. Horton for so-called inhibiting effects (principally API-80) are free of n-paraffins. They contain some iso-paraffins and condensed cycloalkanes which represent the greatest amount of material present. The suggestion at the moment, therefore, is that these condensed cycloalkanes are inhibitors of accelerators.

In an attempt to separate these inhibitors from other compounds present in the white oils, Dr. Horton is going to use distillation, thiourea separation, and liquid thermal diffusion. In addition, he may possibly consider the use of molecular sieves.

Dr. Horton submitted his Interim Report on his work dated September 26, 1957 which was distributed to the Subcommittee at this meeting.

Epidemiology

Next, Dr. J. J. Phair gave a progress report on the epidemiological work. Dr. Phair indicated that he had completed the coding and punching of the cases. In this process he felt it necessary to discard some cases since the information contained on the report was inadequate. Hence, the total number of cases reported in his final report will not be the same as in previous reports from Dr. Phair. At the moment, the status of this final report is that the introduction, the objectives, and so forth have already been written up and the data tables are now being prepared and the comparisons and correlations will be made. It is hoped by both Dr. Phair and Dr. Kehoe that this final report can be made available to the Subcommittee by the first of the year.

In Dr. Phair's work he pointed out that in the cases occurring after 1950, 28% of the tumors have been found to be skin tumors, whereas, only 15.3% of the cases prior to 1950 were skin tumors. In general population figures available, 16.6% tumors are skin tumors. Whether this increase in the relative number of skin tumors in the post-1950 group of cases is significant, is not now known. Dr. Phair is at present making age, geographic location, primary site and occupational-group breakdowns of the cases which he analyzed.

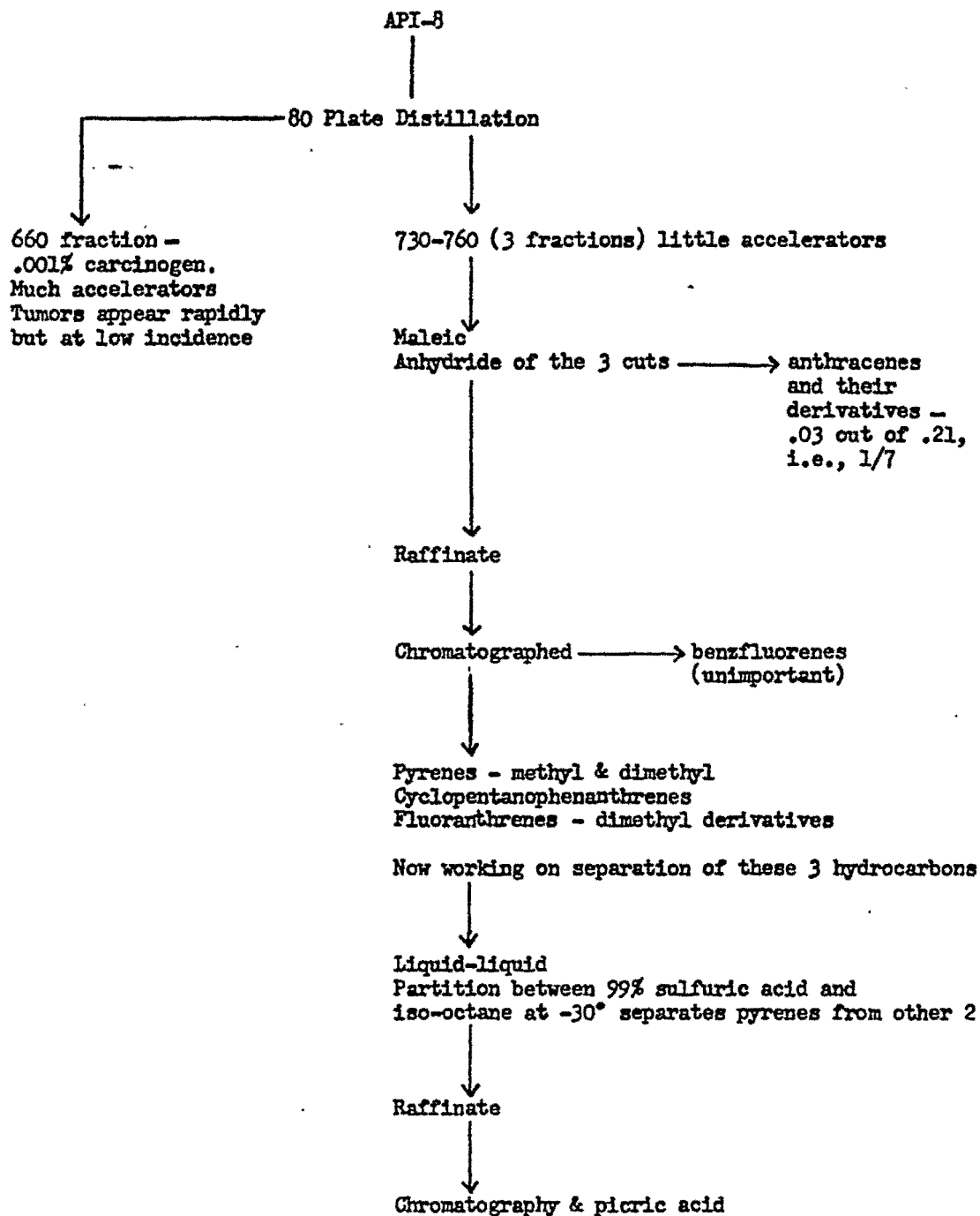
- 5 -

Following Dr. Phair's presentation, the Subcommittee discussed in private with Dr. Kehoe certain phases of the relationships between the Subcommittee and the Kettering Laboratory and it was concluded that these relationships remain on a friendly, amiable, and professional level.

The Subcommittee meeting broke up at approximately 4 p.m. on September 27, 1957, without having set a date for its next meeting.

R. E. ECKARDT, M.D./cjh
Chairman, Subcommittee on Carcinogenicity
October 1, 1957

Attachment



AMERICAN PETROLEUM INSTITUTE
50 WEST 50TH STREET
NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

May 10, 1955 .

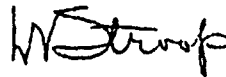
To Members and Technical Advisors
Medical Advisory Committee

Gentlemen:

You will find attached for your information and
file a copy of the Minutes of the Meeting of the Medical
Advisory Committee held in Buffalo, New York on April 25, 1955.

Please notify me if you find any errors in the
minutes.

Very truly yours,



DVS:ms

mc: Professor Philip Drinker
Dr. Robert R. Dugan
Members Medical and Health Committee

For Information Only - Not For Publication

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

NINETEENTH MEETING

April 25, 1955
Statler Hotel
Buffalo, N. Y.

Registration

MEMBERS PRESENT OR REPRESENTED

George M. Saunders, M. D. - Chairman
F. D. Gassaway, M. D. - Secretary

W. O. Armstrong, M. D.	T. J. Kelly, M. D.
Lamson Blaney, M. D.	E. P. Luongo, M. D.
F. F. Boys, M. D.	C. R. Miller, M. D.
Marshall Clinton, M. D.	M. N. Newquist, M. D.
J. W. Crookshank, M. D.	J. W. Osborn, M. D.
L. E. Curtis, M. D.	R. J. Potts, M. D.
R. E. Eckardt, M. D.	B. B. Reeve, M. D.
K. R. Fourcher, M. D.	J. C. Ruddock, M. D.
T. M. Frank, M. D.	Leo J. Wade, M. D.
C. H. Hine, M. D.	(Rep. by J. J. Thorpe, M. D.)
	E. R. Ware, M. D.

TECHNICAL ADVISORS PRESENT

E. W. Adams	A. E. Dooley
C. T. Brown	P. D. Halley
E. K. Daniels,	C. A. Neilson
	A. C. Pabst

OTHERS REGISTERED

Philip Drinker	- Harvard University
Robert R. Dugan, M. D.	- Continental Oil Company
A. E. Hoag, M. D.	
E. O. Mattocks	- American Petroleum Institute
William L. Oviatt	- Standard-Vacuum Oil Co.
F. H. Pretsch, M. D.	- Humble Oil & Refining Co.
Lucian E. Reaes	- Phillips Petroleum Co.
H. O. Sappington, M. D.	- Humble Oil & Refining Co.
W. E. Scovill	- The Standard Oil Co. (Ohio)
Jack Spence	- Standard Oil Co. of California
D. V. Stroop	- American Petroleum Institute

MEMBERS NOT REGISTERED OR REPRESENTED

V. C. Baird, M. D.	W. F. Kahle, M. D.
Kieffer Davis, M. D.	E. K. Linder, M. D.
	R. C. Page, M. D.

I

MINUTES OF EIGHTEENTH MEETING

ACTION: The committee voted to approve the minutes of the Eighteenth Meeting as circularized with letter dated September 16, 1954.

II

SUBCOMMITTEE REPORTS

A. Subcommittee on C₉ - C₁₂ Aromatics - C. H. Hine, M. D., Chairman

Dr. Hine reported recommendations for the subcommittee as follows:

- 1) A contract be negotiated between the Medical Advisory Committee of the API and the University of Texas Medical Branch for the purpose of conducting studies on the toxicity of C₉ - C₁₂ aromatics derived from petroleum.
- 2) The principal investigator in these studies should be Dr. Carl A. Nau, Professor and Chairman of the Department of Preventive Medicine and Public Health of the Texas Medical Branch.
- 3) The C₉ - C₁₂ Subcommittee act as a steering committee for this study.
- 4) Funds in the amount of \$20,000 be made available by 1 July 1955 to be used in support of this study.
- 5) The experimental design be agreed upon by both parties and fundamentally should involve chronic inhalation exposures of suitable species of test animals to vapors of a representative sample of C₉ - C₁₂ aromatics and adequate controls (n-decane and benzene).
- 6) The sample should be prepared under the auspices of the subcommittee from a composite mixture of aromatic fractions obtained from interested participating member companies of the API.
- 7) The project be terminated provided there is no evidence of significant toxicity upon completion of the presently planned study.
- 8) The project be continued for an additional year providing the data collected at the completion of the proposed study indicates that further study is warranted and that \$20,000 be tentatively budgeted for 1 July 1956 for that purpose.

ACTION: The report was adopted by the Medical Advisory Committee for recommendation to the Medical and Health Committee.

B. Subcommittee on Carcinogenicity - R. E. Eckardt, M. D., Chairman

Dr. Eckardt presented the subcommittee's report which is attached to these minutes as Exhibit A.

ACTION: The Medical Advisory Committee voted to adopt the subcommittee recommendation for continuation of Research Project MC-1 at Kettering Laboratory with a budget of \$58,500 for the fiscal year ending June 30, 1957 with the understanding that of this amount \$15,000 to \$20,000 would be used for epidemiological work.

C. Subcommittee on Atmospheric Pollutants - E. P. Luongo, M. D., Chairman

Dr. Luongo presented the report which is attached as Exhibit B.

ACTION: The report was accepted.

D. Subcommittee on Dermatology - Leo J. Wade, M. D., Chairman

In the absence of Dr. Wade, Dr. Thorpe presented an interim report on the status of the dermatitis survey of the Division of Marketing which is attached as Exhibit C.

E. Subcommittee on Economic Poisons - C. H. Hine, M. D. Chairman

Dr. Hine presented a brief status report which is attached as Exhibit D.

F. Subcommittee on Physical Agents - J. W. Osborn, M. D. Chairman

Dr. Osborn submitted the subcommittee report which is attached as Exhibit E.

III

PUBLIC GROUP SESSION AT SAN FRANCISCO

In the absence of Dr. V. C. Baird, Chairman, Dr. Eckardt reported that members of the Program Committee had discussed and were recommending a group session program as follows:

Monday, November 14, 1955
Group Session
10:00 A.M.

Medical Advisory Committee
Open Session (Fairmont Hotel)
Presiding: M. J. Rathbone, Standard Oil Co. (N.J.)

Outline of History, Membership, Scope and Activities of the Medical
Advisory Committee. Dr. Saunders

The Ailing, Aging Truck Driver. (Wade or Newquist)

Industrial Hygiene in Our day to Day Operations. (Industrial Hygienists)

Are There Noise Problems in Our Industry? (Industrial Hygienist)

Toxicological Evaluation of Chemicals and Products of the Petroleum Industry.
C. H. Hine

ACTION: The committee approved the program as outlined.

IV

BUDGET ESTIMATES FOR 1956-1957

The committee reviewed the budget for 1955-1956 and the preliminary recommendations of the several subcommittees and voted to recommend to the Medical and Health Committee of the Board that the budget estimates for 1956-1957 should include the following:

1) University of Cincinnati	
a) Carcinogenicity	-\$58,500
b) Physiology of Skin	- 5,000
2) Professor Philip Drinker	\$63,500
3) Toxicity of C ₉ - C ₁₂ Aromatics	3,000
4) Miscellaneous	20,000 - 3 samples - inhalation
	1,000
	<u>\$87,500</u>

V

NEW BUSINESS

A. Precautionary Labeling

Mr. Stroop read the report made by M. J. Rathbone to the Board of Directors. See copy attached as Exhibit F.

B. Round Table Session

The committee requested the reservation of a conference room at the Fairmont Hotel, San Francisco on Tuesday, November 15, 1955 for the holding of an informal round table discussion on subjects of common interest to members. (Note: Arrangements have been made to reserve such a room for this unscheduled meeting.)

VI

ADJOURNMENT

There being no further business to come before the committee the meeting was adjourned.

F. D. Gassaway, M. D.
Secretary

Approved by:
George M. Saunders, M. D.
4/29/55 Chairman

EXHIBIT B

REPORT OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS E. P. Luongo, M. D., Chairman

The last report of this committee pointed out the deficiency of scientific knowledge on the health effects of community atmospheric pollution. There has been very little change in this situation except for a remarkable increase in public interest and in the interest of Public Health agencies.

I. Summary of Present Status of Knowledge of the Effects on Health by Air Pollutants. According to the current thinking on atmospheric pollution, the possible effects of air pollution on man may be grouped under four categories.

- A. Mortality There have been four occurrences of reported increased mortality in certain localities due to the acute effects of community air pollution - Donora, London, Poza Rica, Meuse Valley. In London and Donora a careful clinical and pathological investigation has failed to establish any specific cause of death in man or animal due to any specific agent or the smog as a whole.

Per se: To date there are no other reported authentic cases either acute or chronic due to community air pollution.

- B. Morbidity To date there are no reported authenticated cases of disease caused by contact with community air pollution. However, it is possible that there are as yet undetermined accumulative adverse effects on health.

- C. Irritative Effects There are definite acute irritative effects in certain localities. Acute irritation of the mucous membrane of the eye and upper respiratory tract do occur during certain periods of community air pollution. These effects disappear when the individual is removed from exposure without known residual effects.

- D. Psychologic Effects Because of reduced visibility, and certain anxiety associated with odor and other manifestations, there are psychologic effects. A polluted atmosphere may make people unhappy for a variety of reasons.

II. Investigations as to effects of Community Air Pollution on health.

A. Investigations now in progress.

1. Stanford Research - Irritation effects of smog on the eyes (completed or near completion).
2. Kettering Laboratory, University of Cincinnati - Effects of Air Pollutants on persons chronically ill with cardiac and respiratory diseases.
3. U. S. Public Health Services and related public health agencies. Epidemiological studies in a number of areas, the latest reported by State Department of Public Health, California (March 1955).
4. University of Southern California (Research grant from U. S. Public Health Service) - Under direction of Dr. P. V. Kotin. Carcinogenic studies on animals relating to community atmospheric pollution.

B. Future or projected investigations:

1. The Surgeon General (U. S. Public Health Service) has recently stated that a considerable sum of money would be made available for support of research on health effects of community air pollution. This will be in the form of grants-in-aid and contract research with universities and research centers in the U. S. and also by the U. S. Public Health itself.

III. Areas of Deficiency in Knowledge of the Problem.

- A. Does prolonged exposure to community air pollution cause an increase in morbidity and mortality in human beings?
- B. What is the mechanism of irritative effects of community air pollutants?
- C. By what mechanism do air pollutants cause psychologic effects?
- D. It has been assumed that 3, 4, benzpyrene is a constituent of smog and it is a suspected carcinogenic agent in man. How much of the 3, 4, benzpyrene that is in the smog is the petroleum industry responsible for?
- E. Are there any substances in community air pollution that will cause pulmonary malignancy in man?
To what extent does the petroleum industry contribute either indirectly or directly in producing these substances.

IV. Summary

If the Committee on Smoke and Fumes deems it desirable to actively investigate any of the problems mentioned above, the Medical Advisory Committee, through this sub committee, is available for consultation. We feel that preventive engineering now in effect in the petroleum and automotive industry may solve any or all problems before there is time to do any medical investigation.

April 25, 1955

EXHIBIT C

INTERIM REPORT TO THE API MEDICAL ADVISORY COMMITTEE

DERMATITIS SURVEY

April 22, 1955

Mr. M. D. Gjerdie and I visited the Industrial Hygiene Foundation on April 14th, where we met with Dr. Walmer and his associates. After exploratory discussions, it was agreed that they would give the problem thought and provide us with a proposed plan for action in the very near future.

Several points of particular interest developed during the talks:

1. State records are probably of no value. Such records as are available would be confined to compensable cases and hence represent only a small portion of the total cases.
2. Insurance company (several are members of the Institute) records would be reliable and provide diversification of industry, geographic location, and both technical and medical information of high caliber.
3. Entree to smaller operators of many sorts could be secured through contacts in larger industries represented among the membership of the Institute.
4. Observations should be confined to the shortest and most recent interval of time compatible with a sound and reliable result.
5. A small group (3 or 4) of A.P.I. representatives should be appointed as liaison group to work with the investigators if the job is done by the Institute.
6. Unless the study is published by the investigators in a reputable scientific journal, none of the acquired data or information may be used by the A.P.I. or its members for advertising or propaganda purposes.

Under the circumstances, we doubted the wisdom of seeking consultation with others until the Industrial Hygiene Foundation has submitted its suggestions.

LWade:oh

/s/ Leo J. Wade

EXHIBIT D

REPORT OF THE SUBCOMMITTEE ON ECONOMIC POISONS

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

1. Liaison has been established with the Medical Committee of the National Agricultural Chemical Association thru Dr. Curtis who recently has been appointed to membership in this organization.
2. Attention of the Medical Advisory Committee members has been called to the publication on the allowable limit of pesticides set forth by the Federal Food and Drug Administration.
3. Attention of the Medical Advisory Committee members is directed to the increased activity in dissemination of professional information concerning the diagnosis and treatment of acute poisoning by the following organizations.
 - A. American Academy of Pediatrics

This group is helping establish poison centers locally. Such centers are now active in New York City, Boston, Chicago, San Francisco, Seattle and Durham, North Carolina
 - B. U. S. Public Health, Technical Service Branch, Savannah, Ga.
 - C. California Spray Company.
 - D. Local health departments recommend the subcommittee continue its role of disseminating information on economic poisons of interest to the Medical Advisory Committee. No funds are required for this purpose.

April 25, 1955

EXHIBIT E

REPORT OF SUBCOMMITTEE ON PHYSICAL AGENTS J. W. Osborn, M. D. Chairman

The subcommittee on Physical Agents met at Buffalo, N. Y., on April 25, 1955 with Chairman J. W. Osborn, M. D., presiding. Present were Messrs. Osborn, Potts, Reeve, Hendricks and Halley.

This being the first meeting of this new subcommittee, discussion revolved around the functions and scope of the committee. The committee agreed that two physical agents most worthy of consideration at this time were noise and radiations.

On the subject of noise the following action was taken:

1. The committee wishes to go on record as recognizing that that noise problems do exist in the petroleum industry, that some such noise exposures in the industry will produce loss of hearing in exposed employees while other exposures are borderline, and to recommend that the MAC approve the subcommittee's beginning a study of the noise problem in the petroleum industry.
2. Mr. Hendricks will contact the Industrial Hygiene Foundation to determine whether they will make available to the subcommittee copies of their recent compilation of state laws pertaining to hearing loss. If such can be obtained, they will be distributed to MAC members.
3. The committee wishes to call to the attention of members of the MAC a Noise Reduction Program or course of instruction being given at the Massachusetts Institute of Technology, August 15-26 of this year.

Further, the committee feels that if any member companies send representatives to this meeting that a report from such persons to the Subcommittee on Physical Agents would be invaluable to the work of the subcommittee. Consequently, the subcommittee wishes to advise the members of the MAC at this time that they will later be contacted by letter inquiring as to whether their companies are sending any representatives to this meeting and if so, whether such persons could report in writing and in person to the subcommittee, the proceedings of that meeting.

On the subject of radiation, the committee wishes to go on record as recognizing that potential radiation hazards do exist in the petroleum industry and that such radiations include those from radioactive materials and gases from same, x-rays and ultra-violet radiations from such sources as shielded arc welding.

The subcommittee takes cognizance of the need for medical departments of the individual companies to be familiar with the hazards and uses of x-ray and nuclear radiations peculiar to their company. The subcommittee suggests the establishment within the individual companies of a Radioactivity Committee or similar group, with medical representation, as a means of keeping abreast of

- 2 -

the problem.

The Subcommittee on Physical Agents will welcome suggestions as to the need for activity or study pertaining to other physical agents such as heat, cold, vibration and ultrasonics but has no specific recommendations to make along these lines at this time.

April 25, 1955

EXHIBIT "I" - ITEM 17

Exhibit F

REPORT OF MEDICAL AND HEALTH COMMITTEE

M. J. Rathbone, Chairman

As authorized by the Board of Directors on November 9, 1954 a representative special committee made a study and has reported recommendations on the organization of an Institute committee to handle problems incidental to precautionary labeling of petroleum products.

The committee has reported six findings as follows:

(1) Recent regulatory developments have created an urgent need for a committee representative of oil company operations to consider problems of national significance incidental to precautionary labeling of petroleum products.

(2) At this time the most urgent problem relates to the labeling of products packaged for sale.

(3) The most important phase of this problem is the development of standards for the design and use of the labels.

(4) Such standards will depend upon specific knowledge of the physiological and other properties of petroleum products included in the package.

(5) The adoption and use of the standards will be accomplished only by close cooperation between regulated and regulatory agencies.

(6) Compliance with labeling regulations primarily is a function and responsibility of oil company sales and marketing departments.

Based upon these six findings the committee made eight recommendations as follows:

(1) The American Petroleum Institute should have a committee representative of the industry's responsibilities in precautionary labeling of petroleum products packaged for sale.

(2) The committee should comprise members representative of those responsible in the industry for:

- (a) Manufacturing
- (b) Marketing
- (c) Medical
- (d) Research and development
- (e) Transportation

Exhibit "I" - Item 17 (Cont'd)

(3) The committee should develop necessary information and should formulate API recommended standards on the design and use of precautionary labels for petroleum products.

(4) As may be necessary, the committee should recommend research and experimental work to develop physiological and other properties of petroleum relating to labeling.

(5) The committee should establish and maintain cooperative relationship with other national agencies concerned with precautionary labeling of products packaged for sale.

(6) The committee should work with the American Petroleum Industries Committee in its guidance of state petroleum industries committees on state laws and state regulations in this field.

(7) The committee chairman should have the benefit of legal guidance in the conduct of meetings.

(8) Information developed by or through the committee should be disseminated widely to interested members of the Institute.

I concur in these recommendations and request authority for the Chairman of the Medical and Health Committee to organize the labeling committee as recommended and to supervise its activities from time to time as outlined in this report.

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

December 10, 1953

To Members and Associates
Medical Advisory Committee

WHO DID NOT ATTEND 17TH MEETING OF COMMITTEE

Gentlemen:

For your information and files we enclose copies of reports which we do not believe have been mailed to you previously.

They are as follows:

1. Explanatory Notes on Tabular Summary of Biological Experiments - September 1, 1953.
2. Summary of Recent Progress in the Investigation of the Carcinogenicity of Petroleum Intermediates and Products - September 29, 1953.
3. Summary of Progress - API Research Project MC-1 - September 30, 1953.
4. Report of the Progress in the Epidemiological Studies. (17 pages with 21 figures containing data reported on or before September 1, 1953. Report is not dated).
5. Estimated Budget - API Research Project MC-1 - July 1, 1954 - June 30, 1955.

---ooOoo---

Very truly yours,

W. Stroop

DVS:js

Enclosures (5)

cc: Other Members and Associates (Without enclosures)

We have extra copies of these enclosures and will supply them to you on request.

DVS *ovs*

meeting 9-30-53

AMERICAN PETROLEUM INSTITUTE
50 WEST 50TH STREET
NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

November 9, 1953

To Members and Associates
Medical Advisory Committee

Gentlemen:

Enclosed with my letter of October 29, 1953 you received a copy of the Minutes of the Meeting of the Medical Advisory Committee held in Houston, Texas on September 30, 1953. You will now find enclosed corrected Pages 1 and 2 of those Minutes.

✓ These corrections are made in accordance with the request of Mr. L. N. Haugen, Cities Service Oil Company, in his letter of November 2, 1953 which reads:

"In the Minutes of the Meeting of the Medical Advisory Committee which accompanied your letter of October 29, you included Mr. D. R. McConnohie among 'others present'. Please correct the record to show him as representing L. N. Haugen. My only reason for requesting the correction is because of our continuing interest in the work of the Medical Advisory Committee."

Please substitute these two corrected pages to your copy of the Minutes.

Very truly yours,

D. V. Stroop _{js}

DVS:js
Enclosures (2)
mc: L. B. Gough
E. Porter Johnson
Members, Medical Committee of Board of Directors

Dr. A W Houston

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20. N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

October 29, 1953

To Members and Associates
Medical Advisory Committee

Gentlemen:

Enclosed for your information and file you will find
a copy of the Minutes of the Meeting of the Medical Advisory
Committee held in Houston, Texas on September 30, 1953.

Please notify me if you find any errors in the minutes.

Very truly yours,

DVStroop

DVS:mr

MC - L. B. Gough

E. Porter Johnson

Members Medical Committee of Board of Directors

For Information Only - Not For Publication

AMERICAN PETROLEUM INSTITUTE

MEDICAL ADVISORY COMMITTEE

Seventeenth Meeting
September 30, 1953

Shamrock Hotel
Houston, Texas

Registration

Members Present or Represented:

T. M. Frank - Chairman
George M. Saunders - Vice Chairman

W. O. Armstrong	W. F. Kahle
V. C. Baird	T. J. Kelly
F. F. Boys	E. K. Linder
J. W. Crookshank	E. P. Luongo
L. E. Curtis	C. R. Miller
Kieffer Davis	M. N. Newquist
R. E. Eckardt	J. W. Osborn
K. R. Fourcher	R. C. Page by T. E. Allen
F. D. Gassoway	B. B. Reeve
L. N. Haugen by D. R. McConnohie	J. C. Ruddock
C. H. Hine	L. J. Wade

Associates Present or Represented:

E. W. Adams	J. D. Haney
W. H. Barcus	L. M. Henderson
Clyde Berry	C. K. Hewes
R. C. Cole	L. C. Kemp, Jr.
A. E. Dooley	R. M. Landon
N. J. Gothard	C. A. Neilson
J. W. Hammond	A. C. Pabst

F. J. Sanders by D. G. Stevens

Members of Medical Committee of Board of Directors Represented:

R. M. Bartlett represented by R. M. Landon
J. W. Newton represented by L. B. Gough
J. G. Pew represented by E. Porter Johnson
M. J. Rathbone represented by L. B. Gough

Medical Advisory Committee

Minutes - Page 2

Others Present:

Philip Drinker	-	Harvard University
Robert R. Dugan	-	Continental Oil Company
A. W. Horton	-	University of Cincinnati
John J. Phair	-	University of Cincinnati

Members not Registered:

Marshall Clinton	W. R. Levis
D. M. English	R. B. Lynn
E. Richmond Ware	

Associates not Registered:

W. R. Argyle	E. W. Isom
L. C. Beard, Jr.	D. W. Larmer
R. D. Bent	C. R. McKay
J. S. Boylan	R. C. Mithoff
C. R. Brown	J. R. Morrison
L. C. Burroughs	R. B. Roaper
R. S. Driver	R. M. Shepardson
J. E. Hill	F. M. Watkins
H. D. Wilde	

I

INTRODUCTION OF MEMBERS AND GUESTS

Those who had not attended previous meetings were introduced.

II

MINUTES OF SIXTEENTH MEETING

ACTION: The Committee voted to approve the minutes of the Sixteenth Meeting as circularized.

III

REPORT OF SUBCOMMITTEE ON CARCINOGENICITY

Dr. Kieffer Davis, Chairman, presented the subcommittee's report.

ACTION: The Medical Advisory Committee voted to amend the report and to adopt the amended report as follows:

"The Subcommittee on Carcinogenicity convened at 9:30 on Tuesday, September 29, 1953 at the Shamrock Hotel, Houston. The minutes of the preceding meeting were reviewed and accepted. A report of the RPA Committee, which held its last meeting at Kettering Laboratory on September 11, 1953, was received. Brief progress reports of the work of the Kettering Laboratory were given by Dr. Horton and Dr. Phair. Copies of these progress reports were distributed to those members and associates present. The budget of the Kettering Laboratory was reviewed. Dr. Eckardt briefly reviewed the work of Dr. Paul Kotin of the University of Southern California and the recent meeting of the National Lung Cancer Committee. Dr. Curtis presented some interesting statistics on cancer death prevalence among company workers which indicate no higher prevalence of cancer deaths in company workers than among the general population of California.

"The Subcommittee recommends:

1. That the proposed budget of the Kettering Laboratory for July 1, 1954 - June 30, 1955 be approved by the Medical Advisory Committee and the funds solicited for this work.
2. That the report of the RPA Committee be forwarded in part or in whole to the API group to which the Medical Advisory Committee reports."

IV

REPORTS OF SUBCOMMITTEE ON CUTTING FLUIDS

Dr. Leo J. Wade, Chairman, reported as follows:

"The Subcommittee on Cutting Fluids, after due consideration, recommends to the Medical Advisory Committee that it give approval to the proposed request that the General Committee of the Division of Marketing obtain funds to:

1. Conduct a critical analysis of available information pertaining to the character, incidence, and problems in relation to cutting fluids on dermatoses.
2. Formulate a report setting forth results and conclusions and make appropriate recommendations for prevention.
3. Make recommendations for further studies or continuation of the project.
4. (a) The work to be planned and supervised by a joint committee consisting of eight members, four from the Medical Advisory Committee and four from the sub-panel on Lubricants and Process Products of the Hygiene Panel of the Lubrication Committee. The chairman of the Lubrications Committee of the Division of Marketing to be chairman of the joint committee.

(b) The findings shall be solely the property of the API.

"While it is agreed that the cost of this project shall not exceed \$20,000, it is further recognized that the goals can probably be achieved with a lesser expenditure of funds.

"Attention is called to the fact that the Hygiene Panel requests that the words 'cutting fluids' (section 1 above) be replaced by the words 'petroleum products'."

ACTION: The Committee voted to adopt the report and to authorize the Subcommittee to extend the scope of the project to include products other than cutting fluids if such extension is deemed to be practicable.

V

REPORT OF SUBCOMMITTEE ON MEDICAL POLICIES AND PRACTICES

Dr. Kenneth R. Fourcher, Chairman, reviewed the assignment which had been made to the Subcommittee for study and recommendation on suggested minimum standards for physical examinations of employees and suggested qualifications for medical directors and plant doctors. He read drafts which had not yet been circularized to the Medical Advisory Committee.

ACTION: The committee voted to table the report.

VI

REPORT OF SUBCOMMITTEE ON FLUORIDES

Dr. George M. Saunders, Chairman, reported as follows:

"The American Petroleum Institute is one of nine sponsors of a fluoride investigating program at the Kettering Laboratories, University of Cincinnati. Sponsors of the program for the year 1952 and their contributions were as follows:

Aluminum Co. of America	\$4000.00
Aluminum Laboratories Ltd.	2000.00
American Petroleum Institute	2500.00
Kaiser Aluminum & Chemical Corp.	4000.00
Minnesota Mining & Mfg. Co.	1000.00
Pennsylvania Salt Co.	3000.00
Reynolds Metals Co.	4000.00
Tennessee Valley Authority	4000.00
Universal Oil Products Co.	500.00
	\$25,000.00

"One phase of the work has been the compilation of an extensive literature survey, abstracting all known references to the subject of fluorine. Part I on 'Inorganic Fluorides' was issued in 1950, Part II on

'Organic Fluorides' in 1952, and a supplement to Part I was issued in early 1953, a volume of 500 pages of references. Several other publications have been made including:

1. An annual report of observations on fluorides.
2. Fluorides in water -- maximum physiological safe limit for continued human consumption.
3. Supplement to report on legal treatment of fluorines.
4. Toxicological evidence for the safety of the fluoridation of public water supplies.

"In summary, it is believed the American Petroleum Institute through the Subcommittee on Fluorides has been fortunate in participating in extensive investigations on fluorides through cooperation with other industrial companies interested in the problem. Because it has and will continue to receive by this means benefit of a study far more comprehensive than it could possibly undertake itself at a fraction of the cost of the work, the chairman on behalf of the Subcommittee, recommended that support of this work at the Kettering Laboratories should be continued for 1954-55."

ACTION: The report was adopted by the Medical Advisory Committee.

VII

REPORT OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS

Dr. John C. Ruddock, Chairman, presented an informal information report.

ACTION: The Committee voted in favor of a symposium to be arranged by the Subcommittee at a suitable future date with a program of speakers to include investigators such as Dr. Paul Kotin.

VIII

REPORT OF CONSULTANT

Professor Philip Drinker reported informally on a number of matters of interest to the Committee.

IX

REPORT OF SUBCOMMITTEE ON AWARDS

Dr. George M. Saunders, Chairman, reported that during the year three names were received and submitted to the Safety Committee of the Board of Directors. These names were unanimously approved for the

Certificate of Appreciation. They were:

Dr. Mc Iver Woody
Dr. Joseph P. Holt
Dr. Arthur E. Hoag

These individuals have the distinction of being the first physicians to receive the award.

X

REPORT OF SUBCOMMITTEE ON ECONOMIC POISONS

Dr. T. J. Kelly, Chairman, stated that he had no report except to recommend the continuation of the Committee on a standby basis.

XI

REPORT OF SUBCOMMITTEE ON PHYSIOLOGY OF THE SKIN

Dr. Robert E. Eckardt, Chairman, recommended continued support of the Kettering project to the extent of \$5,000 for the fiscal year 1954-1955.

ACTION: The Committee voted to adopt the recommendation.

XII

REPORT OF SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS

In the absence of Dr. Marshall Clinton, Chairman, Mr. Stroop mentioned for the record that the Institute had printed for sale the third series of toxicological reviews which had been approved for publication.

XIII

REPORT ON ASA COMMITTEE ACTIVITIES

As API representative on ASA committees Z4 and Z37, Allan E. Dooley reported on the status of work under these committees.

XIV

NEW BUSINESS

A. American Foundation of Occupational Health

A member suggested that consideration should be given to the standards on physical examinations issued by the American Foundation of Occupational Health.

ACTION: The Committee voted to submit the suggestion to its membership for a letter ballot.

B. Aromatic Hydrocarbons

This subject was reopened to see if there had been any increase in interest during the year.

ACTION: Upon a showing of increased interest the Committee voted for the appointment of a subcommittee to study and report recommendations.

C. California Cancer Mortality Data

Dr. Curtis submitted data which had been obtained for the State of California in comparison with data for the Standard Oil Company of California.

ACTION: The Committee expressed its interest in these data and requested Dr. Curtis if possible to supplement the information and to report results at the Eighteenth Meeting.

D. Annual vs. Semi-Annual Meetings

By a show of hands a majority of members expressed a preference for two meetings each year.

- - - - -

RECESS FOR LUNCHEON SESSION

- - - - -

LUNCHEON SESSION

Forty-seven members, associates, and guests attended the committee luncheon and heard Leo J. Wade, M. D. present illustrated discussion on "A Clinical Approach to the Alleged Cancer-Producing Properties of High-Boiling Catalytically Cracked Oil".

(A copy of Dr. Wade's discussion is attached as a part of these minutes.)

BUSINESS SESSION

A. Budget for 1954-1955

Mr. Stroop stated that a staff estimate of \$75,000 had been submitted to and tentatively approved by the Institute's Program and Budget Review Committee as the amount to be solicited in 1954 to continue the medical

program until June 30, 1955. He said this estimate would provide for a 1954-1955 budget estimate of \$83,750 as follows:

To University of Cincinnati	
- Carcinogenicity Project	\$72,250
Fluorine Project	2,500
Skin Project	5,000
To Professor Drinker	3,000
Miscellaneous expense	1,000

It was estimated that \$75,000 added to the unobligated balance on deposit on June 30, 1953 would provide a total of \$104,225 or \$20,475 more than the estimated budget.

ACTION: The committee voted to adopt the staff estimate of \$75,000 which was the same amount that had been solicited in 1953.

B. Organization

Members discussed a number of suggested modifications in the committee organization which had been proposed in the interest of expediting and facilitating the transaction of business at meetings. They also discussed the need for a small advisory group to provide continuity and to recommend prompt action on matters arising between meetings.

ACTION: The Committee voted to authorize the appointment of a small "Committee on Committees" to work with the officers of the Medical Advisory Committee on matters requiring action between meetings.

C. Eighteenth Meeting

The Chairman was empowered to fix the time and place of the Eighteenth Meeting.

D. Adjournment

There being no further business to be acted upon the meeting was adjourned.

D. V. Stroop, Acting Secretary

Approved:

T. M. Frank, Chairman

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

September 21, 1953

To Members and Associates
Medical Advisory Committee

Gentlemen:

For your information we attach Agenda of the
Seventeenth Meeting of the Medical Advisory Committee
to be held Wednesday, September 30, 1953.

We are not informed on items of new business
to be presented nor do we have advance copies of sub-
committee reports.

We anticipate an interesting and helpful
meeting; hope you may all be able to attend.

---ooOoo---

Also, please bear in mind that two subcommittee
meetings will be held on Tuesday, September 29, 1953 in
The Castilian Room, Shamrock Hotel.

Very truly yours,

W. Stroop

DVS:js
Attachment
cc: William H. Furlong III -
Executive Sales Director, Shamrock Hotel

AGENDA

SEVENTEENTH MEETING

MEDICAL ADVISORY COMMITTEE

AMERICAN PETROLEUM INSTITUTE

Houston, Texas

Shamrock Hotel

Castilian Room (Sections B & C)

September 30, 1953

9:00 A. M. Central Standard Time

MORNING SESSION

- I. Introduction of new members and guests.
- II. Approval of minutes of Sixteenth Meeting.
- III. Report of Subcommittee on Carcinogenicity.
Kieffer Davis, M.D. - Chairman.
- IV. Report of Subcommittee on Cutting Fluids.
Leo Wade, M.D. - Chairman.
- V. Report of Subcommittee on Medical Policies and Practices.
Kenneth R. Fourcher, M.D. - Chairman.
- VI. Report of Subcommittee on Fluorides.
George M. Saunders, M.D. - Chairman.
- VII. Report of Subcommittee on Atmospheric Pollutants.
John C. Ruddock, M.D. - Chairman.
- VIII. Report of Consultant - Professor Philip Drinker.
- IX. Report of Subcommittee on Awards.
George M. Saunders, M.D. - Chairman.
- X. Report of Subcommittee on Economic Poisons.
T. J. Kelly, M.D. - Chairman.
- XI. Report of Subcommittee on Physiology of the Skin.
Robert E. Eckardt, M.D. - Chairman.
- XII. Report of Subcommittee on Toxicological Reviews.
Marshall Clinton, M.D. - Chairman.
- XIII. Report on ASA committee activities.
Allan E. Dooley - API representative on
Z4 and Z37.
- XIV. New business.

(Continued)

LUNCHEON SESSION

Luncheon has been planned for 12:30 P. M. in
Section A of the Castilian Room.

Discussion: "A Clinical Approach to the Alleged
Cancer-producing Properties of High-boiling
Catalytically Cracked Oil".

Leo Wade, M.D.

AFTERNOON SESSION

(Immediately after close of luncheon session)

Business session to consider program and budget
for 1954-1955.

EVENING SESSION

The Humble Oil and Refining Company and the
Pan American Refining Corporation will be hosts at
a buffet supper for all members and associates at a
time and place to be announced at the morning session.

Each member and associate is cordially invited to
attend this informal social gathering.

---ooOoo---

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

January 9, 1953

To: Members of the
Medical Advisory Committee

Gentlemen:

Pursuant to action taken by the Committee at its Sixteenth Meeting, arrangements have been made to hold your Seventeenth Meeting at the Shamrock Hotel, Houston, Texas, on Wednesday, September 30, 1953.

Through the courtesy and help of John R. Fraker, Houston Chamber of Commerce, a block of guest rooms has been set aside for your use upon arrival Tuesday, September 29, 1953; however, it will be necessary for each of you individually to notify the hotel of your need for a room and the hour of your arrival.

Please do this as promptly as possible otherwise it may be impossible to secure desirable reservations. It is always easier to cancel reservations than to make them just before a meeting.

Very truly yours,

DV Stroop

DVS:rd

mc - Mr. John R. Fraker, Manager
Civic Affairs Department
Chamber of Commerce
Houston, Texas

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

June 18, 1953

To Members and Associates
Medical Advisory Committee

Gentlemen:

By letter dated June 11 Howard J. Stroud, M.P.H., Chairman - Industrial Health Conference of the Houston Chamber of Commerce, informs me that each of you have been added to his regular mailing list to receive complete information on the conference to be held at Shamrock Hotel, October 1, 2, and 3, 1953.

Pending the receipt of such information, James W. Hammond, Humble Oil and Refining Company, has provided me with a preliminary program as follows:

"PRELIMINARY PROGRAM

6th ANNUAL INDUSTRIAL HEALTH CONFERENCE

SPEAKERS SCHEDULE

THURSDAY: 8:00 - 9:45 Registration

Oct. 1 9:45 Opening Ceremony

Mr. Charles Fleetwood, Presiding

Mr. John C. Flanagan - President, Houston Chamber of Commerce

Mayor Roy Hofheinz - Welcome Address

Mr. Howard J. Stroud - Chairman, Industrial Health Conference

10:15 PROGRAM HONORING PETROLEUM INDUSTRY

Mr. James Hammond - Presiding

Mr. L. F. McCollum - Continental Oil Co. - Keynote Address

"INDUSTRIAL HEALTH VALUE IN PETROLEUM
INDUSTRY AS SEEN BY TOP MANAGEMENT"

- 10:45 Dr. George M. Saunders - Chairman API Med. Advis. Comm.
"HOW SOCONY-VACUUM WORKS AN INDUSTRIAL
HEALTH PROGRAM"
- 11:05 D. H. Hine, M.D. - Shell Oil Development Co.
"A PROGRAM FOR THE EVALUATION OF THE SAFE
HANDLING OF COMPOUNDS DEVELOPED BY THE
PETRO-CHEMICAL INDUSTRY"
- 11:25 R. E. Eckardt, M.D. - Director Medical Research -
Standard Oil Development Company
"A MEDICAL RESEARCH PROGRAM IN INDUSTRY"
- 11:45 Discussion - Adjourn for Lunch
- 12:00 LUNCHEON PROGRAM
Douglas Marshall, Quintana Petroleum Co., Presiding
- 1:00 Luncheon Speakers - Robert King, M.D. - President American
Heart Association
"WHAT THE AMERICAN HEART ASSN. OFFERS INDUSTRY"
H. N. Marvin, M.D. - Former President
American Heart Association
"THE EXECUTIVE AND HIS HEART"
- 2:00 Vice Admiral, Ross T. McIntyre, M.D. - Chairman, Presidents'
Committee on Employment of Physically Handicapped
"RECOVERY OF HUMAN RESOURCES THRU REHABILITATION"
- 2:30 PANEL - THE HEART IN INDUSTRY, Sidney Schnur, M.D., Presiding
H. N. Marvin, M.D. - "THE PHYSICIANS VIEWPOINT"
- 2:50 Mr. James J. Healy - Saul Wallen Arbitration and Mediation
of Labor Disputes
"HOW THE WORKER VIEWS IT"
- 3:10 Mr. Albert Jones - Helm & Jones Law Offices
"ACCORDING TO THE MEDICO-LEGAL ANGLE"
- 3:30 Mr. Stokes Marshall - Personnel Director, Hughes Tool Co.
"AS VIEWED BY THE PERSONNEL DIRECTOR"
- 3:50 Gent Graves, M.D. - Medical Director, American General Life
Insurance Co.
"A PROBLEM FOR THE INSURANCE CARRIER"
- 4:10 Questions and Answers
- 5:00 Adjourn for Dinner

- 3 -

EVENING PROGRAM

7:00 AFTER DINNER RECEPTION - Prudential Building Auditorium

7:45 Recognition of Distinguished Guests -

8:00 SPECIAL PROGRAM

Mr. Charles Fleetwood - Presiding

Philip Drinker, Ph.D. Professor of Industrial Hygiene -
School of Public Health - Harvard University

"CURRENT DEVELOPMENTS IN INDUSTRIAL HEALTH IN
FREE EUROPE"

9:00 Discussion -

9:30 Entertainment - Giving of Awards - Music

FRIDAY 9:00 Dr. Hardy Kemp - Presiding

to
Oct. 2 12:00

Mr. Paul C. Sparks, Executive Secretary, Texas State
Federation of Labor

"LABOR LOOKS AT HEART IN INDUSTRY"

Mr. C. Richard Walmer, M.D., Manager, Industrial Hygiene
Foundation, Mellon Institute, Pittsburgh, Pa.

"NOISE IN INDUSTRY"

Rear Admiral Hugh L. Pugh, M.C. (U.S.N.), Surgeon General,
Bureau of Medicine, Surgery Dept. of the Navy

Paper on Original Research on effect of Noise on
working personnel.

James H. Sterner, M.D. - Medical Director Eastman Kodak Co.
Longview Plant

"NOISE, A MEDICAL PERSPECTIVE"

Jack L. Bangs, Ph.D. - Methodist Hospital - Medical Center

"COMPENSIBLE INDUSTRIAL HEARING LOSS, MEASURES FOR
PREVENTION"

12:00 LUNCHEON - Miss Jeannette Bartholomew, Presiding

Speaker - Mr. James H. Pipkin - Vice President, The Texas Co.

"MANAGEMENT'S STAKE IN INDUSTRIAL HEALTH"

- 2:00 MANAGEMENT & MEDICINE LOOK AT THE BY-PRODUCT DISPOSAL
PROBLEM PROGRAM
- Councilman George Marquette, Presiding
- 2:00 Movie, "THE DISAPPEARING CITY"
- 2:20 W. L. Stewart Jr., Exec. Vice-Pres. - Union Oil Co. of
California
"MANAGEMENT'S RESPONSIBILITY IN AIR POLLUTION"
- 2:40 Arthur J. Vorwald, M.D., Trudeau Foundation, Saranac Lake,
N. Y.
"MEDICAL ASPECTS IN AIR POLLUTION"
- 3:00 Movie - "RIVER AT MY DOOR"
- Mr. Geo. F. Smith, President Johnson & Johnson Co.
"HELPING A COMMUNITY WITH A STREAM POLLUTION PROBLEM"
- 3:45 Philip Drinker, Ph.D. - School of Public Health - Harvard
University
"POLLUTION - THE ENGINEERING ASPECT"
- Robert Kahoe, M.D. - Director, Kettering Research
Laboratories
"AN EVALUATION AND PREDICTION"
- 4:30 Discussion - Adjourn
- 5:30 Shamburger Parter - Open to Registrants & wives or guests.
Shamrock - Pool Side

NURSING SECTION -- PROGRAM

- FRIDAY 8:00 REGISTRATION
- Oct. 2 9:00 Program on Rehabilitation
- 10:45 Panel Discussion
"IN-PLANT RELATIONSHIPS"
Moderator - Jas. Madigan
- 12:00 LUNCHEON
Mr. James Pipkin - Vice President, The Texas Co.
- 2:00 - 5:00 PLANT TOURS
- SATURDAY 9:00 PANEL DISCUSSION
- Oct. 3 "NURSING PROBLEMS"
Moderator - Dr. T. B. Blackwell

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11:15 PAPER - by G. C. Mossman
12:00 ADJOURN FOR LUNCHEON
1:00 Trip Down Ship Channel - Port of Houston"

If and when additional information becomes available, it
will be forwarded to you.

Very truly yours,

W. Stroop

DVS:kn

AMERICAN PETROLEUM INSTITUTE

30 WEST 30TH STREET
NEW YORK 20, N. Y.

February 16, 1953

Mr. N. C. McGowen, Chairman
Safety Committee of Board of Directors
c/o United Gas Pipe Line Company
P. O. Box 1407
Shreveport 92, Louisiana

Dear Mr. McGowen:

At its meeting on September 25, 1952 the Institute's Medical Advisory Committee requested me to review its eight years of work and to report the results to you.

The report is enclosed.

Additional copies of it are available for transmittal to members of the Safety Committee of the Board if and when you desire to have them mailed.

Very truly yours,



E. K. Linder M. D., Chairman
Medical Advisory Committee for 1952

mc - Members and Associates
Medical Advisory Committee

For Information Only - Not For Publication

American Petroleum Institute

Medical Advisory Committee

Report for Period 1945 - 1952

February 16, 1953

(1) Chronological Highlights*

- May 7 - 8, 1945 - Committee held organization meeting.
- May 15, 1945 - Executive Committee of Board approved Medical Advisory Committee recommendations to establish:
- (a) Special Medical Research Fund
 - (b) Three research projects:
 - 1. Chlorinated compounds
 - 2. Carcinogenic properties
 - 3. Permissible concentrations
- November 14, 1946 - Medical Advisory Committee requested increase in research fund and addition of two more projects, namely:
- (1) Cutting fluids study
 - (2) Fluorine study
- April 2, 1948 - Medical Advisory Committee recommended increase in program of work on carcinogenicity.
- November 11, 1949 - Medical Advisory Committee recommended retention of Professor Philip Drinker, Harvard School of Public Health, as consultant on industrial-hygiene problems.
- November 3, 1951 - Medical Advisory Committee recommended participation and financial support by and for petroleum industry in research on physiology of skin at Kettering Laboratory.

* See outline of Objectives, Functions and Procedures (January 18, 1952) attached as Appendix A.

(2) Financial Summary

(a) Contributions received 1945 - 1952 \$ 528,187.00

(b) Expenditures and commitments to June 30, 1953

University of Cincinnati
Carcinogenicity \$ 396,506.91
Fluorine Studies 11,500.00
Physiology of Skin 7,500.00

Harvard University
Toxicological Reviews 45,453.73
Cutting Oil Study 2,500.00
Philip Drinker 12,500.00

Miscellaneous 447.28

Total \$ 476,407.92

Unobligated balance, December 31, 1952 \$ 51,779.08

(c) Budget for year ending June 30, 1954

University of Cincinnati
Carcinogenicity \$ 78,283.00
Fluorine 2,500.00
Physiology of Skin 5,000.00

Harvard University
Philip Drinker 2,500.00

Total \$ 88,283.00

(3) Objectives of Work

The Medical Advisory Committee functions as an advisory group to provide the Board of Directors with medical information deemed to be helpful in protecting oil-company employees against known and potential sources of industrial disease. It serves only in an advisory capacity. Its recommendations relate only to the medical aspects of specific problems.

Therefore, the committee by cooperative study, discussion, and recommendation seeks to anticipate and to ascertain conditions which may adversely affect the health of oil-company employees; to investigate the causes and circumstances giving rise to such conditions; to seek ways and means to prevent or remedy such conditions; and to make its findings available to the Board and, through it, to the industry.

(4) Status of Work

a. Carcinogenicity

As evidenced by the amount of money expended during the past eight years, the investigation of carcinogenicity properties of petroleum constitutes the major part of the committee's work. This long-range study may require the continued attention of the committee for many years; however, its immediate objectives are now well defined and on the road to accomplishment. The rate of expenditure should decrease substantially after June 30, 1954. (For detailed report on this study, see Appendix B to this report.)

b. Other committee activities

1. Toxicological Reviews

Literature reviews on sixty-three substances used or produced by oil companies have been prepared and made available primarily for oil-company use; but as a public service they are also available to public purchase at nominal prices. (See Subcommittee report attached as Appendix C.)

2. Fluorine Studies

Cooperating with industries and others interested in fluorine compounds, the Medical Advisory Committee is one of the sponsors of the investigative work being done at Kettering Laboratory (University of Cincinnati). The results obtained are available to the oil companies which contribute to the special medical research fund. (See report attached as Appendix D.)

3. Philip Drinker

Professor Drinker is an outstanding authority in the field of industrial hygiene. He has been retained by the committee and is available for advice upon request from any contributing oil company.

4. Physiology of Skin

The great need for knowledge on the physiology of skin and the lack of financial support for research on the subject have impelled the committee to take a modest share of the cost of a project underway at Kettering Laboratory. This is research of a fundamental character. There is no certainty of compensatory results. (See report attached as Appendix E.)

5. Atmospheric Pollutants

The committee seeks to keep informed on the medical aspects of atmospheric pollutants. (See report attached as Appendix F.)

6. First Aid

The committee has assisted in the preparation of the API First Aid Training Guide.

7. Cutting Fluids

The committee has endeavored to assist in problems incidental to the use of cutting fluids, but to date circumstances have not favored an organized study of the subject.
(See report attached as Appendix G.)

8. Medical Policies and Practices

This committee has arranged to make available upon request by any member or associate member the various records and record systems used by member physicians in their respective medical organizations. These records are available in the API headquarters. In April 1952 this subcommittee sponsored an information illustrated resume of how a good medical program functions in the petroleum industry. In September 1952 the subcommittee presented to members and associates a complete method of uniform medical records and sponsored a discussion on "What Constitutes a Good Record System in the Petroleum Industry".

In addition, in response to request made by the General Committee, Division of Refining, the Medical Advisory Committee is formulating the following:

1. Suggested minimum standards for physical examination of employees,
2. Suggested qualifications for medical directors and plant doctors,
3. Suggested uniform methods of preparation and maintenance of medical records of employees.

Additional information on any phase of this report or the work of the Medical Advisory Committee will be supplied promptly upon request.

E. Kern Linder, Chairman
Medical Advisory Committee for 1952

OUTLINE OF OBJECTIVES, FUNCTIONS AND PROCEDURES
OF THE
MEDICAL ADVISORY COMMITTEE

(AS RECORDED IN COMMITTEE FILES AND MINUTES OF MEETINGS)

* * * * *

June 1, 1944	Dr. Robert E. Wilson, President, Pan American Petroleum and Transport Company, suggested by letter that the API Department of Safety investigate as to the availability of information on degree of hazard involved in the more important compounds being made or used in refineries.
June 21, 1944	Circular letter addressed to 27 members of the Institute's Board of Directors transmitted copy of Dr. Wilson's letter and quoted in part a letter referring to carcinogenicity of certain residue oil and requested expression of views on dissemination of information on health hazards and supplying of names of representatives.
August 25, 1944	Recirculated June 21 letter to 28 API directors, with statement of favorable response already made by 15 and with invitation to attend a joint meeting of safety and medical men in Chicago on October 2, 1944.
October 2, 1944	At the October 2, 1944 meeting of the Central Committee on Accident Prevention (attended by representatives of medical departments), those present voted unanimously to request the appointment of an API Medical Advisory Committee to formulate and recommend a program of work on the medical aspects of occupational health problems in the petroleum industry.
November 1, 1944	Circular letter to 28 directors requested names of medical men who should be made members of the Medical Advisory Committee.
February 23, 1945	Pursuant to nominations made by API directors, President Boyd appointed 16 oil company medical directors and physicians to serve as the Institute's Medical Advisory Committee.
April 3, 1945	Notice of first meeting (May 7 and 8, 1945) was issued with suggestion that members may be accompanied by non-medical technologists who are familiar with recent progress in hydrocarbon research and development.
May 7 & 8, 1945	Actions taken at first meeting of the Medical Advisory Committee included:

Appendix A

- 2 -

1. Dr. McIver Woody, Standard Oil Company of New Jersey, was chosen to serve as chairman for 1945.
2. Selection of four studies for 1945, as follows:
 - a. Medical policies and practices and formulation of tentative procedures.
 - b. Chlorinated compounds, particularly chlorinated cutting oils used in petroleum products.
 - c. Possible carcinogenic properties of hydrocarbons.
 - d. Toxic effects and properties of other hydrocarbons, products and substances.
3. Placed names of each duly authorized associate on committee mailing list to receive all committee communications.
4. Recommended to the Executive Committee of the Board of Directors a three-year program of medical research to be conducted under the auspices of the American Petroleum Institute with guidance and advice of the Medical Advisory Committee, with authority to:
 - a. Raise \$25,000 special Medical Research Fund.
 - b. Establish three research projects on substances made, used, or sold by oil companies, as follows:
 - (1) Chlorinated compounds.
 - (2) Carcinogenic properties.
 - (3) Permissible concentrations.

May 15, 1945

The Executive Committee of the Board of Directors approved the recommendations as submitted by the Medical Advisory Committee.

July 1945

(See API Quarterly, Vol. 15, No. 3, July 1945, pages 18, 19, and 20, for public announcements on appointment and work of the Medical Advisory Committee.

November 16, 1945

At its second meeting, the Medical Advisory Committee:

1. Accepted subcommittee reports as follows:
 - a. Carcinogenicity - Dr. M. N. Newquist, Chairman
 - b. Chlorinated Compounds - Dr. F. F. Boys, Chairman
 - c. Permissible Concentrations - Dr. V. C. Baird, Chairman.
 - d. Medical Policies and Practices - Dr. R. A. Jewett, Chairman.

Appendix A

- 3 -

2. Established budgets for allocation of funds for research on:
 - a. Carcinogenicity.
 - b. Permissible Concentrations.
3. Recommended that Dr. McIver Woody should continue as chairman during 1946 and that he should make changes in subcommittee memberships.
4. Recommended circularization of subcommittee reports in advance of each meeting.
5. Recommended Dr. Woody and Mr. Bonsib as member and alternate respectively on ASA Committee on Toxic Dusts and Gases (Z37).

April 5, 1946

At its third meeting the Medical Advisory Committee received and accepted recommendations reported by its subcommittees.

November 14, 1946

At its fourth meeting the committee received and accepted recommendations reported by the subcommittees, and voted to ask the Executive Committee to authorize solicitation of \$30,000 for allocation to research work in 1947 as follows:

1. Carcinogenicity	\$ 10,000
2. Permissible Concentrations	10,000
3. Cutting Fluids	5,000
4. Fluorides	5,000
TOTAL	\$ 30,000

April 28, 1947

At its fifth meeting the committee received reports and adopted recommendations submitted by its subcommittees, and voted that the chairman should report committee activities to the Safety Committee of the Board of Directors.

November 13, 1947

In addition to the adoption of subcommittee recommendations reported at its sixth meeting, the Medical Advisory Committee voted that all meetings of the committee and its subcommittees should be closed to all persons except members, associates, and invited guests.

April 2, 1948

The seventh meeting of the committee resulted in recommendations to the Safety Committee of the Board for the enlargement of the program of work on carcinogenicity at Kettering Laboratory.

November 12, 1948

The eighth meeting produced recommendations relating to APT medical publications and circulars and to atmospheric pollution, in addition to those pertaining to subcommittee work.

April 2, 1949

Preliminary to the regular order of business at the ninth meeting, the chairman stated that the members of the Medical Advisory Committee, in executive session, had requested him to report statements of committee policy as follows:

Appendix A

- 4 -

1. Decisions on recommendations as to medical problems and policies and as to appropriations of funds for medical research should be the sole responsibility of the fully accredited members (MDs) of the Medical Advisory Committee.
2. Recommendations to individual oil companies about contributions to the API Medical Research Fund also should be the sole responsibility of the fully accredited members.
3. In keeping with these responsibilities, each motion and each vote on such a matter should be made or cast by a fully accredited member or, in his absence from the meeting, by his duly designated representative.
4. No limitations should be imposed upon associate members or invited guests in the discussion of motions at meetings of the Medical Advisory Committee.
5. At meetings of subcommittees there should be no restrictions limiting the making of motions or voting by associate members of the Medical Advisory Committee.

(The members present voted unanimously to adopt these statements of committee policy.)

November 11, 1949

At the tenth meeting the Medical Advisory Committee was informed of action taken by the Executive Committee of the Board of Directors on November 10, 1949, to wit: "That the Safety Committee of the Board of Directors of the API be requested to ask the Medical Advisory Committee to refer to the General Committee of the Division of Refining all material dealing with or affecting refinery operation or petroleum products, prior to approval for the publication of this material by the Institute or through other channels."

April 24, 1950

The eleventh meeting was devoted almost entirely to actions on subcommittee reports.

November 10, 1950

At the twelfth meeting members were of the opinion that work was being delayed and in some cases jeopardized by the number of guests in attendance, particularly when guests are unidentified. This led to adoption of a committee policy that future meetings of the Medical Advisory Committee and its subcommittees should be "closed" except for the first of the two sessions of the Medical Advisory Committee.

April 21, 1951

The thirteenth meeting was concerned only with reports and appointments of subcommittees.

PROGRESS REPORT OF SUBCOMMITTEE ON CARCINOGENICITY

MEDICAL ADVISORY COMMITTEE A.P.I.

British experience with occupational skin cancer, particularly from shale oils, a few cases of skin cancer among petroleum workers in the United States, and the fact that catalytic cracking produces polycyclic aromatic hydrocarbons suggested the possibility of an occupational skin cancer hazard in this country from some petroleum materials. Research Project (MC-1) was, therefore, established to study this subject.

OBJECTIVES of the research project are (1) determination of which, if any, refinery streams and products are carcinogenic, (2) identification of the cancer-causing agents, (3) development of an analytical tool for determining potency of any oil instead of having to rely on time-consuming, expensive biological testing, (4) investigation of protective measures which might be applicable, and (5) epidemiological studies to determine cancer incidence among employees in the petroleum industry. A special progress report from Dr. R. A. Kehoe summarizes the research work to date and is attached hereto as part of this report.

HIGHLIGHTS of Dr. Kehoe's report and of the research work are as follows:

1. Carcinogens are present in low concentrations in crude oil, the amount varying in different crudes.
2. These carcinogens are concentrated by distillation in the high-boiling fractions. Catalytic cracking, and thermal cracking to a lesser degree, create additional carcinogens and these are likewise concentrated in the high-boiling fractions.
3. Progress is being made toward identifying the individual or classes of polycyclic aromatics which cause the skin cancers.
4. An analytical tool (spectrophotometric) has been developed by which potencies of cracked residua apparently can be predicted with fair accuracy. To date this tool has not proven applicable for high-boiling straight-run or cracked distillates due to variables such as the presence of materials, as yet unidentified, which accelerate or retard the action of the carcinogens.
5. When a carcinogenic oil was removed from the skin of mice by washing with soap and water 10 minutes after applications, practically no skin cancers developed. Washing 4 hours after applications greatly increased the time before skin cancers appeared in the mice. When the washing was done 9 hours after applications, skin cancers developed on almost the same basis as if there had been no washing. This finding is of considerable practical significance since it confirms earlier opinions and experience that personal cleanliness is the chief preventive measure.
6. Limited studies have shown that the potencies of catalytic cracked residua can be reduced by dilution with non-carcinogenic oils. Mouse tests of some samples from certain refining processes which are known

Appendix B

- 2 -

to alter or remove polycyclic aromatics have revealed a reduction or elimination of cancer potency of such samples to mice. Further studies may yield information of practical significance, but present studies are directed towards the fundamental aspects of the problem rather than the testing of large numbers of individual samples. No studies are directed towards changes in processing.

7. The study of incidence of skin cancer among employees in the petroleum industry (epidemiological survey), which is not a costly item, should be continued for a period of years in order to be of practical value.
8. This research project (MC-1) started on a small scale in 1946 and was expanded in 1949. Expenditures and allocations up to June 30, 1953, will total \$404,893.33. The budget for this project for the year starting July 1, 1953, is \$78,283.00.

DISCUSSION - While the results of experimentation on mice may not be strictly applicable to man, these findings plus the development of scrotal cancers among some wax pressmen and the fact that catalytically cracked residua have a close resemblance to coal tars in their effects on mice and in their content of certain types of polycyclic aromatics, indicate that a potential skin cancer hazard exists in certain petroleum materials and that appropriate control measures are advisable. Three points should be emphasized: first, the time it takes for a skin cancer to develop in man after exposure to a carcinogen is long, some estimates being as high as ten to twenty years or more; second, skin cancer being on the surface can be readily detected in its early stages when it can be cured; and third, whether or not a skin cancer is due to oil requires careful evaluation of all pertinent facts and circumstances.

FUTURE ACTIVITIES - While it is not expected to develop all the answers to this problem, it is reasonable to expect that within the next year or two it will be possible to outline more clearly the magnitude of the hazard and to recommend specific preventive measures where indicated. It is also hoped that further progress will be made in developing analytical methods which will enable a refiner to determine the carcinogenic potencies of oils without resorting to time-consuming biological testing or at least to minimize the need for animal testing.

PREVENTIVE MEASURES - Industrial hygiene engineering controls, avoidance of unnecessary skin contact, good personal cleanliness and adequate medical control which includes periodic physical examinations are the fundamentals in the prevention of occupational skin cancers due to oils. Of these, good personal cleanliness is a simple measure which can and should be observed by everyone. It will not only aid in this particular problem but is of value in the control of occupational dermatitis in general.

HAZARD TO CUSTOMERS - An epidemiological study of cancer among employees in the petroleum industry to aid in evaluating the hazard is a part of the research project. The matter of similar studies to determine whether a hazard exists among customer employees exposed to petroleum products has been kept in mind since the inception of the subcommittee. Due to the many difficulties and possible undue implications that would be involved in an epidemiological study

Appendix B

- 3 -

of cancer among employees of oil company customers, it is the consensus of the subcommittee that no action be taken with respect to such a study. However, the subcommittee will continue to give this subject its earnest consideration and no recommendations for action will be made without the knowledge and consent of interested divisions of the Institute.

M. N. NEWQUIST, M.D., Chairman

November 20, 1952

ATTACHMENT: Progress report from Dr. R. A. Kehoe (November 7, 1952)

Kettering Laboratory - University of Cincinnati

THE POTENTIAL CANCER HAZARD IN THE PETROLEUM INDUSTRY

Introduction

This investigation has as its primary purpose the appraisal of the hazard of cutaneous cancer to persons whose work involves contact of their skin with petroleum products. For the sake of perspective, it is well to recognize that occupational cancer has long been known to medical men. Examples are "mule spinners" cancer, the bladder cancer of workmen employed in the manufacture of beta naphthylamine, and the malignant tumors of the lung, skin, bone and blood of those whose occupations have provided exposure to certain radiations and radioactive materials.

A feature of occupational cancer which should be mentioned to provide further perspective is the time factor so often associated with its induction. Regular or intermittent exposure to cancer-inducing materials over periods of ten or fifteen years may be required to induce the disease. This and other features of the disease necessitate reliance upon employment and medical records for direct information. Since such records are not available, generally, in the petroleum industry, it is impossible to determine by direct means, the significance of the hazard which has existed up to the present time. Resort must be had to indirect measurement of the potential hazard, therefore, and adequate recording must be instituted for the future.

This report must limit itself to the experimental program undertaken and thus far prosecuted by the staff of the Kettering Laboratory. Acknowledgement must be made, however, if only in passing, of the many contributions of other investigators in this country and abroad, and also of the invaluable information and help given by many representatives of the companies that have supported the investigation.

Initiation and Cost

The work of this Laboratory on this problem, under the sponsorship of the American Petroleum Institute, and at the instigation of its Medical Advisory Committee, began in April of 1946, in a preliminary manner. The early observations served to point up the need for precision in the experimental methods and for means of expressing the results in numbers which would portray the relative carcinogenic potencies of materials under test.

A systematic attack on the general problem was initiated in 1949, after extensive planning by representatives of API and the Laboratory. Funds were provided for an expanded experimental program, and additional sums have been added annually. The investigation has been carried out essentially as planned under the critical guidance of a Research Advisory Committee. The expenditures made for the prosecution of the work, including those involved in the preliminary work (\$6000.00) and those provided for physical facilities (\$40,000.00), will have reached the total sum of approximately \$335,000.00 by the end of 1952, and somewhat more than \$400,000.00 by the end of 1953.

Scope and Methods

The investigation has been conducted along the following four main lines:

1. Representative samples of petroleum products derived from various raw materials and technologic processes have been selected;
2. The samples have been tested (biological tests) for their capacity to induce cancer in susceptible mice;
3. Systematic efforts have been made to relate the cancer-inducing capacity of these materials to certain physical and chemical properties and to certain specific chemical constituents (chemical research);
4. Data on the incidence of cancer among employees of the petroleum industry are being gathered (epidemiologic research) to establish the scope of the control measures that might be required, and the extent to which control measures, once applied, shall have achieved success.

The procedure that seemed to be required to carry out these four lines of investigation within reasonable limits of time and cost, was that of applying the available biological and technologic methods of study to relatively few samples of clearly defined type with respect to source and processing procedure, while at the same time subjecting the experimental methods to critical examination, and adapting them to specific practical ends.

The ultimate goals of the investigation are intensely practical, in that the work is pointed toward precise localization of the hazard, the determination of its significance, and the elaboration of the means by which it may be prevented or controlled. Such information will enable the industry to apply measures of prevention or control which will be appropriate, whether based upon technologic or hygienic procedures.

Progress

Samples of three hundred and forty (340) product and feed streams have been collected from over two hundred (200) operating units, in conjunction with continuing study of detailed data on charge streams and operating conditions. These samples have been examined for physical properties, among which the pattern of their transmission of ultraviolet light has appeared to be of special significance as a means of predicting their cancer-inducing capacity. Further work has tended to relate these properties to specific chemical compounds. One hundred and sixteen (116) samples of such products have been subjected to biological tests. Some of these have been fractionated and retested piecemeal, one of them to the extent of thirty (30) different fractions, and others in lesser numbers of fractions.

The epidemiologic aspects of the investigation have developed slowly, but are now progressing. Medical records are being gathered in accordance with a plan accepted by medical representatives of a number of the participating companies.

Results

A firm foundation has now been laid for further work. Careful exploration of significant variables in the methods of biological testing has led to the development of techniques of observation and recording whereby all results can be related to each other and expressed in simple terms of cancer-inducing potency.

Certain practical questions have been answered by the biological tests. As a generalization, it can be said that certain current technologic processes in the petroleum industry tend to concentrate cancer-inducing substances which are present in low concentration in crude petroleum, while certain other processes result in an absolute increase in the available quantity of cancer-inducing substances. By this means certain products and intermediate materials come to possess a significant capacity for inducing cancer of the skin of mice. Cracked residua from catalytic cracking commonly exhibit relatively high potencies of this type, although it should be noted that these potencies may vary over a ten-fold range from one source to another. These products bear such close resemblance to the coal tars, with respect to their effects upon mice and also as to their content of certain types of polycyclic aromatic hydrocarbons, as to support the belief that the hazards of the two types of materials are comparable.

It has been established that the high cancer-inducing capacity of a catalytic gas oil cannot be reduced by further thermal cracking on a practicable basis. However, by such methods, appreciable proportions of the hazardous streams may thus be broken down to valuable noncarcinogenic products such as gas and gasoline.

Spectrophotometric analysis of distillate fractions of residua from catalytic cracking and also from thermal cracking of catalytic gas oils has revealed in them characteristics which have been associated with their relative cancer-inducing potency. Such analysis, therefore, has become a useful tool, when employed experimentally with appropriate reservation of judgment, for the estimation, by physical means, of the extent of carcinogenic properties in these types of cracked residua. Satisfactory analytical methods for predicting the potencies of side-stream products of catalytic cracking and coking operations are still being sought. An increasing body of evidence is being developed, which indicates that a major contribution to the potencies of such distillate streams is being made by non-carcinogenic alkylbenzene components, which boil in the range 400°-600°F, acting as accelerators. The fuller understanding of this phenomenon which has come out of the work of the past few months has given promise of the development of a reliable and widely applicable physical method of estimating the carcinogenic potency of any petroleum intermediate or product.

Chemical fractionation experiments are pointing the way toward a classification of the polycyclic hydrocarbons which are responsible for the carcinogenic potency of catalytically cracked oils, and which, at the same time, are responsible for the characteristic absorption spectra of such oils. The specific carcinogenic compound, 3,4-benzpyrene, has been isolated from a sample collected from a catalytic cracking unit, in a state of purity satisfactory for its positive identification.

The information obtained by animal experimentation, while not strictly applicable to man or to the conditions of his occupational exposure, is such as greatly to strengthen the suspicion, which was responsible originally for these investigations, that an occupational hazard actually exists. There is need, therefore, for the development and application of appropriate and effective measures of control.

From the Kettering Laboratory in the Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati.

Robert A. Kehoe, M. D., Director

November 7, 1952

ASSIGNMENTS AND ACCOMPLISHMENTS OF THE
SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS

The Subcommittee on Toxicological Reviews, of which I am chairman, was created in 1951, to replace or succeed the Editorial Subcommittee in the handling of work on toxicological reviews. Both of the above mentioned subcommittees in turn were created for the purpose of editing the toxicological prepared reviews at Harvard University by Professor Philip Drinker and associates under the auspices of the Subcommittee on Permissible Concentrations. The Subcommittee on Toxicological Reviews has compiled comments from member companies and carried on minor editorial revising of the toxicological reviews. In addition they have seen to the publication of the various toxicological reviews already distributed and in process.

Two additional toxicological reviews have been prepared by Professor Drinker during the past year. These reviews on oil mists and lead compounds and cutting oils have been circularized among the Medical Advisory Committee members and associates.

Marshall Clinton, M. D., Chairman

October 20, 1952

REPORT OF
SUBCOMMITTEE ON FLUORIDES

The introduction of HF alkylation caused the petroleum industry to be confronted with the question of health hazards arising from the operation of HF alkylation units as affecting man, animals, and plant life. In January, 1946, considerable hysteria arose among farmers and residents in the industrial regions of Southern New Jersey relative to potential and alleged crop damage. Prior to this and in the central part of the United States, the aluminum industries had experienced great difficulty with fluorosis of cattle grazing in the vicinity of aluminum plants. Accordingly, the A.P.I. Subcommittee on Fluorides was formed to study the matter from the standpoint of the petroleum industry.

One of the first efforts of the Subcommittee was to seek a scientific organization that would undertake such studies. After considerable investigation it was found that the Kettering Laboratory was already working on fluorides, the project being sponsored by five companies handling HF or fluorides to the extent of \$17,000.00 per year. The five companies extended an invitation to A.P.I. to participate in the work and made available all previous data and reports on the project. A.P.I. agreed to contribute \$2,500.00 per year (on a year-to-year basis) and thus received the benefit of an extensive investigation at a nominal cost. Payments of \$2,500.00 per year started in 1947 and have been continued to the present time. Since 1947, several other interested companies have joined the group, the active sponsors in 1952 being:

The Pennsylvania Salt Manufacturing Company
Aluminum Company of America
Reynolds Metal Company
Universal Oil Products Company
American Petroleum Institute
Kaiser Aluminum and Chemical Company
Tennessee Valley Authority
The Harshaw Chemical Company
Minnesota Mining and Manufacturing Company

During the past years reports have been issued on the fluoride problem covering such investigational studies as:

Ingestion of Fluorides
Inhalation of Fluorides
Metabolism of Fluoride by Man
Effects of Fluoride on Man and Animals
Report on Legal Treatment of Fluorine

In addition to the above, a complete and extensive literature abstract survey has been made containing all known references to the subject of fluorine. In 1950, Part I, a 525-page bibliography, was issued on Inorganic Fluoride Compounds entitled, "Publications Concerning Fluorine and Its Compounds in Relation to Man, Animals and Their Environment Including Effects on Plants". In 1952, Part II was issued, a 464-page volume on Organic Fluorine Compounds.

Appendix D

- 2 -

In summary, the A.P.I. Subcommittee on Fluorides has been very fortunate in participating and helping to promote an extensive investigation on fluorides through cooperation with other industrial companies interested in the problem. It has received through this means the benefit of a study far more comprehensive than it could possibly undertake itself at a fraction of the cost of such work.

It is therefore the recommendation of the Subcommittee that the A.P.I. Medical Advisory Committee continue to support this research at the Kettering Laboratory.

George M. Saunders, M. D., Chairman

By
A. C. Pabst

October 20, 1952

REPORT OF THE
SUBCOMMITTEE ON SKIN PHYSIOLOGY

The Subcommittee on Skin Physiology was created in the fall of 1951 in order to consider a request by Dr. Robert A. Kehoe of the Kettering Laboratory for financial assistance in studies being conducted in his laboratory on the physiology of the skin. These studies were already in progress at the time of the creation of the Subcommittee and were being supported by several other interested groups, including the Air Force.

At its first meeting, the committee believed that the work at the Kettering Laboratory on skin physiology was of such importance to petroleum industry that the Medical Advisory Committee of the API could well recommend that financial support be given to this work. This was based on the knowledge that dermatitis to petroleum products is an ever present problem and on the fact that little is known about the normal physiology of the skin. Therefore, it is believed that until such information on the normal physiology of the skin is developed it will be almost impossible to understand the pathologic physiology of the skin. In consequence, therefore, the committee recommended that the API Medical Advisory Committee support this research at the Kettering Laboratory to the extent of \$5,000 a year, this money to be given as \$2,500 in 1951, \$5,000 in 1952 and an additional \$5,000 in 1953.

One progress report has been submitted by Dr. Kehoe in which it was reported that the laboratory is studying the chemical composition of the fats of the skin in order to understand the chemical changes that occur in these fats in the presence of certain types of dermatitis. In addition, absorption into and through the skin is being studied by radioactive tracer techniques. It is contemplated that information of this type may ultimately lead to basic knowledge on skin physiology, which will be of great value to the petroleum industry in its attempt to control the dermatitis which may result from certain petroleum products.

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

October 15, 1952

REPORT OF SUBCOMMITTEE ON

ATMOSPHERIC POLLUTANTS

The American Petroleum Institute and other organizations have undertaken the study of atmospheric pollutants and are attempting to determine causal relationships to the petroleum industry. These studies are many and varied and much has been learned concerning pollutants and the characteristics of atmosphere. Investigations involve studies by engineers, chemists, physicists, meteorologists, botanists, economists and others.

Your Subcommittee of the Medical Advisory Committee has constantly kept itself informed of the results of these various studies and researches to the present time. We, as a part of the Medical Advisory Committee, are interested in the factors of air pollutants that might injure or affect the health of the human being either directly or indirectly. To date little is known about the exact effect of smog on human health. Your committee is aware that certain presumptions have been made to the effect of air pollutants is detrimental to well being. How serious this presumptuous threat may be has not yet been established. U.S.P.H. is undertaking certain studies at this time which may give us some factual exact data with regard to what acute or chronic effect or physical residuals, air pollutants may have on the well being of humans.

Your Subcommittee has not received any assignments nor any questions for solution on the general subject of air pollutants. Your Subcommittee awaits the results of research that is being carried on at the present time or future research that might connect in some manner any deleterious physiologic effect of air pollutants. At the present time your Subcommittee is not sure whether there is an unknown substance "X" or unknown substances "X, Y, Z" that might affect the well being of man, animals or plants. Theories and presumptions are numerous and when more exact information is available to your Subcommittee, it is felt that no research be undertaken at this time for the determination of whether or not air pollutants are harmless or a nuisance or that it may have a physiological effect that is harmful to the human being.

E. P. Luongo, M. D., Chairman

By

John C. Ruddock, M.D., Vice Chairman

Appendix G to Medical Advisory Committee Report for Period 1945-1952 Feb. 16, 1953

ACCOMPLISHMENTS OF THE SUBCOMMITTEE

ON CUTTING OILS

FOR THE PERIOD 1945 TO 1952

1946 to 1951 - Distribution of Customer Booklets on Cutting Oils and Dermatitis furnished by member companies of the API to members and associates of the Medical Advisory Committee.

Distribution of reprints on Cutting Oil Dermatitis originating in USPHS and N. Y. State Department of Labor to Medical Advisory Committee members and associates.

1946 report and distribution to Medical Advisory Committee members and associates on Chlorinated Hydrocarbons.

1948 - "Safeguarding the Use of Cutting Fluids and Coolants" was prepared by Roy Bonsib, an associated member of Medical Advisory Committee. Circulated 1948 and 1949 and third revised draft circulated to members and associates of the Medical Advisory Committee for use in their own organizations. The final title being "Cutting Fluids, Practices and Hygiene". This final draft covered:

- Causes of Dermatitis
- Preventive measures
 - Cleanliness of Worker
 - Protective ointments
 - Reconditioning of Cutting Fluids
- Preplacement examinations.

Medical treatment was not covered. It was hoped that this revised paper could be used as a basis for the preparation of authentic information by members and associates of the Medical Advisory Committee.

1948 - "Dermatitis from Cutting Fluids - A Critical Review" was prepared by Mr. B. C. Krute of Harvard University under the direction of Dr. Drinker. In 1950 a revised copy was prepared and distributed under the title "The Cutting Oil Dermatoses - A Review".

This review of the literature was criticized thoroughly by the Medical Advisory Committee and was not published but was distributed by mimeographed copy to Medical Advisory Committee members and associates as a review of the literature to be used as each company might see fit.

The committee has been inactive in 1951 and 1952.

F. F. Boys, M. D., Chairman

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

IMPORTANT ANNOUNCEMENT

THIRTY-SECOND ANNUAL MEETING

CONRAD HILTON(Stevens) AND PALMER HOUSE HOTELS, CHICAGO, ILL.,
NOVEMBER 10 - 13, 1952

THIS NOTICE EXPLAINS HOW TO MAKE RESERVATIONS
FOR HOTEL ACCOMMODATIONS FOR THE THIRTY-SECOND ANNUAL MEETING

It is our understanding that hotel reservations are available to any who desire to attend this meeting. Therefore, no Housing Committee will be appointed and everyone will be "on his own." Requests for reservations should be made directly to the hotel of your choice.

All of the committee meetings and group sessions of the Division of Transportation will again be held at the Palmer House and those whose principal activities will be in this group may find it preferable to be at that or another hotel in the immediate vicinity, such as the Bismarck.

While it seems probable that the hotel situation in Chicago next November will be satisfactory, if you will observe the following suggestions it may help materially in assuring adequate accommodations for all:-

1. If you will plan to arrive in Chicago on Sunday, November 9 you will be able to obtain your room more promptly and avoid the inevitable delay which will occur if you do not arrive until Monday.
2. If you can arrange to share a room with someone else. The number of single rooms available will be limited.
3. If you can avoid requesting accommodations at the Conrad Hilton (Stevens) Hotel, where there is always congestion.
4. If each company will keep its requests for suites down to a minimum number required so that more companies may obtain suites.
5. If, in requesting a suite, you will indicate in your application to the hotel whether you will accept a regular bedroom in the event a suite is not available. There is never a surplus of suites.
6. Where companies prefer to make group reservations, it will help if these requests can be divided among two or more hotels, thus permitting the Conrad Hilton to more evenly distribute the rooms they have allocated for our meeting.

If the above suggestions are observed, we are hopeful that everyone who desires to attend the Annual Meeting should be able to obtain accommodations.

Lacey Walker
Secretary

January 15, 1952

AMERICAN PETROLEUM INSTITUTE

50 WEST 80TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

October 8, 1952

To Members and Associates,
Medical Advisory Committee

Gentlemen:

For your review and future reference we enclose Minutes of Sixteenth Meeting of Medical Advisory Committee.

Please note that these minutes constitute and record requests addressed to you as follows:

Item V, Page 4 You are requested to review and submit comments upon the two new toxicological reviews (see Appendices A and B).

Item VIII, Page 5 You are requested to review and to submit comments or criticisms within 30 days on the report of the Subcommittee on Atmospheric Pollutants (see Appendix C).

Also you are requested to send me any news items or other pertinent information which comes to your attention on the physiological aspects of atmospheric pollution.

Item X, Pages 5 & 6 If you are interested in sponsoring research work on the toxicology of aromatic hydrocarbons, please communicate with Doctor Robert E. Eckardt, Standard Oil Development Company, Medical Research Division, P.O. Box 51, Linden, New Jersey.

Item XIV, Page 7 Those members who serve as subcommittee chairmen are requested to send, on or before October 20th, a summary of his subcommittee assignments and accomplishments (1945-1952) to Doctor E. K. Linder, The Atlantic Refining Company, 260 South Broad Street, Philadelphia 1, Pennsylvania.

.....

If during your review of these minutes you discover errors or omissions please notify me at once so that correction may be issued promptly.

Very truly yours,

W. Stroop

For Information Only - Not For Publication

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

SIXTEENTH MEETING

Minutes of Meeting
September 25, 1952
Conrad Hilton Hotel
Chicago, Illinois

MEMBERS PRESENT

E. Kern Linder	- Chairman
T. M. Frank	- Vice Chairman
Marshall Clinton	- Secretary

F. F. Boys	M. N. Newquist
J. William Crookshank	James W. Osborn
L. E. Curtis	B. B. Reeve
Kieffer Davis	John C. Ruddock
Robert E. Eckardt	Leo J. Wade
Kenneth R. Fourcher	E. Richmond Ware

ASSOCIATES PRESENT

E. W. Adams	R. M. Landon
W. H. Barcus	K. G. Mackenzie
L. C. Beard, Jr.	R. C. Mithoff
R. D. Bent	C. A. Neilson
L. C. Burroughs	F. J. Sanders repre-
R. C. Cole	sented by W. E. Scovill
Allan E. Dooley	R. M. Shepardson
L. M. Henderson	F. M. Watkins

OTHERS PRESENT

Philip Drinker	- Harvard University
H. W. Gerardi	- Standard Oil Development Company
A. W. Horton	- University of Cincinnati
E. O. Mattocks	- American Petroleum Institute
A. C. Pabst	- Socony Vacuum Oil Company, Inc.
John J. Phair	- University of Cincinnati
D. V. Stroop	- American Petroleum Institute

Total in Attendance - 37

MEMBERS ABSENT

W. O. Armstrong
V. C. Baird
D. M. English
C. H. Hine
Warren F. Kahle
T. J. Kelly

W. R. Levis
E. P. Luongo
Robert Bell Lynn
Clark R. Miller
R. C. Page
George M. Saunders

ASSOCIATES ABSENT

W. R. Argyle
J. S. Boylan
C. L. Brown
C. R. Brown
L. O. Crockett
R. S. Driver
Nelson J. Gothard
L. N. Haugen

James E. Hill
E. W. Isom
D. W. Larmer
C. R. McKay
J. R. Morrison
W. H. Price
R. B. Roaper
H. D. Wilde

.....

I

INTRODUCTION OF MEMBERS AND GUESTS

In opening the meeting the chairman welcomed and introduced those who had not attended previous meetings of the committee.

II

MINUTES OF FIFTEENTH MEETING

ACTION The committee voted to approve the minutes of the Fifteenth Meeting as circularized.

III

REPORT OF SUBCOMMITTEE ON MEDICAL POLICIES AND PRACTICES - DR. L. E. CURTIS, CHAIRMAN

Doctor Curtis expressed his appreciation and thanks to Doctor Kenneth R. Fourcher, Vice Chairman, for the excellent report which had been transmitted by letter dated September 5, 1952. He stated he was tendering his resignation as chairman and suggested that Doctor Fourcher should present the subcommittee report and should be appointed chairman.

Doctor Fourcher reviewed the material which had been circularized to members with other subcommittee reports by letter dated September 11, 1952.

ACTION The committee voted to accept the report and requested the addition of a set of the new forms to the circulating library of medical department forms maintained in API headquarters.

IV

REPORT OF SUBCOMMITTEE ON CARCINOGENICITY - DR. M. N. NEWQUIST,
CHAIRMAN

Doctor Newquist, with the assistance of Doctor A. Wesley Horton and Doctor John J. Phair, presented and discussed reports as follows:

1. Report of Subcommittee on Carcinogenicity - Sept. 25, 1952 (copies were mailed to all members and associates on September 11, 1952).
2. Tabular Summary of Current and Completed Biological Experiments (34 pages, undated with 3 data sheets issued September 1, 1952). (Copies were mailed to all members and associates on September 10, 1952.)
3. Memorandum from Kettering Laboratory - September 24, 1952 (12-page report by Doctor A. Wesley Horton). (Copies were distributed to those in attendance and copies are attached to these minutes for those who did not attend Sixteenth Meeting.)
4. Memorandum from Kettering Laboratory - September 24, 1952 (22-page report on Epidemiological Studies). (Copies were distributed to those in attendance and copies are attached to these minutes for those who did not attend Sixteenth Meeting.)

On behalf of the Subcommittee on Carcinogenicity, Doctor Newquist recommended the continuation of Project MC-1 at Kettering Laboratory during the fiscal year ending June 30, 1954 at a reduced budget of \$78,283.

ACTION The Medical Advisory Committee accepted the subcommittee report and the recommendation to continue the project for the fiscal year 1953-1954 at a cost not to exceed \$78,283.

V

REPORT OF SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS - DR. MARSHALL CLINTON, CHAIRMAN

Doctor Clinton reported on two matters as follows:

1. The publication of reviews which have been accepted by the Medical Advisory Committee prior to the Sixteenth Meeting.
2. The two new reviews recently submitted by Professor Drinker on:
 - a) Oil Mists
 - b) Lead Compounds in Cutting Oils

He recommended:

1. That the 32 accepted but unpublished reviews should be reproduced by varitype-planograph method in limited number of copies to supply members' requirements and public sale.
2. That the two new reviews should be mimeographed for distribution only to Medical Advisory Committee members and associates for information and comment (see Appendices A and B).

ACTION The committee accepted the report and recommendations presented by Doctor Clinton.

VI

REPORT OF CONSULTANT - PROFESSOR PHILIP DRINKER

The committee received from Professor Drinker a brief report relating to the work on toxicological reviews and to the Saranac Symposium on Occupational Chest Diseases.

VII

REPORTS ON ASA COMMITTEE ACTIVITIES - ALLAN E DOOLEY, REPRESENTATIVE

The committee received brief reports from Mr. Dooley summarizing the scope and activities of ASA sectional committees Z4 and Z37.

ACTION The committee accepted the report and requested copies of the third draft of Z4 as soon as it becomes available.

VIII

REPORT OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS - DR. E. P. LUONGO,
CHAIRMAN

In the unavoidable absence of Doctor Luongo, the subcommittee report was read by Doctor Ruddock, Vice Chairman. The complete report is appended to these minutes as Appendix C.

ACTION The Medical Advisory Committee accepted the report and its recommendation in principle with the understanding that it will be appended to the minutes and that members will be requested to submit their comments or criticisms on its wording within 30 days and before the text of the report is released to other committees.

Note: Chairman Linder requested each member and associate to send news items and other pertinent information on physiological aspects of atmospheric pollution to D. V. Stroop for reproduction and distribution to Medical Advisory Committee members.

IX

REPORTS FOR INACTIVE SUBCOMMITTEES

The committee received brief informative statements of interest to subcommittees as follows:

1. Subcommittee on Cutting Fluids - Dr. F. F. Boys, Chairman. (See Appendix D for excerpt from minutes of meeting of Lubrication Committee, Division of Marketing, held September 10, 1952).
2. Subcommittee on Physiology of the Skin - Dr. Robert E. Eckardt, Chairman. Doctor Eckardt stated he had a report which would be reproduced and distributed to members.

X

AROMATIC HYDROCARBONS - (SEE ITEM IX, PAGE 5, MINUTES OF FIFTEENTH MEETING)

The committee received the tally on the letter ballot of August 29 reflecting the interest of 27 Medical Advisory Committee members as follows:

Actively interested	8
Tacitly interested	3
Not interested	3
Opposed to proposal	-
No letter ballot returned	13

Note: Doctor Eckardt, who had suggested reconsideration of this subject, invited interested members to communicate with him in the thought that a cooperative group, independent of the Institute, may be organized to sponsor research work on toxicology of aromatic hydrocarbons.

XI

NEW BUSINESSA. Resolution Adopted by the General Committee, Division of Refining, May 15, 1952

The chairman read the resolution as follows:

"That the Medical Advisory Committee be requested to prepare and recommend the following to the General Committee of the Division of Refining:

1. Suggested minimum standards for physical examination of employees.
2. Suggested qualifications for medical directors and plant doctors.
3. Suggested uniform methods of preparation and maintenance of medical records of employees."

ACTION

The committee voted to accept the assignment, to request the Chairman of the Medical Advisory Committee to inform the Chairman of the General Committee of the acceptance, and to refer the assignment to the Subcommittee on Medical Policies and Practices for study and recommendation.

B. Hygiene Panel - API Committee on Lubrication

As a record of inquiry, the committee received an excerpt from letter of a Medical Advisory Committee member as follows:

"It seems very strange to me that this group (Hygiene Panel) was not composed of doctors of medicine. Actually, the Medical Advisory Committee of the API has already established subcommittees on carcinogenicity, cutting fluids and eye hazards. It seems to me that this is a definite duplication of effort, and I wonder why the Medical Advisory Committee could not perform the functions now being done by the Hygiene Panel."

XII

BUDGET FOR FISCAL YEAR 1953-1954

In executive session the committee reviewed subcommittee reports and recommendations and voted to recommend a 1953-1954

budget as follows:

University of Cincinnati

Carcinogenicity	\$78,283
Fluorine Study	2,500
Physiology of Skin	<u>5,000</u>
	\$85,783
Philip Drinker	<u>2,500</u>
Total	\$88,283

Based upon an estimated unobligated balance of \$31,000 on deposit as of June 30, 1953, the committee voted to recommend a decrease of \$25,000 from the staff estimate of \$100,000, or \$75,000 to be solicited in 1953 to provide funds for the 1953-1954 budget.

XIII

TIME AND PLACE OF SEVENTEENTH (1953 ANNUAL) MEETING

The chairman presented an invitation from Doctor V. C. Baird to hold the Seventeenth (1953 Annual) Meeting in Houston, Texas just prior to or immediately after the meeting of the Annual Gulf Coast Regional Conference of Industrial Health which usually is held during the last week in September or first week in October.

ACTION The committee voted to accept the invitation tendered by Doctor Baird and left the details of the meeting to be arranged by the chairman and Doctor Baird.

XIV

REPORT TO SAFETY COMMITTEE OF THE BOARD

ACTION The committee voted to authorize and request the chairman to prepare a report summarizing the work and accomplishments of the Medical Advisory Committee 1945-1952 and to submit the report to the Chairman, Safety Committee of the API Board of Directors.

Note: In accepting this assignment the chairman requested each subcommittee chairman to send him a summary of his subcommittee's assignments and their accomplishments.

XV

ADJOURNMENT

By acclamation the members and associates expressed their appreciation and thanks for the outstanding services rendered by

Chairman Linder during 1952.

.....

The meeting was adjourned.

.....

Marshall Clinton, M.D.
Secretary

Approved:

E. Kern Linder, M.D.
Chairman

Note

Upon adjournment Chairman Linder introduced Doctor T. M. Frank who will serve as Chairman of the Medical Advisory Committee for the year beginning January 1, 1953.

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For Information Only - Not For Publication

APPENDIX A

To the Minutes of 16th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

OIL MISTS - A Review

Donald P. MacDonald, M.D.
Philip Drinker
Harvard School of Public Health
Boston 15, Massachusetts

September 2, 1952

If one atomizes a low boiling compound like ethyl ether the stream of liquid emerging from the tip of the nozzle evaporates promptly with a resultant cooling. Unless the air is saturated with ether no visible mist remains. If the same atomization is done with gasoline, as in a plumber's torch, a mixture of mist and of vapor results. Using fuel oil a substantial percentage of the mixture is true mist and with still higher boilers the percentage of mist, as contrasted to true gas, increases.

The stability or permanence of these mists in ordinary air is greatest then with the high boilers. For screening the movement of troops on land or for hiding ships at sea very stable smokes are made from oil. They work best on still muggy days when air movement is at a minimum and there is little or no turbulence.

One of the quickest ways of clearing up smoke of oil, tobacco, or even metallurgical fume is to stir it violently. The result is that the particles collide and flocculate often with such adhesive force that it is hard to disperse them again. Usually they cannot be dispersed in air but only by wetting with various liquids, many of them products of the petroleum industry.

The Aerosol Handbook (1) gives a very full discussion of the physical properties of aerosols, especially of mists and fogs. It includes methods for measuring their concentration in air, their production for testing masks and filters of various sorts, and studies on their penetration through all kinds of protective equipment.

Inhalation

If one breathes aerosols containing particles of various size most of the large ones, say 5 μ , are retained in the upper respiratory passages and do not penetrate to the alveoli. Maximum alveolar penetration (and retention) occurs at about 1 μ . At 0.25 μ they behave, to all intents and purposes, as a part of the transporting gas, they become very difficult to catch with any sort of filter and their stability in air is greatest. Curves illustrating nicely the fundamentals of retention by man and the effects of particle size are given by Brown et al (2) and confirmed by Davies (3). For the sake of brevity we do not give further details but it happens to be a subject of special interest to us and we would be glad to enlarge on it in this report or by correspondence with any interested member of the Medical Committee.

For practical purposes we can assume that upper respiratory retention of 5 μ particles is high, that extremely few reach the alveoli, that alveolar retention reaches a peak value around 1 μ and falls off each side of 1 μ . This is not precise but is near enough for practical purposes. Landahl (4), Dautrebande (5,6) and Rooth (7) attempted to determine the particulate size maximally retained within the lung alveoli. Results were not consistent but, in general, the size indicated lay below 1-3 μ . Davies (3) in his article points out

the fact that "Liquids ---- may reach alveoli irrespective of the location of their first contact with the walls of the breathing system: this fact, associated with impairment of ciliary motion, may explain the occasional deaths reported from exposure to high concentrations of mists which are not highly toxic". . . .

It is assumed -- and there is considerable evidence to support us -- that pneumonic type of affection (from mists) results only from alveolar penetration. Should the inhaled mist be of such a nature that body heat volatilizes 5 μ droplets, caught in the upper respiratory passages, then alveolar penetration by the vapor, as distinguished from the mist, would follow. Whether such a hypothetical mist, of moderately volatility, would be more or less likely to cause pneumonia than would a higher boiler is simply guess work.

Exhalation

Soluble vapors of substances like ethyl alcohol and acetone, when breathed and absorbed, are eliminated very largely by metabolism and by excretion in the urine. Exhalation is of very minor importance. Intoxicating or mildly anesthetizing effects follow when a certain degree of blood saturation is reached. When the substance is as soluble as alcohol it is impossible to achieve blood saturation because intoxication or anesthesia occurs long before saturation, in the physico-chemical sense, is reached.

Insoluble vapors, like ethyl ether, behave quite differently. Blood saturation or equilibrium, at the concentration breathed, is achieved quickly and virtually none is metabolized or excreted in urine. It is eliminated as it is taken in -- by breath.

Men who are intoxicated by alcohol or overcome by gasoline vapors often can be helped by breathing mixtures of 5 to 7 per cent

CO₂ in O₂ simply because the CO₂ causes increased breathing and thus helps get rid of the alcohol or ether in the blood.

Anyone interested in the physiological and physical chemistry of these matters will find a nice discussion in the Henderson and Haggard book (8) on noxious gas, now getting a little out of date, but still good reading.

Toxic Effects

We shall not discuss the basic toxicology of the common solvents such as benzene, toluene, xylene, the chlorinated hydrocarbons, the various alcohols, ketones, etc. Their toxic effects have been described in the literature (9,10,11,12,13) and in our own Toxicological Reviews.

We will confine our attention to exposures resulting from some sort of atomization of the following classes of substances:

- A. Fuel oils, gasoline
- B. Lubricating oils
- C. Mineral oil
- D. Shale oil
- E. Paints, lacquers, varnishes, shellacs
- F. Petroleum distillates -- as vehicles for spraying insecticides

A. Fuel Oils and Gasoline. In 1941 Machle (14) published an article dealing with the etiology and pathology of gasoline intoxication. Although this is concerned chiefly with inhalation of gasoline vapors, most of the pathological changes involved might result from the use of gasoline as a thinner in spray painting.

Machle states that "The usual mode of absorption of gasoline is through the respiratory tract". The lungs may be similarly involved in excretion of ingested gasoline, since a high percentage of ingested gasoline is eliminated through the lungs.

The most common lung findings include hyperemia, hemorrhages, extravasations, bronchitis and pneumonitis.

There are reports of damage to other organs, such as liver, kidney and spleen, based chiefly on destruction of the vascular endothelium with subsequent hemorrhage.

Reports of central nervous system damage from acute intoxication are comparatively rare, but edema of brain and meninges, early demyelination, and peripheral neuritis have been reported.

To illustrate the difference in response due to actual aspiration of liquid petroleum, we cite the following two cases of Kurtz (15) and Zucker (16). In the first, a 44 year old man accidentally aspirated an unknown amount of light fuel oil and died 72 hours after hospital admission. During the brief course of his illness he developed cough, hemoptysis, pyrexia, orthopnea and evidence of consolidation at both lung bases. Post-mortem examination showed bronchial and peri-bronchial necrosis with edema and round-cell infiltration. In addition, there was evidence of toxic hemolysis in vessels of the lungs, liver and spleen.

Zucker's case involved a 19 year old soldier who, after aspirating "a mouthful of gasoline", quickly developed cough, unconsciousness, fever, leukocytosis, pneumonitis and pleurisy -- with complete recovery in one month. There was a transient period of first degree heartblock, raising the question of a toxic myocarditis.

Finally, there is a report by Sterner (17) on the hazards of spray-painting, using gasoline as a "thinner" or diluent. Analysis of gasoline samples used in his study indicated an aromatic hydrocarbon content ranging from 5 to 10 per cent, with a high of 30 per cent.

Workmen were found to be working in concentrations ranging from 300 to 800 ppm, well above safety limits set for xylene or toluene -- two principal components of the aromatic content. Although wearing cartridge-type respirators, painters complained of headache, nausea, weakness, depression and anorexia. One patient showed tremors, weakness, muscular fibrillation and depression associated with suicidal intent. Laboratory studies revealed generally a decrease in hemoglobin and hematocrit and an increase in mean corpuscular hemoglobin, mean corpuscular volume and reticulocyte count, the changes being, for the most part, slight to moderate.

B. Lubricating Oils. The recent heightening of interest in the ultimate fate of oil particles taken into the body is reflected in the careful studies cited in the following paragraphs.

The first is a series of experiments conducted by Lushbaugh (18) in Chicago. The object of these studies was to determine the potential effects upon troops in combat of a smoke-screen produced by two types of lubricating oil. One type of oil was a diesel lubricant, S.G.F. #1, already in use by the U. S. Army Chemical Corps for smoke-screening purposes. The other was an ordinary automobile lubricant, Penn oil, (R)S.A.E. #10.

By submitting mice, rats, rabbits and monkeys to oil fog concentrations approximately equivalent to those expected under combat conditions, Lushbaugh was able to show that all animals, with the exception of the monkeys, tolerated the experiment surprisingly well. They showed little symptomatic response to prolonged exposure over a period of many days and histological reaction was confined to evidence of macrophage activity and persistence of oil particles within the connective tissue stroma.

The group of monkeys, however, proved to be peculiarly susceptible to the oil fog. Within a few days after the start of the experiment they began to shed fur, lose weight and refuse food. Several died during the course of the experiment. At post-mortem, 6 of the 7 monkeys in the original group were found to have a peculiar hyperplastic gastritis, with polyp-formation and a neoplastic-like penetration of the sub-mucosa by epithelial growths. The seventh monkey, sacrificed one and a half years later, showed a typical atrophic gastritis, even though not exposed to further oil during this period. These results were published in an earlier paper by the same author (18).

Although chemical studies revealed that only a small fraction of the oil inhaled had been retained by any of the animals, the monkey's lungs showed greater oil retention and marked increase in focal pneumonitis. Since oil concentrations did not seem to be related to the degree of pneumonitis present, the author speculated that the role of oil particles may be (a) to aid in breaking down the barrier of local defense mechanisms or (b) to serve as a vehicle for bacterial contamination. Although this latter refers to bacteria derived from the nasopharynx primarily, it is interesting that the bacteriological studies of Ernst (19) on lubricating oils revealed the presence of staphylococcus and streptococcus, as well as several Gram-negative bacteria, in oils being used in industry.

The work of Shoskes (20), in which he studied the effect of inhalation of various oil particles, including corn and peanut oil, cod liver oil, mineral oil and motor oil, on the lungs of mice revealed that these animals at least are able to handle brief (two-hour)

exposures quite successfully. Sections of lung taken from mice sacrificed 96 hours after exposure showed almost complete phagocytosis of edible oil particles, while the concentrations of mineral and motor oil particles in the lung were practically unchanged. There was only minimal reaction to these foreign particles in all cases. With prolonged exposure over a two-week period, similar animals showed moderately severe foreign body reaction to the petroleum products, moderate response to cod-liver oil and virtually no response to the other edible oils.

Sante's article (21) on the fate of oil particles in the lung is a clinico-pathological study illustrating the types of tissue reactions evoked in the lung by various oils, and pointing up the possible relationship between petroleum oil aspiration (or inhalation) and production of bronchiogenic carcinoma. He stresses the importance of a high fatty-acid content as a causative factor in the vigorous inflammatory reaction occasionally seen with accidental cod-liver oil aspiration. The droplets of mineral oil, being unsaponifiable, remain undigested within the lung parenchyma. Nearly always, however, a proliferative fibrotic reaction occurs, particularly at the hilum, resulting in the formation of a "paraffinoma", a lesion which may be indistinguishable radiologically from pulmonary carcinoma. It is from this fibrotic mass that the author postulates a neoplasm may arise. To support his contention he cites two cases, personally observed, where bronchiogenic carcinoma has appeared, coexistent with a chronic lipoid reaction. There was a long history of mineral oil intake in both cases.

Reports supporting the relationship between oil inhalation and pulmonary carcinoma have become increasingly common in recent

years. Hugenin (22) produces a statistical study involving metal workers, chauffeurs, mechanics, engineers and others involved in occupations calling for frequent exposure to oil sprays or vapors. From 144 cases of pulmonary carcinoma, 32 cases (or 28.5%) are found to have been exposed to oil for long periods while engaged in one of the above occupations.

Roffo (23) is quoted as having produced pulmonary tumors in mice through inhalation of combustion gases from fuel oil. Despite these and other bits of suggestive evidence, there is as yet no established relationship between petroleum products and pulmonary carcinoma. As expressed by Smith (24) in a recent article. . . . "In reviewing experimental studies, an outstanding fact is that cancer of the lung (other than adenoma) has never been conclusively produced in any animal by any material to which the animal was exposed by inhalation". . . .

C. Mineral Oil. In addition to the role of mineral oil in the production of "paraffinomas", and its suspected involvement in the development of neoplasms, as mentioned above, there have been many reports concerning the production of acute and chronic lipoid pneumonias following accidental aspiration of mineral oil. Proudfit (25), in his article, reports what is believed to be the first case of its kind concerning the production of a chronic lipoid pneumonia from industrial inhalation of mineral oil spray.

Proudfit's patient was a 40 year old man who, for the past 17 years, had been employed in servicing cash registers, spraying them with a naphtha cleaning solvent, followed by a light mineral oil spray for lubrication. Principal complaints when first seen consisted of

weight loss, productive cough, exertional dyspnea, fatigue, abdominal distention and vomiting. X-rays showed extensive shadows radiating outward from the hila and following the general directions of the bronchi. Sputum examination revealed many fatty globules, which took the Sudan stain but refused osmic acid stain -- an indication that the oil was mineral in nature. Three years later, with no further exposure, the patient was somewhat improved, but x-rays showed little change. On the basis of this lack of change, the positive sputum and the history of exposure to mineral oil, a diagnosis of "chronic lipoid pneumonia due to mineral oil" was made.

D. Shale Oil. The toxicity of Scottish shale oil has been studied by various investigators, particularly concerning its propensity for forming skin cancers in those constantly exposed to it -- notably among mule-spinners in the British Cotton textile industry. In a review recently published by Bonsib (26) on this subject, the question as to whether shale oil is capable of producing gastric or pulmonary malignancies through ingestion or inhalation again arose. He quotes Scott (27) as saying that he had observed no such malignancies in shale oil refinery workers, and counters with a reference to Southam (28), in which he states that he had observed such malignancies "from time to time" among mule-spinners. Hueper (29) states "The effect of shale oil upon the incidence of pulmonary tumors in mice is similar to that produced by tar, according to the investigations of Schabad". . . .

E. Paints, Lacquers, Varnishes, Shellacs. The role of gasoline in paint solutions has been referred to above, in the article by Sterner (17). Several years ago Chapman (30) wrote a careful

review on the proposed relationship of turpentine as a paint solvent, and the appearance of renal disease. Although turpentine has been suspected as a noxious agent with a direct effect on the kidneys, and although many seemingly authentic reports have appeared, corroborating this belief, Chapman was unable to substantiate clearly this relationship. After careful perusal of case-records over a period of many years, and with added experimental evidence, exposing rats to turpentine vapors for prolonged periods, he reported that there was no clearcut evidence incriminating turpentine as the offender in cases of renal disease appearing in painters, and others similarly exposed to this agent.

To cite just two more instances of toxicity appearing in those engaged in spray-painting or its many variants, Sessa (31) in 1947 published a report on physical findings in 20 female workers engaged in spraying varnish on household articles. Of these, 15 were found to be anemic, 12 complained of dysmenorrhea and 7 were found to have enlarged livers. Additional symptoms included weakness, headache, gastritis and pharyngitis. The toxic effects here were attributed by the author to the acetone and to acetic acid compounds present in the varnish solvent -- an explanation we consider inadequate and unacceptable.

Hirsch (32) reports a case of a fatal exudative and indurative pneumonia developing in an elderly man who had worked for many years in close proximity to shellac spray. Lung changes were said to resemble those seen with mineral oil intake. However, there were more neutrophils and less lipophages and mononuclear cells, a reaction also consistent with the presence of fatty acids in the resin, plus those

found in the turpentine or linseed oil solvent.

F. Petroleum Distillates -- Use as Insecticide Vehicles.

Interest in this subject began in the early years of the last decade, with the first appearance of DDT as a useful insecticide. The earlier reports concerned themselves, however, with toxicity studies of DDT itself, with little or no regard for the possible effects of the materials used as vehicles. In 1945, Neal et al (33), under the auspices of the U. S. Public Health Service, published the report of an investigation of two DDT-aerosol solutions, differing only in the amount of DDT present. The vehicle used to dissolve the insecticide powder consisted of a primary solvent, a secondary oil solvent and a small amount of pyrethrins. Exhaustive studies were carried out on mice, rats, guinea pigs, dogs and monkeys, using inhalation, percutaneous, subcutaneous and installation routes. Only the inhalation route concerns us here.

It was clearly shown that, apart from the question of DDT toxicity, all species were able to tolerate massive exposures to these solutions, provided they were repeated only once daily and for a relatively short time. When exposure periods were stepped up to three times daily, with only a two-hour interval, the group of dogs being subjected to this experiment failed rapidly and died during the course of exposures. The same result obtained when aerosol solution, minus the DDT, was substituted. At post-mortem, the lungs showed atelectasis, broncho pneumonia, and diffuse pneumonitis, with oil-laden macrophages scattered throughout the alveoli and peribronchial connective tissue. The livers appeared slightly to moderately fatty and there were some casts and other abnormal deposits in the kidney tubules.

It should be reiterated here that these animals were subjected to concentrations of solvent far in excess of that anticipated under ordinary conditions.

The last two references are concerned with the possible toxic role of kerosene as a DDT solvent. In 1946 Gordon (34), conducting an investigation on a small group of African sprayers, carried out careful laboratory and physical measurements which showed that the only detectable effects of the kerosene was the production of a moderate dermatitis. Anderson and Khorram (35) two years later in Iran conducted a similar investigation, with essentially the same findings. Both sets of investigators recommended the use of a less toxic solvent.

Preventive Measures

The use of petroleum products as vehicles for various kinds of sprays is increasing in importance very rapidly. The original suppliers of these liquids may or may not have any "products liability" or legal responsibility for possible ill effects from the sprays but it certainly does the industry no good to have them used carelessly or misused. We would place education, in the form of good labeling, on the containers high in the list of preventive measures. From our experience in questioning users such labels are read and the directions usually heeded. But often we have found them in such small print, for lack of space on a small container, that they were hard to read.

One can rent small spray guns which are handy for home painting of things like shutters or even picket fences. Sometimes precautionary directions are given but it is more than likely no

applied so that the man spraying from the front of the booth is adequately protected. There are plenty of good engineering data now available for design of spray booths. It is assumed that such data are outside the scope of this report but we would be glad to give suitable references to members interested.

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APPENDIX B

To the Minutes of 16th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

POTENTIAL HEALTH HAZARDS ASSOCIATED WITH USE OF
LEAD COMPOUNDS IN CUTTING OILS

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September 2, 1952

To date, a review of the literature concerning the potential health hazards resulting from the inclusion of lead soaps in cutting oils is of necessity an indication of a field of toxicology where work is lacking rather than an evaluation of work done. A thorough search of available literature yields only one reference, appearing last year in France, dealing specifically with this subject. Correspondence with French workers indicates that they have previously given consideration to the matter though specific literature references are lacking.

This review will give first a brief idea of the various uses of lead soaps in lubricants since this may perhaps serve as a guide to indicate where possible health hazards would be encountered. Secondly the specific toxicological information available will be presented, and thirdly a few references which deal with skin absorption of lead salts of the higher fatty acids will be noted.

Uses of Lead Compounds in Lubricants

In special cases, molten lead as such is used as a lubricant. Soda and Miyagawa (1) have reported on its lubricating properties. In this instance the health hazards involved would

obviously be those typical of the handling of elemental lead and are beyond our concern here.

Lead soaps may appear as contaminants or impurities in lubricating grease and oils. Piper et al (2) in an investigation of dielectric losses in insulating oils due to service degradation found that soaps were formed through the interaction of insulating oils with metals used in the construction of high voltage cables.

Elliott (3) has reviewed the chemistry of metallic soap - hydrocarbon systems. Of the heavy metals, lead alone imposes special problems in lubricating compounds when the metal soaps are used. Lead is a rather effective polymerization catalyst so that unsaturated fatty acids are usually eliminated from compositions involving lead soaps. The lead soaps are still used in substantial amounts for various applications where mild extreme pressure conditions are encountered. Under such circumstances they function as a source of lead rather than as thickeners.

The lead salts of naphthenic acids, the carboxylic derivatives of cyclo-paraffin hydrocarbons, are widely used as these acids are saturated and stable to oxidation. The high solubility of the cyclic structure makes these compounds soluble in the wide range of hydrocarbons. A mixture of lead mono- and di- naphthenate is usually manufactured. The presence of the mono-naphthenate gives a more easily handled substance of lower viscosity and the di-naphthenate gives increased hydrocarbon solubility.

Swenson (4) patented a lubricating oil used with an admixture of a complex soap of lead and an alkali or alkali earth metal such as may be prepared by the reaction of lead oxide and a fatty oil such as fish oil and subsequent treatment of the product with

the hydroxide of an alkali or alkaline earth metal. The compound was for use under high pressures as on gears.

Holfenbach and O'Halloran (5) patented a combination of calcium and lead acetates with alkaline earth sulfonates to improve the properties of lubricating greases over those obtained from lead acetate alone. The resulting greases have extreme pressure properties and show good performance on the B.E.C. machine. The use of the lead salt alone results in a resinous precipitate which separates from the oil.

Zweifel (6) has patented a thread sealing and lubricating compound consisting of finely divided copper, powdered lead, amorphous graphite and a viscous, semi-solid or non-viscous petroleum vehicle.

Altamura (7) has a patent stating that the inclusion of from 0.01 to 1.0% of certain trialkyl lead salts of an aliphatic acid in mineral oil gives the mixture both rust and emulsion inhibiting properties. This additive is particularly valuable in turbine oils and may be used in conjunction with other additives.

The use of white lead as a cutting compound for cutting jack screw threads gave the highest instantaneous atmospheric lead exposure reported in the USPHS-Utah State Health Department joint study of lead smelters and lead mines. (8)

Toxicological Information

The exposure of workmen to cutting oils can arise from two main sources, inhalation and skin contact. The rapidly moving metal parts and the heat generated can cause formation of an aerosol of the oil in the atmosphere of the workroom unless ventilation is adequate

to remove the aerosol. Since it is well known that inhalation is the easiest route by which lead can enter the body, the presence of lead compounds in the oil aerosol must certainly represent a potential health hazard. Skin contact occurs as the oil flows continuously over the work. The subject of dermatoses arising from such skin contact with cutting oils has been covered in a previous toxicological review (9), but no mention is made of effects due to the presence of lead compounds in the cutting oils. Skin absorption of lead, especially if skin lesions are already present, cannot be ignored as a possible hazardous exposure though it is probably less important than breathing the aerosol.

Consideration of these facts led to a recent investigation of the toxicology of a lead containing cutting oil by DeSoille, DeRobert, LaBreton, and Martin (10). No specific cases of intoxication of workmen from this source is described but mention is made of the dense aerosols of the lead containing cutting oil in the workrooms of badly ventilated factories. Tests were made of the effect on guinea pigs of inhalation of the cutting oil as well as tests of skin penetration and oral toxicity. The mineral oil used was the same as that supplied to the factories in question. Lead analysis showed it to contain 0.8 g Pb per 100 cc.

For the inhalation experiments five guinea pigs were exposed to an aerosol of cutting oil giving a lead concentration of 0.08 mg. per cu. m. The inhalation lasted seven weeks with the duration of the daily exposure increasing progressively according to the tolerance of the animals -- $\frac{1}{2}$ hr. for 5 days, 1 hr. for 16 days, $1\frac{1}{2}$ hrs. for 13 days, and finally $2\frac{1}{2}$ hrs. for 15 days.

The first inhalation of the aerosol was objectionable to the animals and one of them was found dead following the second exposure. The others showed a transient loss of weight during the first two weeks but otherwise withstood the inhalations well.

Periodic counts of basophilic granulation of the erythrocytes showed that a rise did not appear until the end of the sixth week. By this time, the number of stippled cells had risen from a control value of 0-6 up to 46-138 per 100 leucocytes.

The analysis of lead fixation in the liver showed 26-32 mg. Pb per 100 g. of liver. Histological study of the hepatic parenchyma showed recent periportal hemorrhages with intratrabecular filtration of erythrocytes. The hepatic cells showed no mitochondrial, cytoplasmic, or nuclear alteration.

Pathological changes in the kidney were also observed. The general picture consisted of diffuse and abundant hemorrhage of recent origin, especially in the intertubular spaces but present also in the intraglobular spaces. The renal vascular system also showed a certain cellular edema with partial disappearance of the intercellular space. The epithelial element showed the most important lesions. The ureters showed a narrowing of conjunctive tissue enclosing the vessels. The epithelium was desquamated.

The pulmonary parenchyma, with the exception of one animal, showed lesions typical of pneumonia. The alveolar parenchyma was considerably modified though the normal alveolar texture was conserved. The walls, were considerably thinned and intraperietal edema and proliferation of lymphocytes produced the typical lesions of a reactionary state. These lesions were maximal in the perivascular regions. Abundant deposits of fatty material, blackish in color,

were found around the bronchial orifices especially at the periphery of the alveolar parenchyma under the parietal pleura. Large macrophage cells enclosing fatty particles were seen.

For studies of skin absorption of lead from the cutting oil, 10 drops daily were applied to the skin of the neck or back. Cutaneous application produced a rise in stippled cell count to 20-85 per 100 leucocytes. The increase was irregular, however, and varied greatly for different animals. Inflammatory lesions were produced and a rapid and appreciable loss of weight occurred.

Chemical analysis showed that the liver of these animals at the end of the six week experiment contained 8-24 mg. Pb per 100g.

For the sake of completeness, studies of oral toxicity were included. Daily ingestion of 1 ml. of the oil caused the death of three out of four animals in a week. Daily ingestion of 0.25 ml. of the oil caused the death of four out of five animals in a month. The appearance of basophilic granulation was rapid and the final values reached stippled cell counts of 22-159 per 100 leucocytes. The lead content of the livers was 4-8 mg. per 100 g.

This study shows very clearly that the inclusion of lead in cutting oils involves lead exposure. The main interest lies in the results obtained with the inhalation of the oil mist. Although the total quantities of lead introduced into the system were much smaller by this route than by the oral route, the fixation of lead in the liver was much greater. This is not surprising as the finely divided aerosol combined with the absorptive properties of the respiratory membranes for lead should promote absorption. The authors strongly recommend that the inclusion of lead salts in cutting oils be forbidden both because of the danger from inhalation and the demonstrated penetration of lead when the oil was applied to the skin.

Following this paper is a brief discussion in which the fact is mentioned that the Commission of Industrial Hygiene of the French Ministry of Labor had given consideration previously to this problem. Correspondence with Professor Truhaut has obtained a slight amount of further information from Dr. S. Tara. An incident of saturnism suspected to be caused by lead oleate in cutting oils apparently occurred at Hispano-Suiza, a French firm manufacturing automobile engines. DeRobert at the time made an investigation of the matter but no literature reference is available here. The Commission of Industrial Hygiene also made a study at some time of cutting oil dermatoses and attention was called at that time to the role of lead in its etiology. Here again specific information is lacking beyond the mere statement that the investigation was made. These things indicate that the French workers have given the problem consideration and perhaps in the future more needed work will come from them. A checking of the Journal Officiel de la Republique Francaise indicates that to date at least no laws have been passed forbidding the inclusion of lead compounds in cutting oils though the idea has obviously been considered.

Skin Absorption of Lead Salts

While not concerned with cutting oils directly, a few reports in the literature on skin absorption of the lead salts of the higher fatty acids are pertinent to the problem of dangers from lead in cutting oils.

Cronin in 1925 (11) reports a case of lead poisoning attributed to lead stearate. Nine workers in a rubber plant contacted subacute dermatitis followed by deposits of lead in the skin .

caused by an intracutaneous reaction of the chemicals. The causitive agent was lead oxide in loose chemical combination with stearic acid and sulfur. The heat of the mill turned the stearic acid into an oily liquid that flowed over the workers hands so that the exposure is not dissimilar to that from cutting oils. There were no constitutional symptoms of lead poisoning. The use of the mixture was, however, discontinued and the men put on other employment temporarily.

Matz (12) states that cases of lead poisoning from the use of plasters of lead oleate (diachylon) on the skin have been very rare, only three having been found in a rather complete search of the literature.

Laug and Kunze (13) investigated the penetration of lead compounds through the skin of rats. Penetration of non-volatile lead compounds is slight so that the analysis of urinary lead is not sensitive enough to detect it with any accuracy. Chemical analyses of the kidney, however, show that the lead concentration is significantly increased 24 hours after skin exposure, and may thus be used as a measure of the amount of lead that has entered the body. When 148 mg. of lead aleate was applied to the skin of a rat in petrolatum or oleic acid, the lead content of the kidney rose from a control value of 0.47 mg. per g. to 1.5 in 24 hours. If the skin was broken the value rose to 4.2 mg. per g. While this penetration is extremely small still it does occur and the fact that it increases markedly with skin damage is an important factor.

Summary and Conclusions

As was indicated earlier specific work is lacking on the hazards of inclusion of lead in cutting oils. From the work of

DeSaille and others, however, some information of value can be drawn. They demonstrated pathological changes of lung and other tissues as well as absorption of lead by the body resulting from inhalation of aerosols of lead containing oils. Presumably these changes were caused by the oil mist rather than the lead. Their oil contained 8 mg. Pb per ml. and their aerosol contained 0.08 mg. per cu. m. This means that only 0.01 ml. of oil was dispersed in a cubic meter. This must certainly be concentration far lower than the "dense fog" described by them in the workroom, yet it caused damage to the animals and absorption of lead. From their work they make the very strong recommendation that the use of lead in cutting oils be forbidden. It is certainly clear that adequate ventilation to remove the lead containing oils from the atmosphere of the workroom is very necessary. Both they and other workers have shown that some penetration, though slight, can occur through the skin. Even though this is the lesser of the two problems, some means of protecting the workers' hands from continual contact with such oils should be provided, especially if any skin lesions are present.

Recommendations

It would seem that some simple experiments are advisable first, to determine actual concentrations of lead in air during typical, full scale cutting operations and secondly, to follow lead absorption on humans whose skin is rubbed with small but known amounts of the cutting oils containing lead soaps.

We can do the first job but probably no better than several of the laboratories of member companies of API. We can also do the second job but again no better than others. We will be glad to

discuss both suggestions at the Chicago Meeting on the 25th of September.

Drinker does not subscribe to the French recommendation that use of the lead soaps in cutting oils be abolished. He suggests rather that we get data to define the risk in common sense terms and then see if it is not entirely practicable to control it.

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APPENDIX C

To the Minutes of 16th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS

September 10, 1952

Atmospheric pollution has today become a major challenge to scientists; to administrative officials and to the public. Important meetings have been held and more are scheduled. These include scientific meetings, industrial conferences, public gatherings, and official agency sessions offering information about air pollution, its sources, effect and control.

Universities, foundations and industrial centers of research are devoting more time to fundamental investigations - meteorological studies and comparable research is adding knowledge of the characteristics of atmosphere. Scientific investigations overlap and points of difference occur when professional and technical viewpoints are multiple. Investigations involve engineers, chemists, toxicologists, biologists, meteorologists, bacteriologists, physicists, botanists, physiologists, economists and physicians.

One of the finest engineering investigations has been made under the auspices of The Western Oil and Gas Association, and quoting from the 3rd Interim Report by the Stanford Research Institute a pertinent paragraph as follows:

"Little is known about the exact effect of smog on human health. Reported experience of medical men in the area indicates that smog is detrimental to well-being. How serious a threat this may be has not been established. If it could be demonstrated by medical research that some ingredients of smog are harmful, a great impetus would be given to research leading to their specific elimination and, possibly, to further basic discoveries."

We are primarily interested in air pollution in its relation to the petroleum industry. The petroleum industry has been responsible for certain of the elements that have to do with air pollution. These substances have their origin in the refining processes or in the use and combustion of the finished product. The petroleum industry has not been responsible for the air pollution nuisance in its entirety. This is a local problem and occurs only locally in relation to the amount of waste material from industrial and manufacturing plants as well as the waste material that is released into the air in communities where there is a concentration of population, -- (garbage, refuse, incinerators, etc.).

As physicians and members of the Medical Advisory Committee and further, as members of the sub-committee on air pollution of the Medical Advisory Committee, it is apropos and pertinent at this time that an evaluation be made with regard to what approach should be made by the medical group concerning this problem of air pollution as it effects the oil industry. I have listed these as follows:

1. Medical science deals with physiological and toxicological effects on living human beings, or agricultural effects that might relate directly or indirectly to human health. This is in opposition to the exact science of chemistry, physics, and other types of technical groups. The effect of a substance on an inanimate object can be definitely measured. Whereas the same effect of that substance upon a human being is modified by many physiological laws and actions. One must not forget that in the living human being nature repairs damages that might occur. We, therefore, have two types of approaches from the medical standpoint.

(a) Accute effect. When the physician knows the amount of the substance that a human being has been exposed to, then he can tell you what immediate effect it would have upon that human being and whether or not there would be any persisting residuals of the effect.

(b) Chronic effect. It is only by exposure of an animal over a long period of time to minute quantities of substance "X" that the medical man may state what that effect may be. Is it harmful or is it not? Does it produce disease? Is it carcinogenic? What physiological changes occur in the animal to offset the continued exposure to such an element?

2. To determine physiological effect on an animal of any substance "X" there are basic factors which must be known.

(a) The medium of exposure, - air, liquid or solid.

(b) Is exposure made by inhalation, ingestion or contact?

(c) The nature of the substance, namely, chemical formula and physical properties. I refer you again to the 3rd Interim Report of the Stanford Research Institute wherein the conclusion and recommendations are made with regard to improvement of methods of identifying constituents of air pollutants. The Smoke and Fumes Committee has already proposed certain projects toward the development of analytical and identification methods, and any basic medical research might have to await the outcome of further investigation along the lines recommended in such projects.

IN SUMMARY, the sub-committee on air pollutants of the Medical Advisory Committee feels that they should be kept continuously advised of all research work which have to do with the human physiological effects of air pollutants in relation to the community problem. The pharmacology of these substances, along with the physiological properties if requested may then be worked out by medical investigation.

At the present time the sub-committee feels that no medical research under the auspices of the petroleum industry should be instigated by them at this time. The sub-committee feels they should await the final outcome of such projects and investigations that have been proposed or are already in the process of investigation before undertaking any projects of their own.

As stated in the minutes of the 15th meeting of the A.P.I. Medical Advisory Committee, "The subcommittee stands ready, if necessary, to render whatever service and assistance it can in those matters related to the physiologic effects of atmospheric pollution which it may be specifically requested to consider."

(1) Nuisance values as concerns eye smarting, coughing and odors would be considered physiological effects.

(2) Research has been underway for sometime concerning the effects of air pollutants on plant life. It is conceivable that the effects of plants and animals, - especially that are used for human consumption, - may be direct or indirect upon the human health. When such a problem arises the Medical Advisory Committee stands ready to advise, counsel, or continue any research investigations along these lines.

To investigate the harmful effects of air pollutants can be very definitely summarized in the following:

- (1) How much quantitatively of substance "X" is in the atmosphere?
- (2) What are the physiological effects immediate and after long time exposure?
- (3) What can be done medically to counteract immediate exposures or long time exposures by the medical profession?

For Information Only - Not For Publication

APPENDIX D.

To Minutes of 16th Meeting of Medical Advisory Committee

EXCERPT FROM MINUTES OF API LUBRICATION
COMMITTEE MEETING HELD ON SEPTEMBER 10, 1952
AT ATLANTIC CITY, NEW JERSEY

V. "REPORT OF THE HYGIENE PANEL

"Dr. O. Bridgeman reported as follows:

"The Sub-Panel on Eye Hygiene (N. J. Gothard, leader) were not able to hold a meeting since the last meeting of the Lubrication Committee, and hence there is no report on this activity at the present time.

"The Sub-Panel on Lubricants and Process Products Hygiene (M. D. Gjerde, leader) held a meeting in New York on September 8. They report that they have been assembling the available pamphlets and literature on the use of cutting oils and lubricants in relation to possible dermatitis in the absence of adequate hygiene. A number of such pamphlets have been prepared by various oil companies and other organizations, and the plan is to make a critical review of this literature with the objective of selecting one which is in suitable form for use by all interested organizations, or of drafting a new one possibly with the assistance of the Industrial Hygiene Foundation.

"A study has been made of the records on reported cases of dermatitis during service use of cutting oils and lubricants, which indicates that the incidence is very small. However, the matter is of sufficient importance that the Sub-Panel on Lubricants and Process Products Hygiene felt that an independent and authoritative survey should be made. Accordingly, the Sub-Panel recommends that the Industrial Hygiene Foundation be requested to undertake a comprehensive survey of the incidence of dermatitis through use of cutting oils and lubricants and that appropriate steps be taken through API channels to raise the sum of \$40,000 to conduct this survey.

"ACTION: Accepted unanimously.

"Mr. K. G. Mackenzie then moved as follows:

"That the Lubrication Committee recommend to the Division of Marketing that approval be given to collect \$40,000 for a critical study of dermatoses by the Industrial Hygiene Foundation of Pittsburgh.

"ACTION: Seconded and unanimously approved."

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

August 22, 1952

To Members and Associates,
Medical Advisory Committee

Gentlemen:

Pursuant to action taken by the Medical Advisory Committee at its Fifteenth Meeting, Chairman E. Kern Linder has called the Sixteenth Meeting to be held on

THURSDAY SEPTEMBER 25, 1952 AT 9:00 A.M. (CDT)

in the West Ball Room of the Conrad Hilton Hotel, Chicago, Illinois.

You will recall that subcommittees have been requested to circularize their reports at least two weeks prior to the meeting of the Medical Advisory Committee. In accordance with this plan, we expect to send to you on Thursday, September 11th, the meeting agenda accompanied by copies of all subcommittee reports which have been received by that time.

Very truly yours,

DVStroop

DVS:c

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

**DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR**

September 11, 1952

To Members and Associates,
Medical Advisory Committee

Gentlemen:

As promised by letter dated August 22, there is enclosed for your information the agenda for the Sixteenth Meeting of the Medical Advisory Committee, with copies of all subcommittee reports received to date.

Very truly yours,

DVStroop

DVS:c
Enclosures

P.S. Under separate cover our Washington office is sending you copies of the tabular summary of current and completed biological experiments as reported by Doctor A. Wesley Horton.

DVS
W.S.

A G E N D A

SIXTEENTH MEETING MEDICAL ADVISORY COMMITTEE AMERICAN PETROLEUM INSTITUTE

Chicago, Illinois
Conrad Hilton Hotel
West Ball Room (3rd Floor)
September 25, 1952

9:00 A.M. Central Daylight Time

- I. Introduction of new members and guests
- II. Approval of minutes of Fifteenth Meeting
- III. Report of Subcommittee on Carcinogenicity
Dr. M. N. Newquist - Chairman
- IV. Report of Subcommittee on Medical Policies and Practices
Dr. L. E. Curtis - Chairman
Dr. Kenneth R. Fourcher - Vice Chairman
- V. Report of Subcommittee on Atmospheric Pollutants
Dr. E. P. Luongo - Chairman
Dr. John C. Ruddock - Vice Chairman
- VI. Report of Consultant - Professor Philip Drinker
- VII. Report of Subcommittee on Toxicological Reviews
Dr. Marshall Clinton - Chairman
- VIII. Reports on ASA Committee activities
Allan E. Dooley - API representative on Z4 and Z37
- IX. Reports for inactive committees
NOTE: Chairmen of the following inactive subcommittees will
be recognized if they wish to present information of
interest:
 - a. Subcommittee on Cutting Fluids
Dr. F. F. Boys - Chairman
 - b. Subcommittee on Economic Poisons
Dr. T. J. Kelly - Chairman
 - c. Subcommittee on Eye Hazards
Dr. Kieffer Davis - Chairman
 - d. Subcommittee on First Aid
Dr. T. M. Frank - Chairman
 - e. Subcommittee on Fluorides
Dr. George M. Saunders - Chairman

- f. Subcommittee on Physiology of the Skin
Dr. Robert E. Eckardt - Chairman

X. Aromatic Hydrocarbons - Report on letter ballot

XI. New Business

- a. Resolution adopted by the General Committee, API Division of Refining, May 15, 1952

"That the Medical Advisory Committee be requested to prepare and recommend the following to the General Committee of the Division of Refining:

- "1. Suggested minimum standards for physical examination of employees.
- "2. Suggested qualifications for medical directors and plant doctors.
- "3. Suggested uniform methods of preparation and maintenance of medical records of employees."

- b. Hygiene Panel - API Committee on Lubrication

(Interrelationship of work by panel and Subcommittee on Cutting Fluids.)

XII. Staff report on committee finances - D. V. Stroop

XIII. Time and place of Seventeenth (1953 Annual) Meeting

XIV. Adjournment

API Meeting in Chicago, September 23 - 25

Refinery Streams and Products - Should Diesel Fuels be examined?

Significance of Spectrum Type - No. 114 and 115 - same viscosity - same intensity of absorption.

Page 19 of Table I ~~xxxxxx~~ superscripts - add 4-6 weeks to each age.

Mouse vs. Rabbit - British samples

C3H mice are developing many tumors from straight run distillates.

API-225, page 24, suggests accelerators have greater effect on C3H than on CFW. Rabbits skin frequently more sensitive to primary irritation than that of mice. (API-80, rough on the rabbit).

It would appear that C3H strain is just as reactive to the samples from Oklahoma, Kuwait, and Lagunillas crudes as were the rabbits in the British tests. L-4 no regressions, 1 gross Ca, severe ulceration.

Cancer still due to polycyclic hydrocarbons but rate accelerated more in rabbits than in mice.

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

May 22, 1952

To Members and Associates,
Medical Advisory Committee

Gentlemen:

For your information and files we enclose minutes of the Fifteenth Meeting. Please inform me of any errors you find.

.....

Pursuant to action recorded at the bottom of page 2, I would request you to read the enclosed reprint of "The Epidemiology and Social Significance of Atmospheric Smoke Pollution" by J. C. McDonald, M.D., Philip Drinker, Ch.E., and John E. Gordon, M.D. During and upon completion of your reading of the reprint please note each paragraph about which you desire additional information and send me your notes.

Personally I am having difficulty in obtaining a clear picture of what is needed, even though I have discussed the subject with L. C. Beard, Jr., L. C. Burroughs, Philip Drinker, and E. Kern Linder.

If your comments, based upon the enclosed reprint, reach me promptly I shall endeavor to expedite the action recommended in the minutes.

*filed
in Reprint
API - B*

.....

Because of the number of changes in the membership of the Medical Advisory Committee and its subcommittees, new rosters are enclosed for your information and files.

Very truly yours,

W. Stroop

DVS:c
Enclosures

For Information Only - Not For Publication

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

FIFTEENTH MEETING

Minutes of Meeting
April 19, 1952
Netherland Plaza Hotel
Cincinnati, Ohio

MEMBERS PRESENT

E. Kern Linder - Chairman
Marshall Clinton - Secretary

W. O. Armstrong	C. H. Hine
V. C. Baird	T. J. Kelly
F. F. Boys	M. N. Newquist
J. William Crookshank	James W. Osborn
Kieffer Davis	B. B. Reeve
Robert E. Eckardt	John C. Ruddock
Kenneth R. Fourcher	George M. Saunders
T. M. Frank	Leo J. Wade

E. Richmond Ware

ASSOCIATES PRESENT

E. W. Adams	L. M. Henderson
L. C. Beard, Jr.	R. M. Landon
R. D. Bent	K. G. Mackenzie
L. C. Burroughs	R. C. Mithoff
R. C. Cole	C. A. Neilson
Allan E. Dooley	F. J. Sanders

R. M. Shepardson

GUESTS

Philip Drinker	- Harvard University
A. W. Horton	- University of Cincinnati
Gordon F. Moore	- Sinclair Refining Company
R. W. Pipkin	- Humble Oil and Refining Company
D. V. Stroop	- American Petroleum Institute
Norman G. White	- Shell Chemical Company

Total in Attendance - 38

MEMBERS ABSENT

Theodore E. Allen
L. E. Curtis
D. M. English
Warren F. Kahle

W. R. Levis
E. P. Luongo
Robert Bell Lynn
Clark R. Miller

R. C. Page

ASSOCIATES ABSENT

W. R. Argyle
J. S. Boylan
C. L. Brown
C. R. Brown
L. O. Crockett
R. S. Driver
Nelson J. Gothard
L. N. Haugen

James E. Hill
E. W. Isom
D. W. Larmer
C. R. McKay
J. R. Morrison
W. H. Price
R. B. Roaper
F. M. Watkins

H. D. Wilde

.....

I

INTRODUCTION OF MEMBERS AND GUESTS

In opening the meeting the chairman welcomed and introduced those who had not attended previous meetings of the committee.

II

MINUTES OF FOURTEENTH MEETING

ACTION The committee voted to approve the minutes of the Fourteenth Meeting as circularized.

III

REPORT OF SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS - DR. E. P. LUONGO, CHAIRMAN

In the absence of Doctor Luongo, Doctor Ruddock presented the report which is attached to these minutes as Appendix A. (Also included in Appendix A is a copy of letter dated April 3, 1952 from W. L. Stewart, Jr. to members of the National Committee on Smoke and Fumes.)

ACTION The report was accepted with the understanding that Philip Drinker, with the assistance of members and associates in New York and Philadelphia, would prepare and submit to the subcommittee an outline of information now available on the physiology of atmospheric pollutants of interest to the petroleum industry, a list of major research projects underway and designed to supplement available information, and a suggested program of work which may be desirable concerning the physiologic aspects of air pollutants if, as, and when, money and research workers become available.

IV

REPORT OF SUBCOMMITTEE ON CARCINOGENICITY - DR. M. N. NEWQUIST, CHAIRMAN

Doctor Newquist reported on the work of the subcommittee with recommendations as follows:

1. The subcommittee approved the appointments to the Research Advisory Committee as made by the subcommittee chairman.
2. The actions of the Research Advisory Committee's meeting of November 26, 1951 received 100 per cent approval by the subcommittee through letter ballot.
3. The actions of the Research Advisory Committee's meeting of February 26, 1952 have been approved by letter ballot as of this date, with a few ballots still to be received.
4. The progress reports of Doctor A. W. Horton and Doctor J. J. Phair were received.
5. A brief report will be made within the next two weeks by the Research Project Advisory Committee to T. J. Sullivan, Chairman of a study committee of the General Committee, Division of Refining, on the past and present activities of the Subcommittee on Carcinogenicity, including future objectives and budgetary requirements.

Recommendations:

1. That the Subcommittee on Medical Policies and Practices be requested to promote the improvement of medical records in the petroleum industry so as to provide reliable health data for the benefit of employee and employer and for any health studies which may be made.
2. That the budget of \$104,760, as submitted by Doctor Kehoe on March 4, 1952 for the year July 1, 1952 to June 30, 1953, be approved.

ACTION

The Medical Advisory Committee accepted the report and adopted the subcommittee recommendations.

V

REPORT OF SUBCOMMITTEE ON FIRST AID - DR. T. M. FRANK, CHAIRMAN

Doctor Frank reported that suggestions collected from members were sent to Charles A. Miller. These were studied in detail and the book has now been rewritten incorporating them all. The editorial work and rewriting has been done by Mr. Miller and his associates, with the chairman of this subcommittee sitting in to advise from a medical viewpoint.

Two differences in medical opinion came to light. One was in the use of the tourniquet. The other was in the exact technique of the Holger Nielsen method of resuscitation. An attempt was made to resolve these differences.

The letter poll from the members of this subcommittee on the inclusion of the Holger Nielsen method was reported as being in favor (all but one) of its inclusion but not as a substitute for other methods.

The only action taken was a vote of thanks to Mr. Miller and his associates, and to the chairman of this subcommittee for their work in revision of the book.

ACTION The report was accepted.

VI

REPORT OF SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS - DR. MARSHALL CLINTON, CHAIRMAN

Doctor Clinton reported that the remaining nine toxicological reviews which were approved for publication at the April 21, 1951 MAC Meeting have been editorially revised and now await publication by the American Petroleum Institute.

The subcommittee voted to recommend that revision of existing toxicological reviews be carried out when advised by Professor Drinker or suggested by members of the Medical Advisory Committee. Professor Drinker will circularize minor changes in reviews, without complete revision, when he deems it advisable.

The subcommittee voted to recommend that Professor Drinker be requested to prepare toxicological reviews on the following subjects:

1. Oil soluble lead soaps.
2. Effects of inhalation of oil mists.

ACTION The Medical Advisory Committee voted to accept the report and recommendations made by the subcommittee.

VII

REPORTS FOR INACTIVE SUBCOMMITTEES

The Medical Advisory Committee received brief informative statements pertaining to the assignments of the following subcommittees:

1. Subcommittee on Cutting Fluids - Dr. F. F. Boys, Chairman.
2. Subcommittee on Eye Hazards - Dr. Kieffer Davis, Chairman.

VIII

REPORT OF CONSULTANT - PROFESSOR PHILIP DRINKER

The committee received from Professor Drinker a brief report which supplemented his discussion of the atmospheric pollutant problem.

IX

AROMATIC HYDROCARBONS

The committee resumed discussion of this subject and requested the chairman to canvass all members by letter ballot to ascertain the extent to which they are interested in developing a research program on the toxicology of such hydrocarbons.

X

NEW BUSINESSA. Report on Appointment and Meeting of a Special Coordinating Committee

Chairman Linder informed the committee on this subject by reading letters as follows:

1. January 25, 1952 from John R. Suman to E. K. Linder, M.D.

"The General Committee, Division of Refining, has resolved:

'That the Chairman of the General Committee of the Division of Refining appoint a subcommittee composed of members of said General Committee to review the past work of said Medical Advisory Committee as it pertains to finished and unfinished petroleum products, and to refinery operations as well as to review work now under way and programs, if any, for future work in this field, and to recommend to the General Committee such steps as it feels should be taken, together with such mechanism as it feels should be established to secure the best possible results from the standpoint of the employees of the petroleum industry and the users of petroleum products.'

"The General Committee also has agreed unanimously:

'...that the Vice President for Refining should confer with the Chairman of the Safety Committee of the Board to determine whether or not a mechanism can be worked out whereby the Medical Advisory Committee can be furnished direct assistance and advice of qualified refiners.'

"Pursuant to this agreement, W. L. Stewart, Jr., Chairman, General Committee, Division of Refining, has conferred with me.

"Possibly the working-out of the mechanism sought by the General Committee would be facilitated and expedited by joint conference and collaboration of members of the refinery subcommittee, which is to be appointed by Mr. Stewart, and of a special subcommittee of medical committee members which you might appoint.

"If such a course of action seems appropriate to you, I would suggest that you communicate directly with Mr. Stewart and tender the services of a special subcommittee of medical committee members which could assist the refinery subcommittee in its review of the past, present and future API medical research program and in working out a mechanism to accomplish the results stated in the resolution."

2. February 1, 1952 from E. K. Linder, M.D., to W. L. Stewart, Jr.

"In accord with Mr. Suman's letter to me, dated January 25, 1952, it is my desire to expedite any action on the part of the Medical Advisory Committee which will aid the General Committee, Division of Refining, work out the mechanism referred to in their resolution as quoted.

"I am appointing a subcommittee composed of six members of the Medical Advisory Committee, which subcommittee will be prepared to collaborate with a subcommittee of the General Committee, Division of Refining. These liaison subcommittees, I am certain, can discuss and promote a better mutual understanding.

"Immediately following the November meeting of the Medical Advisory Committee a Research Project Advisory Subcommittee was appointed for the express purpose of maintaining a closer contact with Doctor Kehoe and associates of the Kettering Laboratory relative to their research on carcinogenicity sponsored by the American Petroleum Institute. A meeting of this subcommittee and Doctor Kehoe and associates was held on November 26 and another meeting is planned for February 26. It is my personal opinion that the November meeting proved of value both to Doctor Kehoe and his associates and also to the Subcommittee on Carcinogenicity. This past meeting, and future meetings, I am sure, will serve their purpose to provide a closer bond of understanding and collaboration in direction of work so as to accomplish the objectives in the least possible time and at the least possible cost.

"Inasmuch as there will be available up-to-date information on the research on carcinogenicity at the Kettering Laboratory immediately following the meeting of February 26, may I take the liberty of suggesting that the liaison subcommittees meet on February 27 in Cincinnati? Should this not be agreeable, or should it be in conflict with previous commitments, we will be quite willing to meet at any other time or place you may suggest.

"The subcommittee, which we shall refer to as the Special Coordinating Committee of the Medical Advisory Committee, will be composed of the following members:

Kieffer Davis, M.D.
Phillips Petroleum Company
Bartlesville, Oklahoma

Kenneth R. Fourcher, M.D.
Standard Oil Company (New Jersey)
30 Rockefeller Plaza
New York 20, New York

E. Kern Linder, M.D.
The Atlantic Refining Company
260 South Broad Street
Philadelphia 1, Pennsylvania

James W. Long, M.D.
Gulf Oil Corporation
Port Arthur, Texas

M. N. Newquist, M.D.
The Texas Company
135 East 42nd Street
New York 17, New York

B. B. Reeve, M.D.
Standard Oil Company (Indiana)
910 South Michigan Avenue
Chicago 80, Illinois"

3. February 15, 1952 from W. T. Gunn to E. K. Linder, M.D.

"Mr. W. L. Stewart, Jr., Chairman of the General Committee, has appointed the following members of the General Committee, Division of Refining, to serve on the Special Coordinating Committee of the Medical Advisory Committee:

W. R. Argyle
Sinclair Refining Company
600 Fifth Avenue
New York 20, New York

M. Halpern
The Texas Company
135 East 42nd Street
New York 17, New York

Harold G. Osborn
Continental Oil Company
P.O. Drawer 1267
Ponca City, Oklahoma

M. G. Paulus
Standard Oil Company (Indiana)
910 South Michigan Avenue
Chicago 80, Illinois

William Naden
Esso Standard Oil Company
15 West 51st Street
New York 19, New York

C. S. Teitsworth
Socony-Vacuum Oil Company, Inc.
26 Broadway
New York 4, New York

"Mr. Stewart feels sure that the Medical Doctors will enjoy working with this group, and that the results will be constructive.

"These gentlemen have been notified of the meeting at 10:00 A.M., February 27, at the Netherland Plaza Hotel, Cincinnati, Ohio."

4. March 11, 1952 from William Naden to W. L. Stewart, Jr.

"In accordance with your instructions, as outlined in Mr. W. T. Gunn's letter of February 14th, the Coordinating Committee which you appointed met with a Subcommittee of the Medical Advisory Committee at the Netherland Plaza Hotel, Cincinnati, Ohio, on February 27, 1952. The following were in attendance:

Special Coordinating Committee of the Division of Refining

W. R. Argyle Sinclair Refining Co.
Dr. L. C. Beard for C. S. Teitsworth .. Socony-Vacuum Oil Co., Inc.
F. H. Holmes for M. Halpern The Texas Company
D. R. Johnson for H. G. Osborn Continental Oil Co.
W. J. McGill for M. G. Paulus Standard Oil Co. (Indiana)
Wm. Naden Esso Standard Oil Co.

Subcommittee of Medical Advisory Committee

Kieffer Davis, M.D. Phillips Petroleum Co.
Kenneth R. Fourcher, M.D. Standard Oil Co. (New Jersey)
E. K. Linder, M.D. The Atlantic Refining Co.
M. N. Newquist, M.D. The Texas Company
B. B. Reeve, M.D. Standard Oil Co. (Indiana)
R. M. Landon representing
James W. Long, M.D. Gulf Oil Corporation

"At the start of our meeting there were some discussions as to the duties of the two Refining Division committees that were recently appointed to meet with the Subcommittee of the Medical Advisory Committee -- the above committee and also the committee under the chairmanship of Mr. T. J. Sullivan. It was finally felt that Mr. Sullivan's committee was appointed to review the work of the Medical Advisory Committee, but that our committee was appointed 'to determine whether or not a mechanism can be worked out whereby the Medical Advisory Committee can be furnished direct assistance and advice of qualified refiners.'

"In our discussion we reviewed the makeup of the Medical Advisory Committee which is composed of medical doctors from the member companies, together with a comparable number of associate or technical advisors. It was established that the work of the Medical Advisory Committee is to make recommendations as to medical problems and policies as they pertain to the petroleum industry and that decisions regarding the recommendations to be made is the sole responsibility of the fully accredited members (M.D.s) of

the Medical Advisory Committee. Associates have been available to the committee to give advice on matters pertinent to refining and such technical advisors have always had representation on the subcommittees of the Medical Advisory Committee.

"After a thorough review and discussions of the workings of the Medical Advisory Committee and its subcommittees together with the associate members or technical advisors, it was unanimously agreed that a mechanism already exists to furnish qualified assistance and advice on problems that pertain to the Refining Division. It was felt that if the member companies continue to nominate competent technical advisors to this committee that there would be no need for any further assistance.

"Although it might not have been pertinent to the subject we were commissioned to deal with, your committee did express the thought that consideration should be given to having a permanent committee, such as the committee now working under Mr. T. J. Sullivan, to review the work of the Medical Advisory Committee, and to advise the General Committee on Refining regarding the actions taken and recommendations made by the Medical Advisory Committee.

"At the close of the meeting the group accepted an invitation to visit with Doctor Kehoe and his associates at the Kettering Laboratory where we were privileged to witness the work in progress that is going on for API, as well as work going on for other industries. We not only found it extremely interesting but were very favorably impressed with Doctor Kehoe and his associates. We were impressed with the fact of his long association with industry problems in general, and we all felt that he is eminently qualified to handle the medical research projects that have been assigned to the Kettering Laboratory by the API.

"I trust you will accept the above as a report of the Special Coordinating Committee."

B. API Certificates of Appreciation for Members of Medical Advisory Committee

ACTION Following discussion of this subject, the committee voted for appointment of a small subcommittee on awards to study and to report recommendations.

XI

TIME AND PLACE OF SIXTEENTH MEETING

ACTIONS

1. On motion the committee voted to hold annual meetings instead of semi-annual meetings beginning in 1953, with the understanding that such a change should have no effect on the scheduling of subcommittee meetings.
2. It was agreed that subcommittees should have such meetings as may be necessary to ensure the circularization of their reports at least two weeks prior to annual meetings of the Medical Advisory Committee.

3. It was agreed that the Sixteenth Meeting should be held in Chicago on Thursday, September 25, 1952.

.....

The Fifteenth Meeting was adjourned.

.....

Members, Associates, and guests met informally at luncheon following which Doctor V. C. Baird presented an interesting illustrated talk on the medical program and organization of the Humble Oil and Refining Company, Houston, Texas.

Those present discussed the company program and gave Doctor Baird a vote of thanks for his contribution to the meeting.

Marshall Clinton, M.D.
Secretary

Approved:

E. Kern Linder, M.D.
Chairman

For Information Only - Not For Publication

APPENDIX A

To Minutes of 15th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON ATMOSPHERIC POLLUTANTS

Dr. John C. Ruddock - Acting Chairman

Full discussion of all aspects was entered into by all members and associate members present.

Full recognition was made of the work being done by the Stanford group, Professor Drinker, and others. It was thought that a coordination of the results of this work would be of value to the committee and the API in general. A proposal was moved and seconded and unanimously passed that a sum of money be allotted to coordinate the work and collect the findings of various groups, universities, and colleges that are researching the causes of air pollution - in turn, this information be dispersed to the subcommittee for further study. A discussion was held as to who would collect this data - the Subcommittee on Toxicological Reviews, Professor Drinker and staff, or the Subcommittee on Atmospheric Pollutants? At this time an invitation was extended to the members of this subcommittee to attend the Symposium on air pollution at Pasadena, California, May 5-6, 1952, to be held under the auspices of the Stanford Research Institute.

The subcommittee is aware that this is a complex problem, in general, and by no means is peculiar to the petroleum industry. The problem is both local and general. It is a problem that is controlled by geography, atmospheric conditions, night and day, wind and calm, and rain and clouds. The subcommittee is aware also of the important public relations aspects as well as technical consideration. These public relations aspects vary in scope from small communities near industrial activities to large cities and industrial centers, to counties and states. Basic research should be geared to those aspects of the problem that relate to the petroleum industry, including public relations peculiar to a particular area. The discussion brought out the fact that investigating bodies outside of the petroleum industry are stating factual data, which if unrefuted would lay the major blame for air pollution on the petroleum industry, whereas investigations to the present time are unanimous to the effect that the petroleum industry is responsible for only a small percent.

There exists a definite void in knowledge on medical or physiologic aspects of air pollution. Medical societies are already discussing the possible detrimental effects of smog. These discussions have no basis in fact and are merely surmise and conclusions. Before an industry is saddled with unrealistic and unnecessarily costly regulations, factual data must be developed by knowledge gleaned by realistic scientific investigations. The subcommittee concurs in the proposed 8 projects outlined by the Subcommittee on Smoke and Fumes of the Division of Refining. Such a study should determine what constitutes air pollution or whether smog is merely a public nuisance. When a conclusion is reached it is requested that it be referred to this subcommittee for further study of the physiologic aspects of air pollutants, which might be the result of operations or products of the petroleum industry.

In the interim before receiving conclusions of the aforementioned survey, it was proposed that each participating company should attempt to make a survey of its own employee group for the purpose of determining, if possible, the physiological effects of smoke and fumes on these employees. It was brought out in the discussion that employees were exposed to fumes and smoke peculiar to the petroleum industry in a higher degree, more frequently and continuous than any other human group.

The subcommittee stands ready, if necessary, to render whatever service and assistance it can in those matters related to the physiologic effects of atmospheric pollution which it may be specifically requested to consider.

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

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K. E. KINGMAN
J. A. LA FORTUNE
J. PORTER LANGFITT
W. L. LESH
R. E. LUTON
JOHN F. LYNCH
MAURICE A. MACHNIS
P. S. MAGRUDER
P. L. MARTIN
G. L. MATEER
E. B. MCCONNELL
P. W. MCCURRY
RAY E. MILLER
L. W. MOORE
WILLIAM NADEN
JOHN W. NEWTON
GLENN E. NIELSON
HAROLD G. OSBORN
H. M. PAULSEN
M. G. PAULUS
JOHN S. PFARR
L. W. ROBBIE
J. B. ROGERSON
E. L. SHEA
H. H. SHERWOOD
E. F. SONDRIGGER
HENRY SONNENBORN, III
W. F. STROUD
T. J. SULLIVAN
C. C. TATE
C. S. TEITSWORTH
C. H. THAYER
R. L. TOLLETT
J. W. VAIDEN
JOHN S. WERTZ
C. R. WILLIAMS
L. A. WOODWARD
G. E. WYNN
W. S. ZEHRUNG

April 3, 1952

DIVISION OF REFINING
W. T. GUNN, DIRECTOR

To The National Committee on Smoke and Fumes
Division of Refining

Gentlemen:

The program and expense estimate which may be adopted by the Committee at its first meeting in San Francisco on May 13th must be presented by your Chairman to the General Committee of the Division of Refining for approval at its meeting on May 15th.

In order to expedite arriving at decisions as to the nature of the program the Committee should adopt and the amount of money that would be required to finance it, there is set forth below a list of projects suitable for research under Committee sponsorship. In cases where it is anticipated a project may require more than one year's time for completion, the estimated cost covers the work of the first year only.

Brief summaries of the various projects, outlines of the methods of approach which might be suitable, and breakdowns of their estimated costs into equipment and research expense are shown on the sheets attached. The cost estimates were arrived at with the assistance of Stanford Research Institute personnel and hence should be in the correct order of magnitude.

At least six independent research organizations, namely: Armour Research Foundation, Battelle Memorial Institute, Arthur D. Little, Inc., Mellon Institute, The Engineering Research Department of New York University, and Stanford Research Institute are qualified to conduct research on the type projects suggested. Subsequent to the adoption of a program and budget by the Committee in May, it is contemplated that a Subcommittee may be charged with responsibility for obtaining proposals from these qualified organizations for research on each project approved for sponsorship.

National Committee
on Smoke and Fumes

- 2 -

April 3, 1952

The projects suggested, in the order of their probable importance, are as follows:

	<u>Project</u>	<u>Estimated Time Required</u>	<u>Estimated Cost</u>
(1)	Development of Analytical Methods	1st year	\$ 75,000
(2)	Hydrocarbon Reactions in the Atmosphere	1st year	75,000
(3)	Composition and Origin of "Blue Haze" from Refinery Operations	1st year	65,000
(4)	Quantity, Nature and Origin of Oxidant in the Atmosphere	1 year	75,000
(5)	Development of Tracer Techniques	3 months	10,000
(6)	Composition of Waste Gases from Combustion of Petroleum Fuels	5 months	25,000
(7)	Conversion of SO_2 to SO_3 in the Atmosphere	1 month	1,500
(8)	Atmospheric Impurities in Major United States Cities	1st year	<u>6,000</u>
	Total		\$ 332,500

Any comments will be welcomed regarding these or other projects believed suitable for sponsorship by the Committee.

Very truly yours,

W. L. Stewart Jr.
S.

WLS,Jr.:m
att.-8

Attachment 1

Development of Analytical Methods

Among the substances emitted into the air by oil refineries and consumers of petroleum products are hydrocarbons, oxygenated hydrocarbons, oxides of nitrogen, ammonia, sulfur dioxide, and sulfur trioxide. Heavily polluted air may contain these substances at concentrations of from a fraction of a part per million to several parts per million. The analytical techniques for analyzing specifically for these substances in the presence of other contaminants at such low concentrations are either non-existent or quite unsatisfactory.

The object of the proposed work is to develop specific methods for analyzing for the substances listed above, and to evaluate the methods, using both synthetic and natural industrial atmospheres.

Satisfactory methods for analyzing for hydrocarbons at low concentrations (0.1 to 5ppm.) would be most important to the oil industry. Such techniques do not exist at present and will probably have to be developed and improved upon over a period of several years' time. Therefore, emphasis should be placed on the problem of analyzing for hydrocarbons although improvements in techniques for analyzing for the other substances listed above could be undertaken at the same time.

Estimated Costs - First Year

Equipment	\$ 6,000	
Research	<u>69,000</u>	
Total		\$75,000

Hydrocarbon Reactions in the Atmosphere

Relatively little is known about the reactions which hydrocarbons undergo after they escape into the air from automotive exhausts, filling stations, or refineries. In spite of this, many of the unpleasant properties of Los Angeles smog have been attributed to products of the atmospheric oxidation of hydrocarbon vapors. It is quite likely that unpleasant properties of polluted atmospheres elsewhere also will be attributed to such causes. Studies of the reactions which hydrocarbon vapors in air can undergo would be extremely helpful in evaluating the importance of such reactions.

Previous experience on this problem has shown that two lines of attack have been particularly fruitful. One involves studying the rates at which the reactions occur under various conditions. The other involves the study of the chemical and physical nature of the reaction products and any undesirable effects they may produce.

A start has been made along these lines by studying the mechanisms and products of the reactions of certain olefins with ozone and nitrogen dioxide. However, this has been merely a start and the effect of light, especially when other impurities are present, is almost unknown.

It would be the objective of this work to determine the fate of hydrocarbons in the open atmosphere and measure to what extent they may constitute a nuisance.

It is proposed that the experimental approach would be a continuation of the work that has already been started on the study of mechanisms and identification of reaction products and evaluation of nuisance effects.

Estimated Costs - First Year

Equipment	\$ 6,000
Research	<u>69,000</u>
Total	\$75,000

Attachment 3

Composition and Origin of "Blue Haze" from Refinery Operations

Based on work that has been done thus far, it is believed that "blue haze" is a mixture of air contaminants. The haze contains particulate matter of a size range that causes it to have a bluish cast under some lighting conditions and to appear reddish-brown under others. Its emission is associated primarily with those operations that involve the combustion of fuels containing sulfur. The emission of "blue haze" is common to practically all petroleum refineries and in some areas represents a considerable problem.

In order to develop means of reducing or eliminating "blue haze" from refinery operations, it is first necessary to know its composition and nature. In order that this knowledge may be gained, a program such as the following should be carried out in several of the principal refining areas at the source of emission of the haze-producing materials:

1. Measure the particle size by collection and optical measurement or by photographic colorimetry.
2. Determine the chemical composition by collection of the haze and use of gross chemical analysis and the chemical micrurgic technique.
3. Measure the ratio of sulfur trioxide to the combined sulfur dioxide and sulfur trioxide concentrations at each emission source.
4. Compile detailed data on combustion conditions, nature of fuel burned (including ash content), and correlate data with quantity and nature of haze produced.

Estimated Costs - First Year

Equipment	\$ 5,000
Research	<u>60,000</u>
Total	\$65,000

Quantity, Nature and Origin of Oxidant in the Atmosphere

Past research has shown that hydrocarbons and other materials in the atmosphere may be oxidized to create other substances that are not necessarily emitted directly to the atmosphere as the result of human activities. These reaction products may be damaging or noxious when present in sufficient quantities. In Southern California the atmospheric oxidation is caused by the presence of relatively high concentrations of oxidant, largely ozone, that is present in the atmosphere during periods of smog. On the other hand, studies in New Mexico and elsewhere in the United States do not show periods of high oxidant concentration that typify the Los Angeles situation.

The program outlined here is designed to determine the chemical composition of the oxidants present in the atmosphere, their concentrations under different meteorological conditions, and whether they are present naturally or as the result of human activity.

Continuous measurements of ozone and oxides of nitrogen should be made in several industrial and rural localities. It is suggested that two typical refining centers be selected (one in the East or Midwest and one on the Southern Pacific Coast), and that two typical rural areas in the same geographic areas as the refinery centers be used as controls.

In addition to the continuous measurements at ground level, measurements of total oxidant should be made vertically to an elevation of 10,000 feet at one refinery location and one rural location under various meteorological conditions.

It is estimated that this study can be completed in one year's time.

Estimated Costs - One Year

Equipment*	\$27,000
Research	<u>48,000</u>
Total	\$75,000

* The total estimated cost for measurement and other equipment is \$40,000. About \$13,000 worth of the necessary equipment is available at Stanford Research Institute. It is assumed in calculating the above costs that airplanes can be supplied by one or another of the petroleum companies.

Attachment 5

Development of Tracer Techniques

In many cases of atmospheric pollution it is desirable or necessary to know the amounts of effluent that may, or does, arrive at a given point from one or more sources. This is particularly important where there may be multiple sources of air contamination.

Methods of tracing the course of effluents after they have been emitted from a stack are fairly well developed and most of the necessary equipment is available. However, on an industrial basis, the methods as they now exist are untried.

The tracer technique presently proposed would consist of ejecting into the atmosphere readily identifiable finely divided solid material near some source of suspected emission. Such particles would be collected at those locations where it is suspected that pollutants may be carried. The particle size of the tracer substance would be selected in order that the particles would, for all practical purposes, follow the laws of gas diffusion and would not readily settle. Particles less than one micron in diameter should be suitable for this purpose. More than one suspected source would be evaluated simultaneously by employing different types of particulate matter. The methods developed should be usable over a distance of five miles or more.

It is estimated that this project can be completed in three months of working time.

Estimated Costs - Three Months

Equipment	\$2,500	
Research	<u>7,500</u>	
Total		\$10,000

Composition of Waste Gases from Combustion
of Petroleum Fuels

Much of the man-made contributions to air pollution arise from combustion processes. Since the petroleum industry is a large consumer of fuel, it naturally contributes substantially to the polluting materials in the air over the cities where refineries are located.

A large fraction of the total contaminants in the air will come from one of three sources: combustion of petroleum fuels, combustion of non-petroleum fuels, and combustion of wastes. The study outlined here is designed to provide information on the kinds and quantities of gaseous materials emitted to the atmosphere from various typical unit combustion processes used by the petroleum industry, and its customers.

Adequate data on many of the gaseous constituents of gasoline and diesel exhaust gases now exist. Some additional information on the content of acetylene, aldehydes, organic acids, ammonia, and oxides of nitrogen is needed.

In addition, complete information on the composition of gases from oil and LPG burners (both household and industrial) under various operating conditions is needed.

It is estimated that this phase of the work can be completed in five months' time.

Estimated Costs - Five Months

Equipment	\$ 1,000	
Research	<u>24,000</u>	
Total		\$25,000

Attachment 7

Conversion of SO₂ to SO₃ in the Atmosphere

It has been claimed by air-pollution control authorities and others that sulfur dioxide emission to the atmosphere later results in the formation of sulfuric acid aerosols that obscure visibility. Although considerable work has been done on this subject in the past, there still exists considerable disagreement among investigators as to the extent that sulfur dioxide to sulfur trioxide oxidation occurs in the atmosphere.

It is understood that active work is in progress at the University of Illinois and at the University of California at Los Angeles on this problem. It is proposed that the current work be thoroughly investigated, and that no experimental work be planned until the results of the present work have been reviewed.

Work now under way could be reviewed and reported upon in less than one month's time.

Estimated Costs - One Month

Equipment	None
Research	<u>\$1,500</u>
Total	\$1,500

Attachment 8

Atmospheric Impurities in Major U. S. Cities

Several of the major cities in the United States and Canada have, within recent years, undertaken new programs to investigate the impurities in their atmospheres. Cleveland, New York, Pittsburgh, Detroit-Windsor, and Los Angeles are among these cities. The important substances sought for have not been the same in each city.

A compilation of all the results obtained, and the test methods used, for all the cities having an active investigational program should be of considerable help in comparing one area with another, in establishing a "normal" impurity of air over industrial cities, and in defining areas of ignorance where further work is desirable.

This work would consist mainly of correspondence with investigators active in the field combined with visits to those cities where major studies are being undertaken. The result of the work should be a report each year, assembling all the data available, assessing the trends in municipal investigations, and reviewing any new analytical or sampling methods that might be developed.

Estimated Costs - First Year

Equipment	None
Research	<u>\$6,000</u>
Total	\$6,000

AMERICAN PETROLEUM INSTITUTE

50 WEST 50TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

April 7, 1952

To Members and Associates,
Medical Advisory Committee and its Subcommittees

Gentlemen:

Our final arrangements for the Cincinnati meeting at the
Netherland Plaza Hotel are as follows:

FRIDAY, APRIL 18, 1952

9:30 - 10:30 A.M. - Parlor I - Subcommittee on Atmospheric Pollutants
Chairman: Dr. John C. Ruddock will preside
in the absence of Dr. Luongo

10:30 - 11:30 A.M. - Parlor I - Subcommittee on First Aid
Chairman: Dr. T. M. Frank

11:30 - 12:30 P.M. - Parlor I - Subcommittee on Toxicological Reviews
Chairman: Dr. Marshall Clinton

(No arrangements have been made for members to lunch together on Friday.)

2:00 - 6:00 P.M. - Parlor I - Subcommittee on Carcinogenicity
Chairman: Dr. M. N. Newquist

.....

The Medical Advisory Committee will hold its meeting on

SATURDAY APRIL 19, 1952 AT 9:00 A.M.

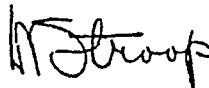
in Parlor I of the Netherland Plaza Hotel (see enclosed copy of meeting
agenda).

The "Dutch Treat" luncheon, \$3.50 per plate, will be held in
the Julep Room at 12:30 P.M., Saturday.

Immediately after luncheon the chairman will introduce a
speaker who will present a talk on a subject of interest to the members.

We trust the change in time for convening the first sub-
committee meeting will not inconvenience any members or associates.

Very truly yours,



DVS:c
Enclosure

AGENDA

FIFTEENTH MEETING
MEDICAL ADVISORY COMMITTEE

Cincinnati, Ohio
Netherland Plaza Hotel

April 19, 1952

.....

- I. Introduction of Members and Guests.
- II. Minutes of Fourteenth Meeting.
- III. Report of Subcommittee on Atmospheric Pollutants
Dr. E. P. Luongo - Chairman (To be presented by Dr. John C. Ruddock)
- IV. Report of Subcommittee on Carcinogenicity
Dr. M. N. Newquist - Chairman
- V. Report of Subcommittee on First Aid
Dr. T. M. Frank - Chairman
- VI. Report of Subcommittee on Toxicological Reviews
Dr. Marshall Clinton - Chairman
- VII. Reports for Inactive Subcommittees

Note: Chairmen of inactive subcommittees will be recognized if they desire to present information about subcommittee assignments, as follows:

Subcommittee on Cutting Fluids
Dr. F. F. Boys - Chairman

Subcommittee on Economic Poisons
Dr. T. J. Kelly - Chairman

Subcommittee on Eye Hazards
Dr. Kleffer Davis - Chairman

Subcommittee on Fluorides
Dr. George M. Saunders - Chairman

Subcommittee on Medical Policies and Practices
Dr. L. E. Curtis - Chairman

Subcommittee on Physiology of the Skin
Dr. Robert E. Eckardt - Chairman

VIII. Report of Consultant - Professor Philip Drinker.

IX. Aromatic Hydrocarbons.

X. New Business

Note: One item of new business will be the report of chairman on appointment and meeting of a Special Coordinating Committee in February 1952.

XI. Time and Place of Sixteenth Meeting.

XII. Adjournment for luncheon and discussion meeting to be held in the Julep Room promptly at 12:30 P.M.

AMERICAN PETROLEUM INSTITUTE

80 WEST 80TH STREET

NEW YORK 20, N. Y.

DEPARTMENT OF TECHNICAL SERVICES
DAVID V. STROOP, DIRECTOR

March 20, 1952

To Members and Associates
Medical Advisory Committee and Its Subcommittees

Gentlemen:

We have made meeting room assignments in the Netherland Plaza Hotel, Cincinnati, Ohio, as follows:

FRIDAY, APRIL 18, 1952

10:00 - 11:00 A.M. - Parlor I - Subcommittee on First Aid
Chairman: Dr. T. M. Frank

11:00 - 12:00 A.M. - Parlor I - Subcommittee on Toxicological Reviews
Chairman: Dr. Marshall Clinton

(No arrangements have been made for members to lunch together on Friday.)

2:00 - 6:00 P.M. - Parlor I - Subcommittee on Carcinogenicity
Chairman: Dr. M. N. Newquist

.....

The Medical Advisory Committee is scheduled to meet on

SATURDAY APRIL 19, 1952 AT 9:00 A.M.

in Parlor I of the Netherland Plaza Hotel.

Arrangements are being made to hold a "Dutch Treat" luncheon at 12:30 P.M., Saturday, and, after luncheon, to discuss matters of interest to members.

One matter of interest will be Medical Advisory Committee Objectives, Functions and Procedures as outlined in the memorandum enclosed with my letter of March 3 and as discussed in three letters, copies of which are enclosed.

If necessary, an executive session of the committee will be announced at the conclusion of the Saturday afternoon discussion.

You will recall action taken at the 1950 Annual Meeting, when it was voted to restrict attendance at subcommittee meetings and

-2-

executive sessions to members and associates. You will also recall it was agreed that members and associates could extend invitations to guests to attend the morning session of the Medical Advisory Committee, provided the names of guests were given to the chairman prior to the meeting.

Very truly yours,

W. Strop

DVS:c
Enclosure