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AGENDA

BOARD OF DIRECTORS MEETING

January 17, 1968

Report of President -

(a) Capital Expenditure:
Property Purchase - France - $1,000,000

1 (b) Techite Pipe Manufacturing License

(c) Major Capital Expenditures

2 Changes in Selling Prices -

3 Forecast of Earnings, 1968 -

4 Treasurer's Report of Cash and Securities -
(For information of Board)

5 Proxy Statement for Annual Meeting -

6 Approval of Minutes -
Regular Board meeting of December 20, 1967

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CRMC-Asb&Health-BODMin-000001

A REGULAR MEETING OF THE BOARD OF DIRECTORS OF JOHNS-MANVILLE CORPORATION was held in the offices of the Corporation on the 11th floor at No. 22 East 40th Street, New York City, on Wednesday, the 17th day of January, 1968, at 9:00 in the forenoon.

The following Directors were present, constituting the entire Board of Directors:

Henry C. Alexander
C. B. Burnett
Edgar G. Burton
F. E. Dutcher
A. R. Fisher
Joseph A. Grazier
K. V. Lindell
George P. MacNichol, Jr.
F. H. May, Jr.
William F. May
John P. Schroeder
A. C. Smith
William C. Stolk
Thomas E. Sunderland

C. B. Burnett, President of the Corporation, acted as Chairman of the meeting and presided thereat and Herbert Morton Ball, Secretary of the Corporation, acted as Secretary of the meeting and kept the minutes thereof.

A notice of the meeting and affidavit of mailing the same to all the Directors of the Corporation were presented to the meeting and, on motion, duly made, seconded, and unanimously carried, were ordered filed with the minutes of the meeting.

The members of the Board of Directors had been furnished in advance of the meeting with most of the material which would be of value in aiding their consideration of the matters appearing in the agenda book.

In his Monthly Report, the President reminded the Board that at the February 1967 meeting it had been informed that it was desirable to establish a headquarters location only for the French subsidiary operations. The Board had approved an expenditure of $630,000 for the purchase of a property but this was not consummated as the property was bought by others. A more suitable purchase could now be made at a cost of $1,000,000. The present staff of J-M de France and certain administrative and managerial personnel of the International Division were temporarily housed in two separate and entirely inadequate locations in the Colombes area of Paris. For more than a year, a search had been made for a suitable location which would include not only sufficient office space, but also afford modest warehouse and parking facilities.

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The Clipper Division of the Norton Company had made a tentative offer to sell their building in the St. Cloud area, since they were consolidating two operations in a larger building in another suburb of Paris. The report contained a complete description of the location, land, building and cost of the property. The Banque Europeenne de Credit a Moyen Terme had offered to lend a J-M company up to $1 million for ten years at 7.5% interest, with a guarantee by Johns-Manville Corporation. It was proposed to purchase the property at once. The Norton Company would require partial use of the building until mid 1969, and J-M would make a lease arrangement to them for the first floor area. The second floor would be used immediately by J-M.

After discussion, and on motion, duly made and seconded, the proposal as presented to the meeting was unanimously approved.

The President, in his report, also reminded the Board that a new pipe, TECHITE, had been brought to its attention at the December meeting. TECHITE Pipe was a new material developed by the United Technology Corp., a subsidiary of United Aircraft Corporation, for fluid transmission. The composite structure of the product was polyester resin, filled with graded silica and reinforced with fiber glass rovings. The product in its present state of development was designed for use in both corrosive and non-corrosive environments and was competitive with clay for sewage lines 18" through 48" and for lower pressure water lines (water transmission, irrigation and drainage), with TRANSITE, 24" through 48", and with concrete with steel cylinder 24"-48" for both sewage and water transmission. TECHITE would also be competitive with pipe for transmission of industrial wastes, especially those of a corrosive nature. There was a strong likelihood that with the possible improvement of pipe-making technology, and lower cost resins, TECHITE would become competitive in the field for high pressure water lines especially in diameter 18" and above, and with diameters above 48" for sewer and lower pressure water transmission.

TECHITE Pipe, the Board was informed, should be superior in various qualities to vitrified clay, asbestos cement, cast iron, and concrete. The meeting was advised as to the advantages of TECHITE for these various competitive products. The Pipe Division recognized the need to enter the piping industry with a plastic reinforced product to hold certain of its markets as well as to improve its position in the industry. TECHITE offered an opportunity to do so. The Pipe Division had negotiated with United Technology Corp. an agreement which would provide J-M with an exclusive license, know-how, and engineering designs to manufacture TECHITE Pipe in the United States and Canada. The exclusive license would be for a period of five years. The license would provide that if J-M should erect a plant west of the Mississippi River, other than at the J-M plant at Denison, Texas, during the five-year period, a payment of $1

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million would be required in addition to payments aggregating $2 million, plus 2% royalty on net sales for 17 years starting March 31, 1969, and a right to sub-license with 75% of fee and royalty received being paid to the United Technology Corp. The said corporation would furnish continuing know-how and reciprocally J-M would furnish United with its improvements in know-how.

The meeting was informed that it was proposed to construct a facility at the Denison plant with the capacity of $4 to $5 million annually at a cost of $1,500,000 and at later dates at a minimum of four other locations.

Mr. Burnett, by means of charts, presented comparative costs on various types of pipe, and gave a comparative market growth forecast which provided for a 10% to 11% growth each year. He noted that the manufacturing labor cost was lower than the general J-M line of products. United had estimated the return at 16% but that a conservative figure of 12% had been arrived at by J-M. He explained to the meeting that failure to enter into such a license might mean the loss of 5,000-10,000 tons per year of TRANSITE business. TRANSITE was lower in cost on sizes 14" and under, but TECHITE had lower costs above 14".

After an extended discussion, and on motion, duly made and seconded, the proposal as presented to the meeting was unanimously approved.

The report also contained, for the information of the Board, a brief summary of the following major capital expenditures (over $500,000 each) that would be presented to the Board for consideration in 1968: Expansion of Milling Facilities at Jeffrey Mine - $7,500,000; Facilities to Increase Capacity of Fiber Glass Textiles at Waterville Plant - $2,250,000; Facilities for the Production of Fiber Glass Insulation Produced by the Rotary Process at Penbryn Plant - $4,000,000; Increase Production of Filter Aids at Wissembourg, France - $750,000; Environmental Control - $1,700,000.

Included in the President's Report were a summary on the status of appropriations expenditures, January 1, 1968, for plants and properties in the United States and Canada; status of expenditures, January 1, 1968, for investments in other companies showing the amounts approved, the amounts advanced by J-M and the amounts expended locally; and the January 1 report of projects completed in November 1967.

Under the heading of "Other Matters", the President's Report noted that securements in the month of December were lower than in November but were substantially higher than in December of last year. Building Products, Dutch Brand, and Industrial Insulations Divisions all established new records for annual sales. New monthly production records were established for mineral wool

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board at Alexandria, for fiber glass at Defiance G-26, G-28 and G-30, and for THERMOBESTOS at Manville.

The report also noted that at Reeves Mine agreement was reached on a three-year contract providing for a wage increase of 3-1/2% retroactive to September 11, 1967, and wage increases of 3-1/2% in September 1968 and 4% in September 1969. Shift premiums were increased from 9¢ and 13¢ to 10¢ and 14¢ and a ninth paid holiday was granted. A strike was in progress at Hayward Plant. The Longshoremen's Union had taken over from the Papermakers'Union approximately three months ago. The appraisal of the situation was that the strike would run for a long time.

The report also informed the meeting that as of December 31, 1967, 126,516 shares had been purchased under the Incentive Stock Option Plan by 99 participants at prices ranging from $27.82 to $57.00. As of December 31, 1967, 3,056 employees had subscribed to 320,610 shares of stock, of which 296,295 shares had been paid for in full and delivered. On the stock remaining under pledge, subscribers had paid $386,416 and owed $758,534. The average subscription price was $40.66.

There was then presented to the meeting a report showing changes in selling prices percentagewise by Divisions.

The Chairman of the meeting presented a report entitled "Forecast of Earnings, 1968", which formed part of the agenda. He noted that the forecast of earnings for 1968 was based on the premise that overall business activity in 1968 would be slightly higher than in 1967, recognizing at the same time that part of the gain in Gross National Product was represented by price increases. Housing starts during the year would decline somewhat from their present level, and for the year 1968 would be about the same as in 1967. Prospects for non-residential construction were that expenditures would increase little more than could be accounted for by cost increases. Company net sales for the calendar year 1968 were forecast at $525 million, or 2.5% higher than the current estimate of $512 million for 1967. The forecast assumed some improvement in prices, principally in the Asbestos Fibre, Pipe, and Industrial Insulations Divisions. Much of the sales increase would occur in the second quarter of 1968. During this period in 1967, sales seasonally adjusted were at a low point for the year. Net earnings at $32 million would be $3.84 per share for 1968 compared to the current estimate of $30 million or $3.59 per share in 1967.

The Chairman called attention to the Treasurer's Report of Cash and Securities as of December 31, 1967, which formed part of the agenda in the possession of the Directors. He noted that since the date of the Board's recommendation, courtesy bank accounts had been reduced from 41 to 10 and compensatory accounts from 18 to 7.

4 of 5
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This memo distributed to Board of Directors and discussed at the January 17, 1968, Board meeting. Item not on agenda.

Asbestos-Health

FACTS

Asbestos is a recognized toxic mineral --- a health hazard.

Asbestos is recognized as causing Asbestosis, a fibrous condition of the lung.

Asbestos fiber is not known to be a carcinogen (cancer causing agent) but is probably a co-carcinogen (co-cancer causing agent) among people industrially exposed to it.

Asbestos does not affect, to the same degree, all those who are exposed to it.

The effects of asbestos are both time-related and dose-related.

The amounts of asbestos dust that can be fully tolerated by the human are presently unknown.

It has been shown that all so-called "asbestos bodies" found in human lungs are not truly asbestos.

The effect of asbestos on human health is probably limited to those who mine, mill, fabricate and apply asbestos or asbestos-containing products.

There is no evidence of any risk to the general public from the use of finished asbestos products.

The effect on the public living in asbestos or asbestos product areas is not totally known but is probably remote.

Crocidolite asbestos fiber appears to be more hazardous to humans than either Chrysotile or Amosite asbestos fiber.

The standards of allowable dust in asbestos mining, milling and manufacturing operations is currently being reviewed.

It may result in reducing these allowable limits to near-zero.

NEEDS

Codes of Practice for miners, millers, fabricators and users of asbestos fiber or asbestos-containing products are currently being prepared and need to be adopted and rigidly followed.

Further dust control is needed at many mines, mills and manufacturing plants in the asbestos industry, both inside and outside the facilities.

The asbestos industry must maintain an open-minded attitude on the asbestos-health question with all news media, a willingness to discuss all phases of the question. Not only that ------ the

asbestos industry must issue positive statements and written articles to the news media as the British asbestos industry has done and must be willing to answer all critical items which appear in the news media.

The asbestos industry must be willing to contact public officials who make public statements or introduce legislation that is damaging to the industry, and present the facts on the asbestos-health question.

PLANNED ACTION

J-M will not wait for possible future reductions in acceptable dust levels. A program has been undertaken to reduce asbestos dust levels in all mines, mills and plants to a point below the presently acceptable limits.

J-M is taking a position of industry leadership

1. in preparing Codes of Practice for miners, millers, fabricators and users of asbestos and asbestos-containing products:

2. in all activities of the QAMA, particularly with respect to the asbestos-health question;

3. in co-sponsoring and co-financing scientific research studies in the asbestos-health area;

4. in all relations with the news media, issuing statements and articles as needed and answering critical items that appear in the media;

5. in contacting civic and public health officials who make statements or introduce legislation that is damaging to the asbestos industry;

6. in providing both information and raw materials to government agencies and to all researchers seriously interested in studying the asbestos-health question.

General Headquarters
January 15, 1968

C. B. Burnett

ASBESTOS AND HEALTH
Report for the Board of Directors

The attached report, documenting activities on asbestos and health from June 1, 1966 to January 1, 1968, is submitted for your presentation to the Board of Directors.

F. J. Solon, Jr.

Attach.

TO: The Board of Directors

Report of Activity

On

HEALTH ASPECTS OF ASBESTOS

June 1, 1966 to January 1, 1968

January 15, 1968

January 15, 1968

Report of Activity

On

HEALTH ASPECTS OF ASBESTOS

I. GENERAL BACKGROUND

Attached for reference is the only prior report to the Board on this subject, dated June 10, 1966. (Appendix A) It traces the origin of the asbestos-health problem and activities undertaken by Johns-Manville between March and June 1966.

This status report summarizes what has transpired since June 1966 and discusses current projects.

II. DEPARTMENT OF ENVIRONMENTAL CONTROL

In March 1967 Johns-Manville established a new Department of Environmental Control. Its director, Ed Fenner, a mechanical engineer by training, reports to A. C. Smith, Senior Vice President for Research, Development and Engineering. He directs a coordinated approach to the overall J-M environmental control situation dealing with both employee and general public, covering all divisions, plants and mines.

Every 60 days, this group gives C. B. Burnett and the President's Staff a detailed briefing on environmental control activities, backed up by a carefully documented written report.

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As indicated by the attached extract from the November 1, 1967 Report (Appendix B), priority attention is being given to locations where asbestos dust levels are higher than we consider acceptable.

Because Johns-Manville was one of the first industrial firms to take a "total environment" approach and set up a special department, we have had favorable publicity in several trade publications, including OCCUPATIONAL HAZARDS. A reprint of the latter article is attached (Appendix C).

One project to which the Environmental Control Department is giving high priority is the development of "Codes of Practice" for the guidance of contractors and customers who handle and work with asbestos-containing products in the field. Several of these booklets are presently being prepared by the EC working with the Public Relations Department.

III. MEDICAL ADVISOR

In November, C. B. Burnett announced the appointment of Dr. George W. Wright as Consultant to the President on medical matters. Dr. Wright, Head of the Department of Medical Research at Saint Luke's Hospital, Cleveland, Ohio, is a recognized authority on asbestos and human health. A copy of his "Curriculum Vitae" is attached (Appendix D).

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IV. ENVIRONMENTAL HEALTH COMMITTEE

To make certain that J-M takes a coordinated, high priority approach to the asbestos/health problem, C.B. Burnett early in 1967, designated an "Environmental Health Committee," under the chairmanship of F. J. Solon, Jr., Vice President, Advertising and Public Relations. This Committee, which meets bi-monthly to review progress, problems and plans, is composed of the following personnel:

C. B. Burnett, President

H. M. Ball, Senior Vice President, General Counsel

E. M. Fenner, Director, Environmental Control

H. M. Jackson, Manager, Industrial Relations and Development

K. V. Lindell, Senior Vice President
Asbestos Fiber Division

A. B. Marchant, Senior Vice President
Industrial Relations

W. P. Raines
Director of Public Relations

Ivan Sabourin, Legal Counsel to the Quebec Asbestos Mining Association

C. L. Sheckler, Manager, Occupational Environmental Control

A. C. Smith, Senior Vice President
Research, Development & Engineering

F. J. Solon, Jr., Vice President, Advertising and Public Relations

Dr. George W. Wright, Medical Consultant to the President

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V. PUBLIC RELATIONS ACTIVITIES

Following are highlights of the public relations activities, in connection with the asbestos/health problem, that have been undertaken by the J-M Public Relations Department with the assistance of Hill & Knowlton, our Public Relations Counsel, during the past 18 months:

A. PUBLIC RELATIONS MATERIALS

Attached is a precisely worded statement titled "Asbestos and Human Health" (Appendix E) which summarizes presently known scientific facts concerning the relationship between asbestos and human health. It was developed by the Public Relations, Industrial Relations, Research and Environmental Control Departments and was reviewed and cleared by all members of the aforementioned Environmental Health Committee.

Quotes from this statement will be used, as needed, by the President, Chairman of Canadian Johns-Manville, Vice President for Finance, Vice President and General Counsel, Controller, the Environmental Control Department and the Public Relations Department in handling inquiries from stockholders, financial analysts, public officials, the press and other outside groups.

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In addition, copies of "Asbestos and Human Health" have been distributed to Senior Officers, Division General Managers, Division Staff Managers, District Sales Managers, Plant and Mine Managers and Industrial Relations Managers at all J-M locations.

B. BACKGROUND PAPERS

We contemplate that this basic statement will answer most questions on the asbestos/health problem. However, for those dealing with scientific writers, the general press, financial analysts, etc., we decided it advisable to have greater detail available on a number of specific aspects of the asbestos/health question. Therefore, preparation is underway on seven "background papers" that will be, in effect, appendices to the basic position paper. Subjects include asbestos-cement pipe, asbestosis, mesothelioma, lung cancer, asbestos bodies, types of asbestos, asbestos and the general public.

C. ACTION PROGRAM

The development and use of the basic statement and the background papers, are part of an overall public relations action program that has been developed and approved by the Environmental Health Committee. A copy of this action program is attached (Appendix F).

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D. HANDLING PRESS RELATIONS IN THE MANVILLE, NEW JERSEY AREA

In August, 1967, THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION published an article by four doctors at Somerset Hospital, Somerville, New Jersey, who said they had diagnosed 17 cases of mesothelioma, a very rare form of ancer, among patients living in the vicinity of the Johns-Manville Plant at Manville, New Jersey. They associated this frequency of mesothelioma with asbestos.

On Sunday, September 10, 1967 the NEWARK-STAR LEDGER ran a Page One article (Appendix G), reporting on this finding. Subsequently, every newspaper covering the general area of New Jersey where the Manville Plant is located ran articles on the subject. Although the basic statement had not been finalized at that time, the public relations Department worked with Legal, Industrial Relations and Environmental Control in developing interim statements that were used to help answer the accusations. In every case, the company was successful in working with editors in the development of follow-up articles that, while they did not absolve asbestos, did present the matter in an objective and realistic light and removed it from the "epidemic scare" atmosphere that had been generated by the initial reports. Attached

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is a typical follow-up article, from the SOMERSET MESSENGER GAZETTE (Appendix H).

E. ASBESTOS-CEMENT PIPE ALLEGATIONS

Late in November, 1967 allegations about the possible hazard of drinking water supplied through asbestos-cement pipe were introduced into a politically-oriented fight in the metropolitan government of Nashville, Tennessee. Briefly -- for many years only cast iron pipe, supplied by one vendor, has been used in the Nashville water system. The Purchasing Committee of the City Council introduced the idea of asbestos-cement pipe as a possible alternate to cast iron.

Through means, not entirely clear at present, Dr. James Snell, a medical professor at Vanderbilt University, was inspired to write the head of the Nashville Metropolitan Water Department, expressing concern about the safety of asbestos-cement pipe, in view of the publicity that asbestos had received as an alleged cancer-causing agent. Dr. Snell's letter is attached (Appendix I).

Publication of Dr. Snell's letter in the NASHVILLE BANNER (Appendix J) and announced plans by the Purchasing Committee of the City Council to visit J-M's Manville Plant

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generated considerable publicity and attention in Nashville.

Working with the Pipe Division, arrangements were made to host the city councilmen and Dr. George W. Wright talked with the group at length on asbestos/health. He put the problem into perspective by emphasizing that asbestos appears to be, at most, an occupational hazard that is definitely dose-related. He stated that there is no evidence to support Dr. Snell's allegation that the use of asbestos-cement water pipe might cause cancer. Dr. Wright's comments were given prominence by the NASHVILLE TENNESSEEAN, the city's largest circulation newspaper, in its December 12, 1967 issue, clipping attached (Appendix K).

Following their return, the Nashville councilmen made further favorable comment about asbestos-cement pipe to the newspapers. (Appendix L).

Shortly after his talk with the Nashville group, Dr. Wright put his verbal comments into written form in a letter addressed to F. J. Solon, Jr. (Appendix M).

A further outgrowth of the Nashville situation has been the stated intent (based upon letters from Nashville officials) by the U. S. Department of Health, Education

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and Welfare, to investigate the alleged health hazards of asbestos-cement pipe.

Photocopies of the damaging November 30th NASHVILLE BANNER article questioning asbestos-cement pipe began turning up in various other parts of the country, in the hands of officials charged with specification or purchase of water pipe. We had sufficient evidence to indicate these clippings were being placed by people connected with the cast iron pipe industry.

So, with legal counsel present and all proceedings tape recorded, a meeting was held at J-M's invitation on January 3, 1968, among the four principal manufacturers of asbestos-cement pipe with the Director of the American Water Works Association also present. These future courses of action were determined:

1. The need to visit informally with personnel of the Department of Health, Education and Welfare, to determine the future course of the proposed investigation of asbestos-cement pipe and the feasibility of broadening such an investigation to include <u>all</u> types of pipe carrying potable water.

2. The Director of Public Relations and Hill and Knowlton to proceed with a background paper on asbestos-cement pipe.

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3. The General Counsel of Johns-Manville, as authorized by the other asbestos-cement manufacturers, to discuss with the Counsel for the Cast Iron Pipe Research Institute the poor advisability of using health hazard allegations as a device to promote the sale of any type of water pipe.

F. GOVERNMENTAL INTEREST

In addition to the above-stated involvement of the Department of Health, Education and Welfare with asbestos-cement pipe, several other indications of interest in asbestos and health, at the government level, are worthy of note. President Johnson's comments to a group of labor editors and Surgeon General Stewart's remarks at a Senate hearing are contained in our June 10, 1966 report to the Board. In addition, New Jersey Congressman Patten of Perth Amboy, in September 1967, introduced a bill designed to set standards in asbestos manufacturing and transportation. Attached is a copy of the newsletter (Appendix N) to his constituents, in which Representative Patten explains his proposed legislation. This Patten Bill received very little national publicity and the best information now that it is most unlikely that any action will be taken upon this proposed legislation.

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To date, none of these actions has led to serious governmental interference with the asbestos industry but such interference as well as congressional investigation, remain quite distinct possibilities.

G. INDUSTRIAL HYGIENE FOUNDATION ADDRESS

In October 1967, F. J. Solon, Jr., Vice President, Advertising and Public Relations, delivered a paper on the subject "Communicating the Effectiveness of Industry's Hazard and Pollution Controls - Whose Job?" to the annual meeting of the Industrial Hygiene Foundation in Pittsburgh. He stressed both the importance of positive communication by industry of the facts regarding its occupational and environmental control problems, and the responsibility of medical and scientific people to challenge those of their colleagues who make sensational charges merely for the sake of publicity, without backup proof. The paper is being printed and distributed by IHF.

H. Monitoring, Evaluating and Circulating Medical Articles, Newspaper and Magazine Clippings, etc.

An important public relations activity is the continuous monitoring of medical journals, both domestic and foreign, as well as newspapers, magazines and radio and television programs, for scientific papers and articles relating to asbestos and health.

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Since these medical papers and publicity mentions are too voluminous to enable mention of each in a report of this length, only the most significant ones are summarized as follows:

I. Medical Journal and Meeting Reports

. Dr. Irving J. Selikoff, Head of Medical Research at Mount Sinai Hospital, New York and Dr. E.C. Hammond, Chief Statistician of the American Cancer Society, reported in June 1967 that the combined effects of exposure to asbestos dust along with cigarette smoking results in a greatly increased risk of lung cancer. However, they reported no lung cancer found among non-smoking asbestos workers in this particular study.

. Drs. Selikoff and Hammond, in another study, reported (October 1967) that 50 percent of the autopsied lungs of New York City residents exhibited so-called "asbestos bodies," although the finding was not related to any specific disease nor to the cause of death.

. Drs. Demy and Adler of Somerset Hospital, Somerville, New Jersey, reported (July 1967) 47 cases of lung cancer and mesothelioma (cancer of the walls of the chest and abdominal cavity) among residents of the

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area. This was attributed to asbestos exposure through previous employment at Johns-Manville.

- Four other physicians from the same hospital Dr. Borow and associates, reported (August 1967) that 17 cases of mesothelioma had been discovered within a three-year period among residents of the Manville area. Two of these patients had not had occupational asbestos exposure. They speculated on the relationship to asbestos in the area.

- Researchers at the Industrial Hygiene Foundation, Pittsburgh, (Dr. Gross and associates) reported (September 1967) producing lung cancer in rats exposed to asbestos dust. These workers noted that the asbestos dust used was highly contaminated with trace metals, which may have induced the cancers.

- Dr. Gross and associates, in another study, reported (November 1967) that growths similar to "asbestos bodies" can be produced by other substances, leading to the suggestion that such bodies of unkown origin should be called "ferruginous bodies" (iron-like bodies) until their actual composition is known.

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. Researchers of the U. S. Public Health Service (Cralley and associates), analyzed samples of chrysotile used in the asbestos textile industry and reported (October 1967) finding significant contamination with trace metals (nickel, chromium and manganese) which should be considered in studies of cancer in asbestos-exposed people.

II. Asbestos and Health Stories in the Lay Press

. The WASHINGTON POST-LOS ANGELES TIMES SYNDICATE distributed a story by science writer Harry Nelson based on the Demy and Adler cancer paper, which was printed in many newspapers. (August 1967) (Appendix O)

. The same syndicate distributed a story in December 1967 by Thomas O'Toole of the WASHINGTON POST based on a review of several mesothelioma-asbestos medical papers (Appendix P).

. A press conference held at the annual meeting of the American Medical Association resulted in extensive news coverage of the Selikoff and Hammond paper on asbestos and smoking. (June 1967) (Appendix Q)

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- An erroneous "scare" story appeared in CHEMICAL WEEK. This was prominently corrected in a later issue. (September and October 1966) (Appendices R and S).

- A news release sent out by the American Medical Association resulted in many newspaper stories about "asbestos bodies" found in autopsied lungs. (June 1966) (Appendix T).

- A news release issued by the U. S. Public Health Service resulted in stories about a Seminar on asbestos and health. (December 1966) (Appendix U)

VI. COORDINATION WITH BRITISH ASBESTOS INDUSTRY

Close liaison is maintained with the British asbestos industry in connection with asbestos and human health. Medical articles and publicity stories appearing in the United States and Great Britain are exchanged on a regular basis. Upon several occasions representatives of the British Medical and Public Relations groups have visited New York and discussed strategies applicable to the two countries.

VII. MEDICAL CONFERENCE AT ANTIQUA

In November, forty interested medical experts from all

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over the world attended a conference at Antigua, BWI, designed to discuss the current thinking on the relationship of asbestos and health. This was the second meeting of the group, which was organized in 1965 by the Quebec Asbestos Mining Association, under the leadership of J-M Senior Vice President Karl Lindell.

There was a good and free exchange of points of view and information at this second conference. Karl Lindell reports that the biggest single benefit was the direct personal confrontation between various individuals pursuing diverse paths and theses in seeking answers to the medical and biological effects of asbestos. There was good dialogue among these men, which confirms the validity of the original idea of organizing the group and of holding periodic conferences.

VIII. RESEARCH ACTIVITIES

As stated in the basic position paper, research into the health effects of asbestos is being sponsored by Johns-Manville and, in some instances, other asbestos manufacturers at a number of locations. The current status of the most important of these studies is summarized in the attached excerpt (Appendix V) from "Environmental Control Report #3."

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And a memorandum (Appendix W) from the Environmental Control Department, outlines supplemental studies that have been initiated as a result of the above-mentioned accusation concerning asbestos-cement pipe.

# # # #

Appendix A

GENERAL HEADQUARTERS
June 10, 1966

C. B. Burnett

Summary of Activity to Date
Public Relations Project
On
Public Health Aspects of J-M Products

The attached report is submitted for your presentation to the Board of Directors.

F. J. Solon, Jr.

CRMC-Asb&Health-BODMin-000030

June 10, 1966

RECENT ACTIVITIES

ON

PUBLIC HEALTH ASPECTS OF J-M PRODUCTS

General Background

In recent months, in the public press and in articles appearing in medical and scientific literature, asbestos is being pointed to as constituting a possible problem of public health.

The problem is two-fold:

Occupational: Scientific studies are going far beyond asbestos mining and primary handling into a much broader occupational group, including workers at the second and third stages of use of asbestos.

Environmental: Increasingly, researchers in asbestos are extending their concern to exposures of the general public. With this escalating public emphasis on and governmental attention to air pollution as a health hazard, this area of concern is bound to attract more attention from medical and scientific research people.

For example, the wearing of asbestos-base brake linings and clutch facings, the scuffing of asbestos-asphalt and vinyl-asbestos floor tile, the weathering of asbestos-based building boards and roofing are being pointed to by

researchers as putting asbestos fiber into the air as a contaminant.

The following chain of events is significant:

October 1964 - Symposium on Asbestos sponsored by the New York Academy of Sciences, organized and co-chaired by Dr. I. J. Selikoff and his associate, J. Churg. The weekend prior to this meeting, Dr. Selikoff released three articles to the press, quoting out of context various preprints of papers to be given by medical participants at the Symposium. These releases were largely one-sided, strongly pointing up a link between lung cancer and asbestos. Because of group action by the British medical men present, declaring from the meeting floor that they deplored Dr. Selikoff's publicity-grabbing attempts and threatening to alk out of the meeting, the press largely disregarded the material released to them by Selikoff. To our knowledge, only one article appeared -- in The Newark, N. J. Evening News. At this same meeting, Dr. Selikoff presented his own findings from a study of Eastern area asbestos workers, emphasizing his claim of an asbestos-cancer link.

March 1966 - At the dedication of his Environmental Health Laboratory at Mt. Sinai Hospital, New York City, Dr. Selikoff repeated his claim of an elevated incidence of cancer among those exposed to asbestos dust. Press material was released, this time .it the wire services and was used by The New York Times, Washington Evening Star and a good number of local papers across the U. S. and in Canada, and on radio and television stations.

May 3, 1966 - Dr. Selikoff was featured on a coast-to-coast radio program ("Dimensions" - CBS Network - 12:00 to 12:50 P.M.) which began with the commentator announcing to a background of drum rolls and martial music - "They've found another killer in the air ... Asbestos!" He also appeared on WOR, New York City.

May 10, 1966 - New York Mayor Lindsay's Task Force on Air Pollution, in their final report, named asbestos dust from brake linings as an air contaminant.

May 1966 - With the headline "Asbestos As An Urban Air Contaminant", an article by two South African and one American researcher was published in the Archives of Pathology of the American Medical Association. It pointed out that in a study in Miami, Florida of 500 consecutive autopsies of the general public over a 15-year period, "asbestos bodies" were found in the lungs of 30% of the males and 20% of the females. As a result of their findings, the researchers said: " An increase in the frequency of malignant mesothelioma of pleura and peritoneum is forecast rather than pulmonary disease or disability."

Coincident with publication of this article, the May issue of the Journal of the American Medical Association published an editorial emphasizing the importance of the Archives article.

On May 23rd the AMA also released material to the press on both the article and the editorial. This was given extensive publication by the wire services and local press across the U. S. and in Canada.

Also on May 23rd, President Johnson in his remarks to a gathering of Labor Press Editors had this to say in part:

"The time has also come to do something about the effects of a working man's job on his health. This problem has been neglected too long. It must be neglected no longer.

"Since World War II dozens of new materials and hundreds of new manufacturing processes have been introduced into our factories. And new hazards have come with them.

"We do not know the full, long-range impact of these new hazards on the health of our workers.

"We do not know enough about what really happens to men and women who handle chemicals, plastics, asbestos, petroleum products, and glass.

"But we do know that the hazards are real. We do know that work-related diseases and other physical and mental disorders are on the rise.

That trend must be reversed -- and we are moving to reverse it.

"I am directing the Secretary of Health, Education and Welfare to make an intensified study of occupation health. He will report to me at the earliest possible moment on what this Government can do:

"--First, to isolate and eliminate the hazards that now exist; and

"--Second, to test new products and processes so that precautions can be taken to prevent health hazards before they occur.

"We are no longer content in America with achieving only the "greatest good for the greatest number." Today, the measure we apply to our national progress is how much we improve the lot of all, and especially of those who have the least."

The President's remarks were given detailed coverage in the the New York Times and newspapers across the country.

June 8, 1966 - In his appearance before the Senate Subcommittee on Water and Air Pollution, Surgeon General William H. Stewart

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pointed up the public health hazards of a number of materials including lead, pesticides, beryllium, cadmium, fluorides, mercury, plastics and asbestos.

Regarding asbestos, he said in part:

> "The occupational hazards of prolonged exposure to asbestos dust are widely known. The possible community environmental hazards are a subject of increasing concern among scientists ....."
>
> "Because of its durability and heat resistance, asbestos is widely used in such products as brake linings, roofing, insulation and household tile. Some of its uses involve almost constant wear, with the result that asbestos particles are released into the atmosphere."

The Surgeon General's remarks were covered by the New York Times and the wire services.

THE RATIONALE

Our initial studies of the scientific literature, symposium papers, press articles and other available materials present these facts:

Published research work on asbestos provides a rather neat set of hypotheses for current thinking about cancers, especially lung cancer:

1. A higher-than-expected incidence among those known or thought to have been exposed to asbestos.

2. Increased longevity among over-exposed workers, whose predecessors might have died at an earlier age from whatever cause, but the longer-lived contemporaries are living through the "latent" period to a lung-cancer age.

3. Lung damage related to, or thought to be related to, inhalation of asbestos fibers, fitting in with the theory that lung cancer is more likely to occur in damaged lungs (by mechanical or bacterial or viral damage.)

4. The suspected presence of a strong (animal) carcinogen, 3,4 benzpyrene actually present in (some) asbestos.

5. The claimed strong affinity for asbestos of this same carcinogen, and perhaps others of the same class -- the polynuclear hydrocarbons. This would appeal strongly to those who theorize that lung cancer results from a combination of factors which result basically in a heavier deposition

of airborne (including cigarette smoke) carcinogens in some lungs than in others, because of a condition that would permit accumulation of such cancer-causing substances in one spot over a period of years.

6. The apparent association of asbestos with a mesothelioma, considered a rare type of lung cancer, which will give a handle for labeling this type of tumor as an "asbestos" tumor.

7. The claimed findings of "asbestos bodies" in lungs of people who never seemed to have been exposed to anything other than the ambient air -- no occupational exposures to asbestos, and the finding of more such "asbestos bodies" in people who live closer to (but not at) asbestos mines or factories.

Those who seek to implicate asbestos can put such theories together in a way to conjecture that, with the (a) long latent period, (b) greater use of asbestos and therefore greater exposures, (c) peculiar type of lung cancer -- mesothelioma, and (d) lung damage plus carcinogen theory, they will be able to find more and more lung (and perhaps other) cancer associated with the presence of asbestosis or asbestos bodies. And, since there was relatively little looking for such in previous years, it is almost certain that they will be able to find and report this increase, no matter what really is responsible for it -- whether an artifact of reporting or what.

Unfortunately, there appears to be little or nothing in the scientific literature that actually contradicts or refutes such findings and indications.

There are, of course, questions but these are not always plus questions. Some of them are:

1. Despite the apparent elevated rate of lung cancer among those exposed to asbestos, the rate is still relatively low compared to all causes of death.

2. Among certain asbestos workers, the lung cancer rate does not appear to be out of line with that of the general population. (But these are not general studies.)

3. The specificity of asbestos to so-called "asbestos bodies" appears to be in some dispute; that is, the pathological entity that is called an "asbestos body" might actually be caused by some other irritant. However, there are those who claim they can tell the true "asbestos" body from other kinds.

4. Some differences of opinion exist as to the relative hazards of different kinds of asbestos, indicating a possible area of dispute as to whether it is "asbestos" that may be involved or particular kinds of asbestos.

5. The epidemiological (or population) studies have been limited in scope and subject to some criticism as to their applicability to general population.

6. Relatively little is known about the mesothelioma that is associated by some studies with asbestos, even including its previous incidence.

7. Other mineral, dust, and chemical exposures may be involved, so that "asbestos" per se may not be a sole or the most important factor, but this is a relatively weak point if the other factors are associated with asbestos uses.

ACTION BY JOHNS-MANVILLE AND THE ASBESTOS INDUSTRY

Since the Symposium of the New York Academy of Sciences in October 1964, these actions have been taken:

Quebec Asbestos Mining Association

QAMA (Karl V. Lindell, General Manager of the J-M Asbestos Fibre Division, is a leading participant member) convened a study conference at Antigua, BWI in November 1965, attended by interested medical experts from all over the world, designed to discuss the current thinking on the occupational health of asbestos workers.

An Ad Hoc Health Committee was formed out of the Antigua meeting, which subsequently established the "Asbestos Health Research Council" of QAMA. A Scientific Committee of this Council was set up under Dr. George Wright of Cleveland to advise the Council on such research programs as the epidemiological study just begun by Dr. MacDonald of McGill University, Montreal; the establishment of a library and accumulation of a body of knowledge on the general subject of asbestos as related to occupational health; organization of symposia or other scientific meetings as appropriate, plus other activities as may be required.

J-M Task Force Group

We have established a Task Force Group headed by F. J. Solon,Jr., made up of Corporate officers and staff from the corporate management, industrial relations, medical, marketing and public relations areas. This group is coordinating all activities bearing on what we now call: "Public Health Aspects of Johns-Manville Products".

Public Relations Counsel

J-M has retained (as of May 16, 1966) Hill & Knowlton, Inc., long-established, worldwide public relations counsel to advise us on public health aspects of all J-M raw materials and finished products.

Hill and Knowlton's initial assignment from J-M is to assemble and interpret existing information and medical research findings so as to:

a. Determine J-M's potential exposure in the area of public health.
b. Determine the "ammunition", if any, that presently exists which would be suitable to rebut public criticism and answer questions from employees, customers, etc.
c. Determine possible directions medical research might take to fill gaps in existing information.
d. Determine possible areas Manville Research might examine, with

respect to health-related characteristics of some of our own as well as competitive products (e.g. Transite vs. cast iron pipe).

Asbestos Textile Institute

Membership is made up of most asbestos textile manufacturers and asbestos mining companies. This group is cooperating in a study, begun in 1962 by the

U. S. Public Health Service

This study concerns environmental and medical aspects of asbestos as it relates to the worker. USPHS researchers have conducted phases of this study at our Manville, Marshville and Denison plants.

We estimate the study is about 50% finished at this time, completion expected by 1969.

Industrial Hygiene Foundation

This foundation is set up at the Mellon Institute, Pittsburgh. J-M, along with such other companies as Owens-Corning, Pittsburgh Plate, Certain-teed, U.S. Rubber, is now in final consideration of a Foundation proposal to study fibrous material of chrysotile asbestos, glass, cellulose, and such binder materials as phenal and chrome.

Upcoming Congress of American College of Chest Physicians

We plan attendance and possible participation at the World Congress of the American College of Chest Physicians in Copenhagen, August 21 - 25, at which Dr. Selikoff is heading a panel on asbestosis. Press coverage of doctors and researchers who will speak out in opposition to Selikoff's claims will be arranged as needed or indicated by Selikoff's own press activities at the Congress. Hill & Knowlton's New York and overseas offices will work on this latter phase of activity.

Interim Position Statements

The J-M Task Force Group has issued and will continually update a statement of facts on the public health aspects of asbestos. This will assist J-M management people in answering questions on this subject from inside and outside the company. All press clippings, radio and television reports and significant scientific writings will also be distributed as soon as they appear.

# # #

EXCERPT- ENVIRONMENTAL CONTROL
Report # 3
November 1, 1967

OCCUPATIONAL ENVIRONMENTAL CONTROL PRIORITIES
REPORT #1, SECTION #1, JUNE 1, 1967 (Pages 3-4)
MANVILLE, WAUKEGAN, PITTSBURG AND MARRERO
STATIONS ABOVE MAC AND UNSTABLE

The Environmental Control Report #1, dated June 1, 1967, indicated that our overall occupational environmental control problems are voluminous. For reasons stated in the June Report, it was essential to assign priorities to specific locations and problems. Maximum emphasis was placed on eliminating toxic dust exposures at Manville, Waukegan, Pittsburg and Marrero.

Our Report #2, dated August 1, 1967 summarized the activities and progress of dust abatement at the four priority locations.

At the General Managers meeting of August 28, the afternoon was devoted to a discussion of Environmental Control. Mr. Burnett emphasized the need for cleaner plants, improved working conditions, reduction of occupational injuries and minimized related liability. A seven point Environmental Control Company policy was established. In conjunction with the policy, Environmental Control Standard Practices for Industrial Hygiene, Housekeeping and Product Toxicology were reviewed and approved. Subsequently, these E. C. Standard Practices were distributed to all J-M locations.

During this reporting period, we have experienced a great deal of newspaper publicity regarding the adverse effects of asbestos on the health of workers. Much of this publicity originated and was concentrated in the New Jersey newspapers. Many of the articles included statements by local physicians and referred to our Manville Plant by name.

In addition to the adverse news publicity, a bill was introduced in the House by Congressman Patten of New Jersey to establish and enforce standards to protect the worker by insuring safer working conditions and the public by producing safer materials. The bill has not moved out of committee and is being watched carefully.

The need for immediate clean-up action at all operations and especially the four priority locations was made evident by:

A. The establishment of J-M Environmental Control policies and standards.
B. Increased news media attacks concerning the use of asbestos.
C. Proposed federal legislation to regulate the use of asbestos.

Engineering assignments, appropriations, improved housekeeping and general progress are being made at the priority locations. The environmental improvement, however, is not progressing rapidly enough in view of the recent developments in New Jersey. It is essential, therefore, that every effort be made to increase dust abatement work at Manville, Waukegan, Pittsburg and Marrero.

Manville Plant should be given first consideration among the four priority locations. On March 23, 1967, a Manville Plant Managers meeting was held subsequent to discussion with the Production Managers, outlining an eighteen month concentrated program for controlling dust to within the allowable threshold limits. Progress has been made but there are currently a number of stations out of control. E. M. Fenner and C. L. Sheckler will again meet with the Manville Plant Managers on November 2, 1967 to review the program and emphasize the target date.

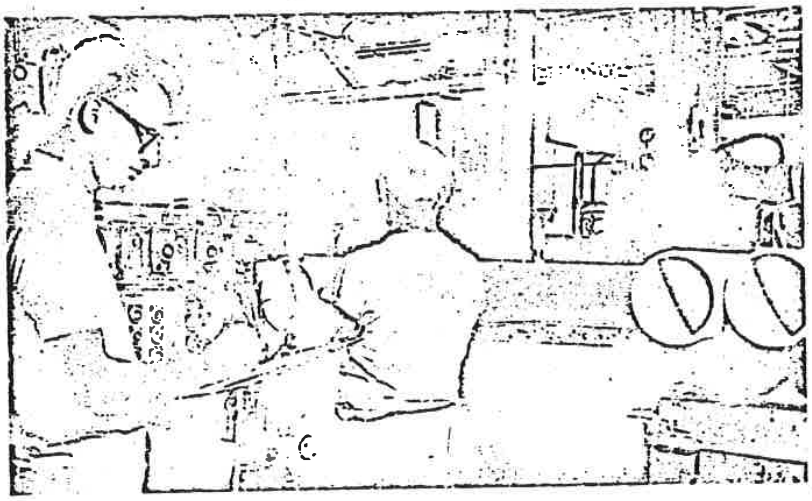
OCCUPATIONAL ENVIRONMENTAL CONTROL PRIORITIES (Cont'd.)

A special Task Force Team has been activated by the Packings and Friction Materials Division to study and initiate asbestos textile dust control measures in conjunction with DPE and E. C. Control measures developed for the Manville textile operation will be applied at Marshville and Asbestos, where possible. The Asbestos Plant has been developing a card enclosure that may be successful in minimizing dust at the carding operations of all J-M asbestos textile plants.

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1795 Appendix C

TOTAL ENVIRONMENT at Johns-Manville



INDUSTRIAL hygiene assistant checks working conditions on production line.



PLANT and Government officials inspect new waste treatment equipment at Waterville, Ohio plant.

These days, safety-security directors are right at home with safety, fire protection, and plant security. When you add industrial hygiene to the list, there's no quarrel that it doesn't properly belong, though, some SSD's are vaguely apologetic about their lack of attention to that aspect of their programs.

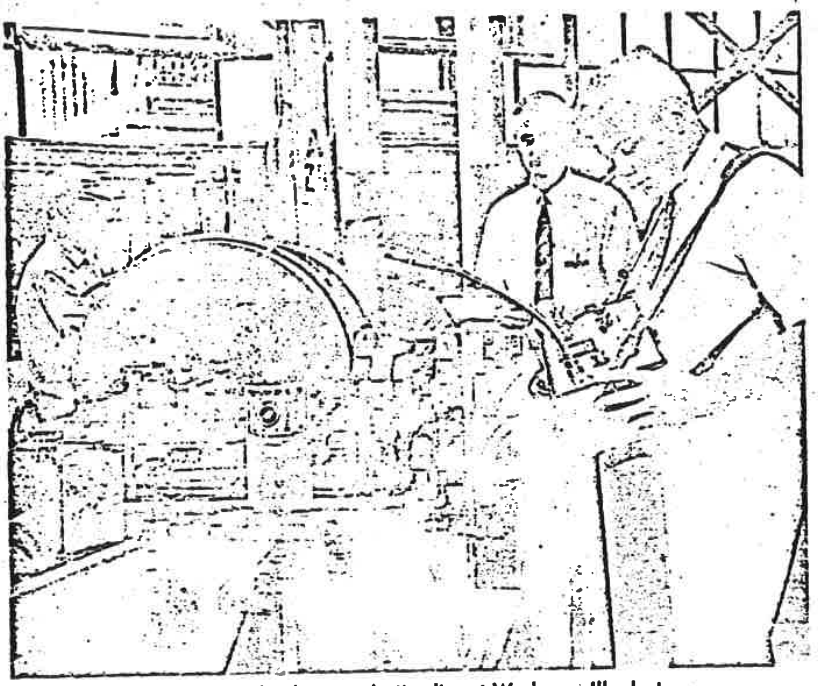
Tack on air and water pollution and product liability, as we did in this issue, and eyebrows start to climb. There are some who immediately see the connection, some who dabble in those three areas and anticipate stepping up their activties, a few who already have firm, direct responsibilities in air pollution, water pollution, and product liability.

The fact remains, though, that many SSD's don't yet see themselves in pollution control or product liability. One group of them will tell you that coordinating additional programs would spread them too thin. Another group will tell you that the total environment concept makes good sense and most assuredly includes air and water pollution and product liability. However, they're pessimistic about the prospects of their corporate management's pulling all the strands together to coordinate the health and safety effort by putting it under one man. Their counterparts of a generation ago were doubtless saying the same thing about fire protection and plant security, two taken-for-granted items these days. We can't help but wonder if Johns-Manville's Ed Fenner who heads up the corporation's department of environmental control doesn't, in fact, cast a long shadow.

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IN ACTION

TOTAL ENVIRONMENT



HYGIENISTS measure noise levels on production line at Waukegan, Ill. plant.

On March 1 of this year Ed Fenner officially assumed his new duties as Director of the Department of Environmental Control. At the same time, Clifford L. Sheckler moved up from Manager of the Industrial Health Program to Manager of Occupational Environmental Control, and James N. Siegfried was named Chief of Community Environmental Control.

When the announcement fluttered to rest on an OH editor's desk, it looked routine enough, until a sentence caught his eye: "Mr. Fenner and his staff, headquartered at Finderne, N. J., will coordinate all company activities dealing with air and water pollution, industrial hygiene, accident prevention engineering, and product toxicology."

Mr. Fenner was dealing with Total Environment. We rang him up and arranged a meeting at J-M's New York offices.

Fenner is a tall, spare, vigorous man who looks to be in his late 40's. His answers to questions are direct and to-the-point. He's not a man to minimize problems or to draw premature conclusions. He has been moving at a brisk clip since his new appointment and seems to thrive on it. When we talked to him he had just concluded a conference with C. B. Burnett, J-M president.

When we described to Fenner our plans for an issue on Total Environment and spelled out its components he nodded knowingly. "That's familiar ground" he said. "We here at J-M have been over it often before March 1 and hard at work on it since that time."

J-M's top management had established programs that go back many years to handle accident prevention, air and water pollution, plant hygiene, and product liability, but by early last year, the brass began questioning whether, in view of the recent developments in these fields, they hadn't been scattering their shots. In the large, highly-diversified company network that takes in 61 locations and includes a wide range of activities from mining operations to the manufacture of industrial pipe, insulating fire brick, brake linings, paper, and textile, Johns-Manville had to reach 21,500 employees and beyond to residents of communities in 30 States and Canada.

The reorganization that resulted in

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new appointments for old pros Fenner, Sheckler, and Siegfried was an effort to take a cohesive approach to occupational and community environmental problems.

Before the reorganization, the company's four industrial hygiene laboratories confined themselves to plant hygiene and reported to plant industrial relations managers in their respective areas. Now, hygiene labs have been expanded in staff and in range of duties with the addition of air and water pollution. The hygiene labs report to a supervisor of industrial hygiene, who, in turn, reports to Sheckler.

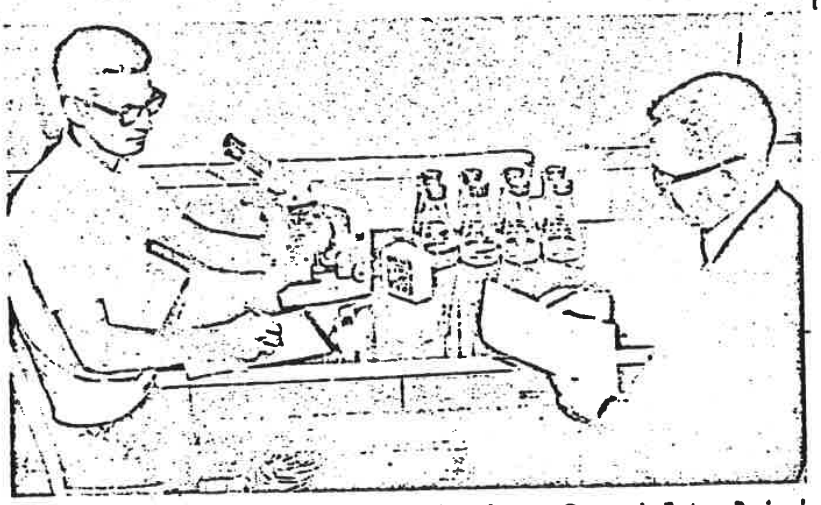
Air and water pollution used to be the responsibility of operating management. Within engineering, J-M had a water treatment group, a dust control group, and, occasionally, did some of its own dust emission sampling. On occasion, the engineering staff retained outside consultants to solve specific air and water pollution problems.

"In the past," Fenner told us, "no central organization had responsibility for identifying air and water pollution problems. Now, our group (Environmental Control) has that responsibility."

Identifying is a key word in that quotation because Fenner's group deals essentially in telling local plant management what is needed, in documenting the need for action. Environmental control does not tell plant managers how to go about effecting the solution, unless asked for recommendations, and, of course, they often are. The point is that implementation remains the jurisdiction of operating management.

The Environmental Control Unit concentrates on appraisal and on getting the word out. Fully six months before the reorganization was announced, for example, J. N. Siegfried, now chief, community environmental control, was conducting a study to round up pending and existing legislation covering air and water pollution control.

The unit published reports for plants in the network, and from time to time as new legislative proposals are introduced, they are published in capsule form in a newsletter, "Environmental Control Notes". ECU also periodically publishes a newsletter, "Notes on Plant Problems", containing summaries of pollution problems and the steps contemplated to solve them. These summaries are distributed to plants likely to encounter similar problems as the plant being reported on.



SAMPLES of materials used by J-M go through analysis at Company's Eastern Regional Industrial Hygiene Lab.

The corporate president and his staff get a bi-monthly report citing the specific environmental problems of every plant in the network.

In addition, ECU keeps posted on environmental health study findings of agencies like the U. S. Public Health Service and the Industrial Hygiene Foundation. These data are then disseminated throughout the company.

An industrial hygiene survey is conducted in every J-M plant at least once a year. The survey includes instrument sampling for noise, dust, fumes, and vapors. Results are logged in the records back at the regional hygiene laboratory. The hygiene supervisor sends the inspectors field recommendations together with his own recommendations to the plant manager. The local plant manager then decides finally what measures to take and requests divisional research and engineering to go ahead with them.

In the meantime, Sheckler as manager of occupational environmental control writes a letter to the division production manager advising him of the results of the survey and the recommendations stemming from it. Ordinarily, a deadline is set for completion of the improvements. Field hygienists follow up with a second inspection to evaluate the improvements, and, if asked, to offer consultative aid.

Safety recommendations are also included in the hygiene survey.

When OCCUPATIONAL HAZARDS visited J-M corporate offices, Fenner told us that field hygienists were covering company locations one by one to determine air and water pollution needs. These are visual observations, made with the aid of a checklist. Their findings go into a report.

One of Fenner's group's bi-monthly reports to top management has already been instrumental in helping a plant solve a water pollution problem before it became full-blown.

One plant, a manufacturer of fibreboard products and ceiling tile, employs some 230 people. It's located in North Bay, Ontario. As with board mills everywhere, effluents were a problem. J-M did what it considered at the time to be its best in holding down pollution.

A stringent water pollution law had been passed by the province of Ontario but had not as yet taken effect. The law combined with engineering and EDC recommendations triggered a whole reexamination of the North Bay plant's water pollution defenses.

The plant stopped dumping one effluent into streams altogether. It will filter another effluent to allow reuse and thereby reduce the quantity of solids going into the river. Extensive engineering changes were undertaken to improve sanitation. Total cost ran around $250,000. By the time the law is in force, J-M will have been well within its letter. Moreover, its community relations are excellent.

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AIR POLLUTION CHECKLIST

Johns-Manville's hygienists use this checklist to make visual inspections for air pollution. There are also similar lists for fluid effluents, solid wastes, and noise levels.

AIRBORNE EMISSIONS

A. General information
Plant location_____ Plant Manager_____
Review date_____ Plant Engineer_____

B. Assigned Stack No.: (devise logical sequence)_____
C. Location within plant:_____
D. Source operation:_____
E. Materials into process:_____
F. Normal operating schedule: hours/day_____ days/week_____
G. Processing weight rate: lbs/hour_____

H. Type of discharge:
____solid particulate
____liquidous particles
____steam or water vapor
____true gases or fumes

I. Emission frequency
____occasionally
____cyclical
____commonly
____continuously

J. Emission intensity:
____slight
____moderate
____heavy
____extreme

K. Particulate nature:
____fine dust particles
____coarse dust particles
____fiberous matter
____moist or wet dusts

L. Dust fall-out pattern:
____local to stack area
____on adjacent roof areas
____mainly on plant property
____dust readily airborne

M. Color of plume:
____white
____grey
____black
____brown
____other

N. Attendant odors:
____none
____slight
____moderate
____strong
____extreme

O. Character of odors:
_____
_____
_____
_____
_____

P. Identification of dust collection or pollution abatement facilities provided:

____absorber	____scrubber	____multiclone
____adsorber	____packed tower	____rotoclone
____catalytic burner	____veuturi scrubber	____baghouse
____afterburner	____settling chamber	____precipitator
____spray chamber	____cyclone	____other

Q. Stack construction and diameter:_____
R. Discharge height above grade:_____
S. Volume of air being moved: scfm._____
T. Estimated contaminant emission rate: lbs/hour_____

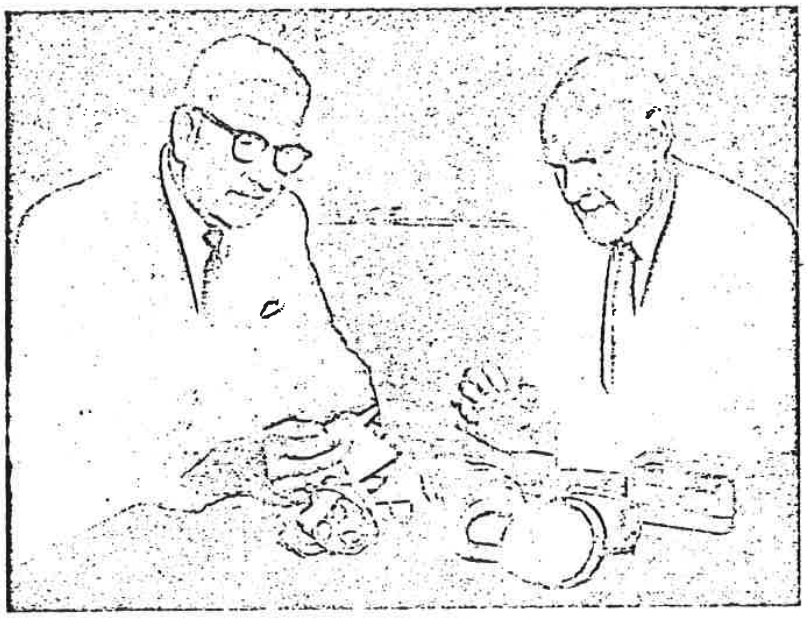
U. Complaint record:
____none
____infrequent
____occasional
____regular

V. Source of complaints:
____area residents
____organized groups
____local authorities
____governmental agencies

W. Complaint comments:
_____
_____
_____
_____

X. Pertinent changes in emission conditions since last inspection:_____
_____
Y. Pertinent changes in process conditions since last inspection:_____
_____
Z. General comments:_____
_____
_____

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OCCUPATIONAL environmental control manager Clifford Sheckler, and Edmund M. Fenner, director of the Environmental Control Department must approve all personal protective equipment.

Checking the ads

Product toxicology, which bears directly on product liability, is also within Fenner's group's bailiwick. That's one of the primary reasons they follow environmental health studies so closely. The Department of Environmental Control publishes for internal use throughout the company a Manual of Standards Practices. A section within this manual keeps plant management posted on accepted methods of safeguarding against toxicity.

All customer health queries are funneled through the Department of Environmental Control. It processes, on the average, about 30 of them a month.

On any product that is toxic, or could be under certain conditions, Sheckler works with public relations and advertising people to see that news releases, advertisements, and brochures contain adequate warnings and proper instructions for use.

Educating the user

J-M not only does an educational job within its own organization but also carries the word beyond in concert with various trade associations. For example, the company manufactures products containing asbestos that contractors install as an insulating material. It's tricky stuff to handle.

Under the aegis of the National Insulation Manufacturers' Association, J-M and Owens-Corning participate in a 2-hour program that they have taken to regional contractors' association meetings. The presentation covers the necessity for dust control measures and the wearing of respiratory equipment. An analysis of the cost of workmen's compensation and occupational disease claims clinches their argument.

These "2-hour" sessions invariably run 3 to 3½ hours. That's how warmly they're received.

First reaction favorable

In plant safety, The Department of Environmental Control drafts and promulgates safety codes throughout the corporate network, makes safety recommendations as part of the hygiene inspections, and acts as the approval authority for all safety equipment that's purchased. The promotional and educational side of the safety program is still lodged in industrial relations.

We asked Fenner how local plant managers had taken to the reorganization in that, to some extent, however diplomatic the approach, the Department of Environmental Control had moved into an area that was formerly solely the plant managers'.

"They're most enthusiastic about this new, cohesive approach," Fenner answered promptly. "After all, if their plant has a problem with air or water pollution, plant hygiene, safety, or product toxicity, they're the ones whose schedules suffer, they're the ones who have to take time out and try to placate the press, government officials, and citizens' groups. They welcome our help."

Fenner acknowledges that he is still self-questioning some of his own techniques. He sees the function of his department as essentially that of a communicator.

"The question is, 'How are we being received?'," Fenner said. "We don't know altogether yet, but there are a number of early indications that we're getting through. The reports on government legislation and the plant inspection summaries both seemed to have had impact. We think we're on the right track."

Certainly, as Fenner would be the first to admit, if the Department of Environmental Control fails to communicate, it won't be the fault of top management. They've given the new department sustained backing. The latest evidence of this came at the General Managers' meeting held late in August. This regular get-together is attended by the top two dozen or so corporate and operating executives in the company. The functions, activities, and responsibilities of the Department of Environmental Control were on the agenda, and the vital contributions made by the department were underscored by President Burnett.

Johns-Manville is firmly committed to a corporate approach to health and safety that recognizes the realities of the times. ♦

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Appendix D

CURRICULUM VITAE

November, 1966

GEORGE W. WRIGHT, M.D.

BORN: Briarcliff Manor, New York, December 21, 1907

Pre-Professional Education:

Evansville College, Evansville, Indiana	1926 - 1928
Indiana University, Bloomington, Indiana	1928 - 1930
	B.S. June, 1930

Professional Education:

Indiana University School of Medicine	1928 - 1932
	M.D. June, 1932

Internships:

Barnes Hospital, St. Louis, Mo.	Service - Medicine Completed December, 1932 - 1933 (18 months)
Barnes Hospital, St. Louis, Mo.	Assistant in Medicine Completed June, 1934 (6 months)

Residencies and Fellowships:

Bellevue Hospital, New York City	Service, Medicine, 2nd Div. Resident Completed June, 1935 (12 months)
New Haven Hospital, New Haven Connecticut	Service, X-ray, Assistant Resident Completed December, 1935 (6 months)
Bellevue Hospital, New York City	Service, Tuberculosis, Resident Completed December, 1936 (12 months)

Present Occupation:

Head, Department of Medical Research in the Division of Internal Medicine, Saint Luke's Hospital, 11311 Shaker Boulevard, Cleveland, Ohio 44104

Teaching Association:

Western Reserve University, Instructor in Physiology, 1937 - 1939
Western Reserve University, Associate Clinical Professor of Medicine, Department of Medicine, 1953 to date

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Curriculum Vitae George W. Wright, M.D.

Hospital Associations - Present.

Senior Associate Physician, Active Staff - Saint Luke's Hospital
Cleveland, Ohio 44104
Associate Physician on the Consulting Staff of Highland View
Hospital, Cleveland 22, Ohio
Associate Physician in General Medicine, Staff of Cleveland Metro-
politan General Hospital, Cleveland, Ohio (July 1,1955 to date)

Memberships in Professional Societies:

1. American Medical Association
2. Ohio State Medical Association
3. Cleveland Academy of Medicine
4. American Physiological Society
5. American Association for Thoracic Surgery
6. American Clinical And Climatological Association
7. American Thoracic Society
8. Ohio Thoracic Society
9. Cleveland Chest Society
10. Industrial Medical Association

Private Practice:

Clifton Springs Sanatorium, Clifton Springs, New York
January 1937 to December, 1937 (cardiologist)
Saranac Lake, New York
October, 1939 to 1953 (chest diseases - consultation only)
Cleveland, Ohio
1953 to date (consultation only)

Licensed in:

State of Indiana	1939
State of New York	1937
State of Ohio	1953

Additional:

Chairman - Medical Advisory Committee, Bureau of Old Age and Survivors
Insurance, Social Security Administration, Department of Health,
Education and Welfare, Washington, D.C. (1960 to date)
Chairman - Committee on Research, American Thoracic Society
New York City
Member - Heart Disease Control Advisory Committee, Division of
Chronic Diseases, Department of Health, Education and Welfare,
Washington, D.C. (January, 1965 to December, 1967)
Member - Medical Advisory Committee, Bureau of Vocational Rehabilitation,
Columbus, Ohio
Consultant - Public Health Service, Department of Health, Education
and Welfare, Washington, D.C.

Curriculum Vitae George W. Wright, M.D.

Additional Activities Continued:

Chairman - Scientific Committee, Institute of Occupational and Environmental Health, Quebec Asbestos Mining Association, Montreal, Quebec, Canada
Consultant - Bureau of Hearings and Appeals, Department of Health, Education and Welfare, Social Security Administration, Cleveland, Ohio

Appendix E

January 15, 1968

ASBESTOS AND HUMAN HEALTH

INTRODUCTION

Asbestos, known since antiquity, has wide-spread and important applications in our modern industrial society. With the 20th century burgeoning of the uses of asbestos has come recognition of the need to cope with occupational hazards associated with excessive inhalation of asbestos dust. This statement summarizes the essential uses of asbestos, the known facts about health problems associated with occupational exposure to asbestos dust, and the research being conducted to identify and reduce these health risks.

AN ESSENTIAL PRODUCT

Asbestos has many essential functions in construction, in industry and in transportation. Over the years fireproof asbestos has saved thousands of lives and much valuable property. For safety, fire prevention and other reasons, products containing asbestos are used in schools, houses, theaters, ships, office and other public buildings, furnaces, boilers and firefighting equipment. The brakes on automobiles, trucks, buses and trains are dependable because asbestos is a major component of brake linings.

WHAT IS ASBESTOS?

Asbestos (from the Greek "unquenched") is the name given a family of mineral fibers comprised of three major types -- chrysotile, crocidolite and amosite -- each of which differs from the other; physically and chemically. Studies of the relationship between asbestos and health are complicated by this diversity.

Chrysotile is a white magnesium silicate, can be attacked by acids, has a positive electrical charge, is flexible and not easily pulverized. Crocidolite is a blue ferrous sodium silicate, is acid-resistant, has a negative electrical charge, and is less flexible than chrysotile. Amosite is a ferrous magnesium silicate with a negative electrical charge, is brittle and easily pulverized.

In the United States, chrysotile, amosite and crocidolite are all used, but chrysotile is by far the most common, accounting for about 90 per cent of the asbestos consumed in this country.

NO RISK SHOWN FOR GENERAL PUBLIC

In studies of asbestos exposure and human health, research has not shown evidence of any risk to the general public from the use of finished asbestos products. There is no scientific evidence that anyone has ever contracted any disease from exposure to the wearing or weathering of brake linings, floor tile, roofing or other products containing asbestos

more . . .

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The lungs of workers known to have repeated exposure to the inhalation of asbestos fiber over a period of months or years contain myriads of small microscopic sized structures composed of a fiber coated with layers of protein and iron pigment. The fiber within the coating, under the circumstances, is assumed to be asbestos and the small unit therefore is called an "asbestos body." These bodies are found in the lungs of those who are occupationally exposed to asbestos fibers, regardless of whether or not there is any coexisting evidence of asbestosis. Therefore, the bodies, as such, are not an indication of disease but rather only of previous exposure to asbestos fibers.

Recently, by utilizing special techniques, it has been shown that the lungs of persons from the general population rather frequently contain a very scant number of similar small bodies composed of a fiber coated with protein and iron pigment. In these instances, it cannot be assumed that the fiber of these bodies is "asbestos," since other fibrous materials are known to develop a similar appearance within the lungs. For the present, the term "ferruginous" or iron-coated body is more appropriate.

The finding of ferruginous bodies in such small numbers in no way indicates that disease caused by asbestos fiber coexists and the presence of such bodies does not, in any way, justify a diagnosis of asbestos-caused disease. If it is ultimately shown that these small bodies are in fact protein covered asbestos fibers their wide dispersion in the population would not be too surprising in view of the many opportunities, from baby powder to building construction, for a small number of asbestos fibers to exist from time to time in the air that the general public breathes. The presence of these few fiber bodies in the lungs of the majority of the population is not associated with specific lung disease but simply reflects the chance inhalation of fibrous material. The complete implications of large numbers of ferruginous bodies within the lungs await further research.

KNOWN AND SUSPECTED OCCUPATIONAL RISKS

For workers who handle asbestos fibers in mines, mills, factories, and some building and insulation trades, the industry shares with doctors, public health officials and others involved in industrial medicine a concern about possible health effects from excessive on-the-job exposure to asbestos dust.

ASBESTOSIS: The industry long ago recognized the risk of a particular lung disease called asbestosis among some workers and took steps to safeguard employees. This non-malignant disease is brought on after inhalation of excessive concentrations of asbestos dust over a period of many years.

Asbestosis is one of the lung diseases called pneumoconioses. Others are silicosis, from silica (stone) dust; talcosis from talc; anthracosis, from coal dust. These are considered industrial health risks against which the various industries have instituted protective measures.

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For years, the asbestos industry has taken protective measures to reduce excessive exposures to asbestos dust and the risk of asbestosis among its workers.

BRONCHOGENIC (Lung) CANCER: The industry is aware of some medical studies that have reported an association between excessive exposure to asbestos dust and an increased risk of a certain type of lung cancer (bronchogenic). Even though the number of these cases among asbestos industry workers is only a small fraction of the total employed, the industry considers the problem a serious one. It has become the subject of considerable scientific research through statistical, clinical and pathological studies of exposed workers; through experimental studies with laboratory animals; and through studies of the physical and chemical nature of asbestos and associated minerals. Recent studies have suggested that the trace metals often found with asbestos dust (nickel, cobalt and chrome) should be examined more closely.

In 1967, results of a study of deaths occurring among a group of insulation workers indicated that occupational exposure to asbestos greatly increased the risk of lung cancer but only among cigarette smokers. Although the number of deaths involved was small, the study showed no cases of lung cancer among insulation workers who were non-smokers.

MESOTHELIOMA: Also under study is a rare disease called mesothelioma, a tumor of the chest and abdominal cavity which is different from bronchogenic lung cancer. Recently, investigators have associated a frequency of cases of mesothelioma with exposure to asbestos in certain geographic locations. This was originally reported from South African areas where only crocidolite asbestos is produced.

Mesothelioma has been reported so infrequently that there are no accurate figures on its occurrence in the U. S. as a whole. In Britain, only two cases are currently being reported for every thousand cases of lung cancer. The search for the cause of such a rare disease is difficult, particularly since medical people themselves do not agree on its diagnosis and recognition. The asbestos industry, through research grants, is seeking more knowledge about mesothelioma.

INDUSTRIAL HYGIENE AND PREVENTIVE MEDICINE

Today, the asbestos industry has invested millions of dollars in equipment and techniques to prevent the inhalation of asbestos dust by workers in the mining and milling of asbestos and in the manufacture of asbestos-containing products. Johns-Manville continually strives to eliminate dust exposure in the mines and plants which it operates. Processing areas and machinery are equipped with dust-collecting devices. Atmospheric dust levels are regularly monitored. Filters and ventilators have been installed. Individual respirators are used where indicated. Employees are given physical examinations, including chest x-rays, on a scheduled basis.

A program of consultation with asbestos fabricators and applicators is carried on to provide a thorough understanding of potential risks and to encourage general adherence to sound industrial hygiene practices.

Studies in asbestos-using industries in England and the U. S. indicate that where dust control measures have been taken, the risks of lung diseases have been reduced.

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ASBESTOS AND HEALTH RESEARCH

Scientific research to identify and reduce the health risk from asbestos dust exposure is being conducted in many places throughout the world. The asbestos industry both sponsors such research and cooperates in work being done by government agencies and private medical investigators.

Johns-Manville has extended full cooperation to the U. S. Public Health Service in its study of asbestos processing plants. In addition, the company provides funds, asbestos materials, equipment and information, as the individual situation may require, for research of such organizations as: The Industrial Hygiene Foundation of America, The Asbestosis Research Council (headquartered in Great Britain), The Institute of Occupational and Environmental Health in Montreal, The Environmental Health Center at Mt. Sinai Hospital and others. Johns-Manville also conducts studies on technical aspects of asbestos in its own Research and Engineering Center at Manville, New Jersey.

Among the subjects scientists are now exploring are: the specific identification and health signifance of fiber-like (ferruginous) bodies found in lung tissues; the health of asbestos mining, processing and fabricating workers compared with the general population; the relationship between cigarette smoking and cancer among asbestos insulation workers; the accurate identification of particles found in the air over a major industrial city; and the development and evaluation of the most effective industrial hygiene practices for use in the asbestos industry.

In cooperation and in conjunction with other agencies, the asbestos industry will continue to seek new information about the biological effects of asbestos fiber and to develop ways of assuring maximum possible protection from occupational hazards, for its employees in asbestos mines, mills and plants and among fabricators and applicators of this essential material.

# # # #

Appendix F

ADVERTISING AND PUBLIC RELATIONS DEPARTMENT

PUBLIC RELATIONS PROGRAM FOR JOHNS-MANVILLE CORPORATION ASBESTOS AND HEALTH

I. OBJECTIVES

The following are the objectives for the immediate future of the Johns-Manville asbestos and health program:

1. Define the Johns-Manville and industry public posture with regard to asbestos and health.

   It is assumed that Johns-Manville will undertake the role of industry spokesman in asbestos and health matters.

   The public posture will emphasize Johns-Manville's concern over environmental health affecting its employees, customers and users of its products and the general public, and will emphasize the company's concentration on research and utilization of proper safeguards in all of its operations.

2. Equip Johns-Manville officials with materials to disseminate that position when and if required.

3. Establish machinery and procedures for communicating the story to the media and to other groups important to the program.

4. Seek to keep the discussion on a positive note by stressing

Continued .....

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concern for public welfare and prepare for acute all-out emergencies that could occur later on.

Flexibility must be a guiding principle in all activities. In health matters such as this, fairly innocuous reports can be easily steamed up into a major crisis.

II. DEFINING J-M'S POSTURE

The public posture of Johns-Manville is to be completely outlined in the position paper, the detailed back-up papers on the more important subjects, and the releases and comment statements included in an operating kit (see below). These documents will be revised periodically, to reflect new information on the asbestos/health subject.

A. WHAT TO SAY

1. The following documents will be prepared, cleared with Legal, Industrial Relations, Research, Asbestos Fibre Division, Environmental Control, the Medical Consultant and the President and then serve as the basis for J-M comment, reply and testimony on questions relating to asbestos and health:

   a) A basic position paper, written in a style suitable for college educated audiences.

   b) Back-up papers on such subjects as mesothelioma, asbestos bodies, asbestosis, etc.

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c) Reprints or copies of scientific papers, editorials, etc., that are deemed favorable to the asbestos industry.

d) Brief critiques of scientific papers, books, etc., that are unfavorable to the asbestos industry.

2. These documents will be revised and added to (and the revisions and additions given the same clearances as the initial text) when changing circumstances dictate.

B. WHO TO SAY IT

1. Depending upon the audience, J-M comments that are based solely upon the previously cleared material described in "IIA," above, may be attributed to:

a) The President

b) The Chairman of the Board, Canadian Johns-Manville

c) The Medical Consultant

d) The Medical Director

e) The Director of Environmental Control

f) "Johns-Manville" or "J-M Spokesman"

2. The J-M comments normally will be relayed by:

a) The Medical Consultant or Medical Director - in direct dealings with medical profession and medical journals.

Continued.....

b) The Chairman of the Board, C.J-M, in reply to queries concerning Canadian operations.

c) The Vice President, Finance or the Controller - to financial analysts.

d) Industrial Relations or local plant management - to employees, unions, etc.

e) The Legal Department - in all legal actions.

f) The Environmental Control Department - in dealings with regulatory bodies, civic groups, trade associations, etc.

g) Public Relations (directly or via Hill & Knowlton) - to the press and all other audiences not listed above.

3. So long as they are based solely upon the previously cleared material described in "II-A," above, comments need not be given further clerance at the time they are released. However, in the case of press queries, the individual to whom the comment is being attributed, will be notified promptly that his name has been so used.

C. WHEN TO SAY IT

1. Comments to the medical profession, civic groups, financial analysts, etc. would be made in response to query or at the discretion of the individual listed in "II-B," above.

continued ....

2. Comments to the press would be made in response to direct query. Also, at its discretion, the Public Relations Department will contact writers of critical or adverse items, columns or editorials on asbestos and health and ask for the right to comment on, rebut or clarify any inaccurate or unfavorable comments. In some cases it may not be desirable to press for the right of published rebuttal, but desirable to inform the responsible editor or writer about any inaccuracies contained in the published material.

III. OTHER "MAKE READY" STEPS

A. Clean Up Asbestos Effluent

The highest priority should be given to the immediate elimination of discharge of asbestos fiber into the ambient air at J-M plants and mines. We should be in a position to assure plant community representatives that we are NOT letting asbestos dust get into the air they breathe.

B. Clean Up of Asbestos Dust in Plants

Among the steps being taken to improve environmental control at J-M plants and mines, the highest priorities should go to eliminating or minimizing asbestos dust exposure. We should be in a position, as soon as possible, to invite press, legislators and community leaders to tour our asbestos-processing facilities and see for themselves that our workers

are not exposed to potentially or apparently dangerous dust concentrations.

C. Conservative Medical Comment

Efforts, presumably spearheaded by the Medical Consultant, should be made to line up a list of qualified doctors who have generally conservative views concerning asbestos and health (particularly as it relates to alleged danger to the general public) and who are willing to state these views to science writers, legislators and others who may be referred to them, by J-M.

D. Monitoring

All possible efforts should continue, to alert J-M, as soon as possible, to the publication, in medical or lay media, of articles, papers and statements about asbestos and health; to the plans for medical conferences at which this subject will be discussed and to the plans and/or activities of legislative and administrative bodies, in the U. S. and abroad, that relate to asbestos and health.

1. Hill and Knowlton will continue to monitor all pertinent medical and scientific literature and evaluate significant articles and papers.

2. J-M plants, mines and sales office managers will be reminded, periodically, to be alert for asbestos/health

continued .....

articles in their local newspapers and to relay this to Public Relations.

3. J-M will continue to employ all major clipping and broadcast monitoring services to search for printed or broadcast mention of asbestos and health.

4. J-M and Hill and Knowlton will continue to exchange significant information with their British contacts.

IV. GOVERNMENT HEARINGS/ACTION

A. Until and unless government attention toward the asbestos/health subject becomes intense and widespread, it is contemplated that J-M reaction will be primarily defensive in nature, i.e. :

1. Consider contacting officials who make public statements or introduce legislation concerning asbestos/health. Present to them the positive story contained in our basic position paper, etc.

2. Where appropriate, consider inviting these officials to visit the Research Center and (when it becomes feasible) the Manville Plant.

3. Be prepared to furnish our basic position material to government agencies investigating asbestos/health, when they approach J-M for comment.

4. Be prepared to testify and produce qualified conservative medical experts at public hearings, when deemed legally or tactically necessary.

V. COMMUNITY RELATIONS

A. For the time being, the efforts suggested below will apply only to those J-M locations where public attention actually has been drawn to the asbestos/health subject.

B. Each situation must be handled separately when/if it occurs. We should:

1. Consider contacting public health, environmental control and other officials in the community and presenting our story to them.

2. Consider inviting some community leaders to tour the local J-M plant (if asbestos dust has been controlled and asbestos effluent eliminated); or to visit the J-M Research Center.

3. Give full cooperation with local press, as was done in Manville area in September, 1967.

VI. FINANCIAL PUBLIC RELATIONS

1. Queries from individual analysts, bankers, etc., should be handled by the Vice President, Finance or the Controller, using the materials listed in "II-A," above.

continued .....

2. Should the asbestos/health subject be covered, in a potentially damaging context, in a publication widely read by the financial community (e.g. FORBES, BARRONS, WALL STREET JOURNAL or newsletter of major brokerage house) consideration should be given to the following steps:

   a) A special mailing to analysts of a statement summarizing the J-M position on asbestos/health.

   b) A meeting with building materials analyst in New York, to give them the background on asbestos/health.

   c) A special mailing to stockholders to summarize the J-M position.

VII. INTERNAL COMMUNICATIONS

A. Periodic reports should be given to the Board of Directors and Senior Officers, on the status of the asbestos/health problem.

B. The basic position statement, when approved, should be distributed to those J-M people who have a "need to know." These could include general, sales and product managers and salesmen whose "lines" include products containing asbestos; J-M representatives in such trade associations as the Asbestos Textile Institute; managers of asbestos mines and asbestos processing plants (to be used with unions, employees, etc). Record should be kept of the J-M persons

having copies of the position paper, so that they may be kept abreast of additions and changes.

None of the above mentioned people are authorized to make statements to the press on this subject, without prior approval by the Advertising and Public Relations Department.

C. NEWS/PIC should continue its series of articles describing the health and industrial hygiene facilities and care provided by J-M.

VIII. SEEKING POSITIVE PLATFORMS

A. Efforts should be made to induce conservative-minded doctors, especially those who are working on projects partially or fully supported by J-M, to present the findings of their research at scientific conferences and to embody these findings in articles submitted to scientific journals.

B. Efforts should be made to disseminate such papers and articles and to add them to the materials listed in II,A, above.

IX. INDUSTRY COOPERATION

A. When the J-M position papers, etc., are approved, consideration should be given to making copies available to other major factors in the U. S. and British asbestos and asbestos processing industry.

Continued

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B. At an appropriate time, further consideration should be given to the formation of a U. S. asbestos trade association that would:

1. Serve as the public spokesman for the asbestos industry.

2. Help share the cost of industry-sponsored research and public relations activities.

C. Public Relations will assist the Environmental Control Department in preparing "codes of practice" for the various asbestos-using industries.

Appendix G

NEWARK-STAR LEDGER
Snnday, September 10, 1967

Rare cancer reported by Somerset physicians

By RUTH WINTER

High incidence of a rare and incurable cancer has been found at Somerset Hospital, Somerville, four physicians reported in an article in the Journal of the American Medical Association.

The article links the rare disease, mesolthelioma, with asbestosis, a lung disease developed by people who inhale asbestos particles.

It notes that a large asbestos manufacturing plant is located within two miles of the hospital.

Johns-Manville Co. maintains a large plant in Bound Brook.

The article appeared in the Aug. 21 issue of the journal. Its authors are Drs. Maxwell Borow, Alfred Conston, Lawrence L. Livornese and Norbert Schalet from the hospital's departments of surgery and pathology.

Mesothelioma is a rare malignancy which infiltrates

A special section on cancer starts today on Page 33

the lung cavity or the abdominal cavity, spreads rapidly and is incurable. The first large series of cases was diagnosed in 1957 at Johannesburg, South Africa. The majority of these patients had not actually worked with asbestos but had lived in the vicinity of the mines and mills and some had left these areas of exposure as young children. The average period between exposure and development of the tumor was 20 to 40 years.

Asbestosis is a lung disease developed by people who inhale asbestos particles.

The Somerset physicians reported that within a three-year period at Somerset Hospital, 17 cases of mesothelioma were found at surgery.

"Two of the patients," they said, "had contracted this malignancy with only environmental exposure consisting of

(Please turn to Page 8)

Page 1- Section II

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A rare cancer reported in N.J.

(Continued from Page One)

living in a community adjacent to the asbestos mill."

The report also mentioned that lung cancer with asbestosis is "high." A check showed it is more than nine times the rate found in other New Jersey hospitals.

The Johns-Mansville plant converts to commercial use approximately 75 per cent of all the asbestos fiber mined in North America.

The Somerset physicians said a review of the autopsy material at the hospital revealed only one other case of mesolthelioma which had been misdiagnosed.

HARD TO EXPLAIN

The doctors found this hard to explain since the plant had been in the area more than 60 years. They reasoned that perhaps patients with general cancer who had not been autopsied were misdiagnosed.

However, the physicians state in the JAMA article, "Regardless of whether this reasoning is correct, it is our distinct impression that there has been a definite increase in the incidence of malignancy within the last few years."

Dr. Conston, who is chief of pathology at Somerset, said in an interview that asbestosis has been found in people who have not worked or lived near an asbestos plant.

"Asbestos is used increasingly in such products as insulation, brake lining and roofing materials. It may be that people are picking up the disease from these products alone," he said.

AIR POLLUTION

"Some experts," he continued, "believe that asbestos alone is not the cause of malignancy. That some other factor such as air pollution has to be present.

"We want to draw attention to the serious situation," Dr. Conston said. "We are hoping to get a grant and to get other researchers interested in pursuing further studies. The incidence of asbestosis, lung cancer and mesothelioma may be much greater than is now recognized."

E. H. Fenner, director of Johns-Manville's department of environmental control, said:

"Mesolthelioma is considered a very rare disease and apparently nobody knows very much about it. Some studies have indicated that this rare tumor may be associated with certain types of asbestos, but the great need is to find out more about it. We are cooperating in a number of research projects that we hope will provide more knowledge about the problem."

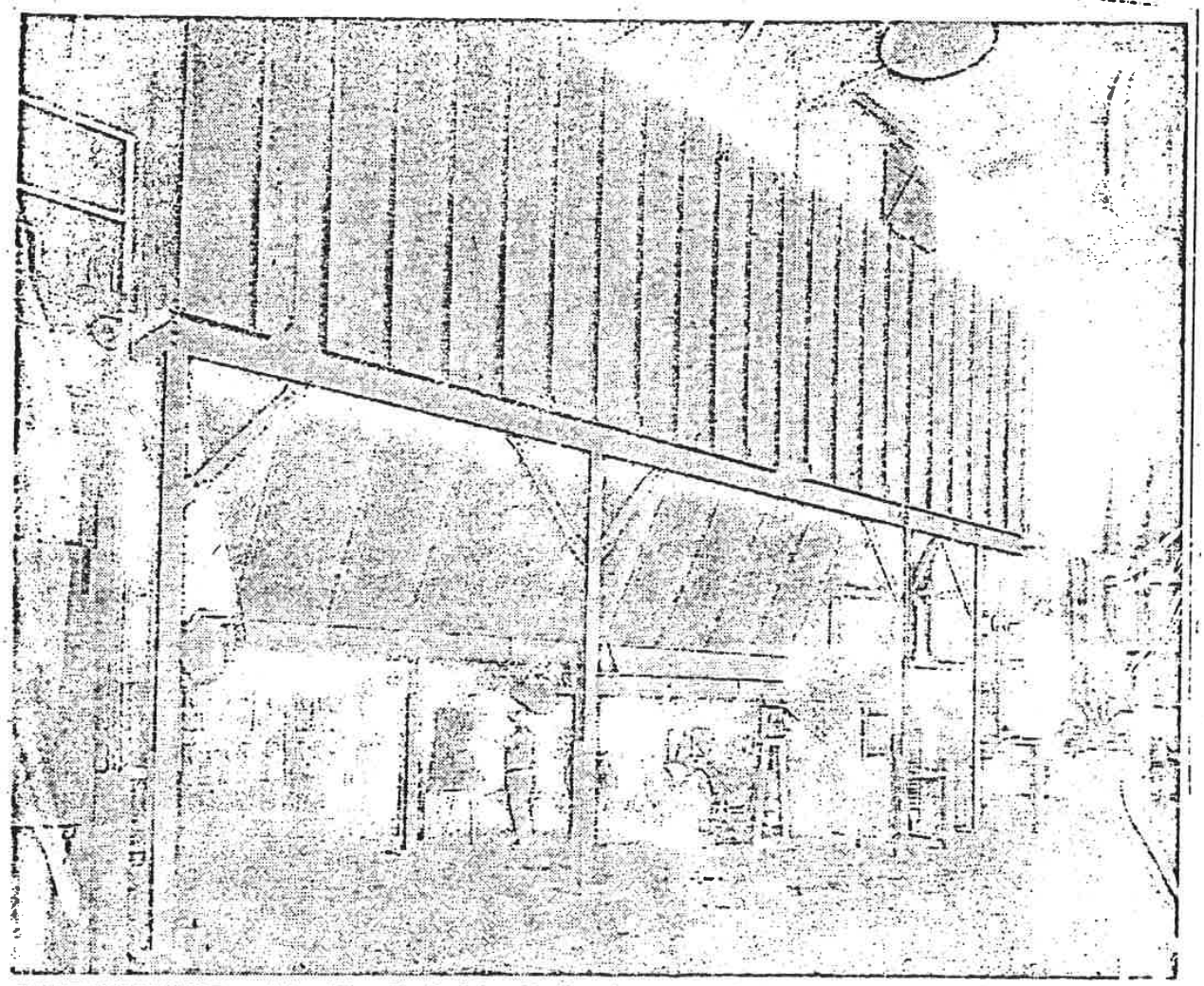
Said Dr. Roscoe Kandle, state health commissioner:

"This is a subject of considerable research with no firm answers at this time. The department's occupational health program is participating in a modest way, with research being conducted at the Madison campus of Fairleigh Dickinson University. But until more is known than at present, I would not want to comment on the article which, up to this moment, I have not read."

Pg 1

Appendix H

BD



DUST COLLECTOR at Johns-Manville Building Products plant, installed last April, represents approximately $180,000 of the more than $1 million J-M has invested in air-cleaning equipment at its Manville operations in recent years.

Lung Disease Called Poser For Medicine

MANVILLE — The asbestos industry and Johns-Manville in particular came under public suspicion last week with publication of medical findings suggesting asbestos particles as a causative factor in malignant disease.

Already the Borough Council has promised to make a study of air pollution at the local J-M plant, a citizen from that community appeared at Tuesday's Freeholder meeting to press for county action, and a Middlesex Congressman said he is introducing legislation to set safety standards for asbestos workers.

Johns-Manville spokesmen say the plant here is complying with laws on air and water pollution and uses all practicable precautions to protect its workers.

Subject for Research

But this matter of malignan diseases is not really so much a question of laws and enforcement as it is a subject for research. At present no one can prove asbestos causes cancer, and no one can prove it does not.

In the latest reported findings, doctors at Somerset Hospital have linked 17 cases of mesothelioma, a very rare form of malignancy occurring in the chest and abdominal cavity, with the J-M plant where about 3 per cent of North America's asbestos products are manufactured.

But these findings leave many questions unanswered. Why did 16 of these cases occur during the past three years? Why has it developed in two residents of the community with no history of employment at the mill, and not affected others whose exposure to asbestos is far greater? And why mesothelioma was found here but not in Canada where J-M asbestos is mined?

Lung cancer, which is far more common than mesothelioma, has been the subject of re-

(Please turn to page 12)

Lung Disease Called Poser For Medicine

(Continued from page one)

search for years. But no one has yet produced conclusive findings that asbestos, smoking, lead or any other suspect substance, really is the cause.

Of all the questions of possible health hazards from asbestos, perhaps the closes to being resolved is whether asbestos abraded from brake linings as they are being used can contaminate the air with dangerous particles.

Johns-Manville is collaborating on research in this field, and preliminary findings suggest the asbestos is destroyed plant.

Air in the factory is continuously monitored to be certain by intense heat generated as the brakes are applied. Simulated braking systems are operated by J-M's research staff, and any dust generated is painstakingly collected. This is turned over to other teams of researchers working with the U. S. Public Health Service for further studies.

New Filters Used

The fact that asbestos is a substance to be handled with care has been recognized for 50 years. A Johns-Manville spokesman said hardly any J-M workers now wear masks for protection. Instead a giant ventilation system filters out the dust. It is so efficient the same air can be recirculated through the asbestos particles do not exceed safe limits set by the U. S. Public Health Service, and chest x-rays are a routine check-up for every employe.

Fortunately, asbestosis, caused by particles of the mineral inhaled into the lungs, can be controlled. Once exposure to the dust stops, progress of the disease is halted. There are today on the J-M payroll workers who contracted asbestosis years ago; they are collecting partial disability under workmen's compensation, and are still able to work.

Johns-Manville executives, in an official statement, said, "The industry shares with physicians, public health officials and others a concern about possible health effects from exposure to asbestos dust. The industry long ago recognized the risk of asbestosis among some of the workers in asbestos mines, mills, and factories and instituted preventive measures. Great strides have been made in bringing this occupational hazard under control. Today we are sponsoring and supporting intensified medical research to extend present knowledge and understanding of other possible occupational health risks which may be related to asbestos, so that these, too, may be controlled and reduced to an absolute minimum."

Appendix I

November 14, 1967

Robert L. Lawrence, Director
Metro Water Department
Metropolitan Court House
Nashville, Tennessee

Dear Mr. Lawrence:

I read with great concern the council's recommendation that Metropolitan Government re-write their specifications on water pipe to allow asbestos-cement pipe to competitively bid. I was not aware, nor apparently are many medical people aware that asbestos containing pipe has been used in water systems.

Asbestos has been fairly well established in medical circles as causing a high incidence of cancer, in the lungs if breathed, or in the gastrointestinal tract if swallowed even in amounts small enough to be visible only under a microscope.

Regardless of who is using it now, and regardless of any reassurances by the salesmen from asbestos-cement pipe manufacturers, I would consider it a medical hazard of significant degree to use such pipe in a water system, until the U.S. Public Health Service had checked it out completely. Without specific clearance by the Public Health Service it seems to me the burden of common sense would suggest that it is impossible to work on the pipe or add to it without releasing particles of asbestos into the water. If any particles were released, current medical knowledge suggests that a rise in certain types of cancer could be expected in about 20-50 years among the population.

I have a premonition that such things as water pipe may not have to be cleared with any U.S. Public Health Service agency except those to make sure bacteria cannot penetrate the pipe. If so, there has been a terrible mistake made in allowing use of asbestos containing pipe in water systems.

It is my opinion that although it is common practice in many cities, we would be unwise to change our specifications to allow asbestos-cement pipe to compete in the bidding until the full facts can be ascertained. I intend to pursue this matter with public health officials to see if this pipe has some safety features of construction which make it non-hazardous.

Respectfully,

James D. Snell, Jr., M.D.
Assistant Professor of Medicine

JDS:jd
cc: Joseph M. Bistowish, M.D.
James J. La Penna

Metro Nashville
Medical Director

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Appendix K

THE NASHVILLE TENNESSEAN
Nashville, Tennessee
December 12, 1967 (p.1)

Asbestos Pipe, Cancer Tie Hit

By JIM SQUIRES
Staff Correspondent

NEW YORK — There is no evidence to support a recent statement by a Nashville doctor that use of asbestos—cement water pipe might cause cancer, a noted cancer researcher said here yesterday.

Dr. George Wright, chairman of The Institute for Occupational and Environmental Health, said he did not think such a relationship "will ever be established."

WRIGHT, HEAD of the department of medical research in internal medicine at St. Luke's Hospital in Cleveland, Ohio. said a letter from Dr. James Snell, an assistant professor at Vanderbilt University school of medicine, suggesting such a relationship "apparently arises out of an incomplete perspective" of the problem.

Wright spoke to nine Metro councilmen here to tour a Johns-Manville plant in Newark, N.J., a manufacturer of asbestos-cement pipe.

Snell sent a letter last month to Metro waterworks director Robert L. Lawrence supporting Lawrence's decision to prohibit asbestor-cement manufacturers from bidding on Metro waterpipe purchases.

The council committee on purchasing had suggested that Lawrence allow asbestos-cement manufacturers to bid because the product is less expensive than the cast iron pipe now being used.

SNELL WROTE that asbestos is a known cause of cancer and can contaminate drinking water. The physician said he did not believe this fact had been brought to the attention of the U.S. Public Health Service.

Wright, an adviser to the U.S. Public Health Service, said the asbestos-cement pipe industry had long been aware of a link between certain types of asbestos fibers and lung cancer and with Mesothelioma, a rare malignant tumor found on the lung covering and the gastrointestinal tract.

He pointed out, however, that asbestosis (a lung tissue disease) and lung cancer are caused only by inhalation of certain asbestos fibers in large amounts and over long periods of time.

MESOTHELIOMA, he said, has never been linked positively with swallowed amounts of asbestos and is "extremely rare."

"Evidence of research indicates that virtually everyone is exposed to asbestos fibers," he said. "In fact, it would appear reasonable to assume that there is no such thing as not having been exposed. If mere exposure is a cause, we would all have it."

Wright cited widespread use of asbestos fibers in insulation, electrical wiring and stove ovens and toasters.

"THERE IS A great upswing in the use of asbestos fiber, but the incidence of cancer has actually fallen off," Wright said.

Wright said asbestos-cement pipe, consisting of 20% asbestos fiber, has been in water systems in some areas for as long as 30 years. In many instances, he said, there is no evidence of wear in these pipes to release asbestos fiber.

"After this many years of experience, if these fibers were to be a source of Mesothelioma — a dramatic tumor — it would be known," Wright stated.

"THIS WOULD not escape. This is not a new point of interest to the industry," he added.

Wright said manufacturers of asbestos products were among the first to discover its possible biological effects and have spent "millions of dollars" in the field.

The doctor said he is preparing a written answer to Snell's statement.

"I don't know Snell or his background in this area," Wright said, "but no doctor is knowledgeable in all areas. I have spent much of my life in this field, and even I am not."

SNELL WROTE Lawrence Nov. 14, stating he would consider the use of asbestos-cement pipe "a medical hazard of significant degree" until the U.S. Public Health Service had checked it out completely.

Officials of the Johns-Manville Co., asked about this yesterday, said the Public Health Service is among its customers.

"We have sold them thousands of feet of pipe," said Jay Baker, product manager. "I feel certain we will sell them much more."

THE COUNCILMEN are scheduled to tour the manufacturing plant and research center today. The company claims its product will save Metro $300,000 a year on pipe purchases.

CRMC-Asb&Health-BODMin-000076

12/13/67
NASHVILLE TENNESSEAN

Asbestos Pipe Use Backed

By JIM SQUIRES
Staff Correspondent

NEW YORK—Eight Metro councilmen recommended yesterday that waterworks director Robert L. Lawrence allow manufacturers of asbestos-cement pipe to bid on Metro pipe purchases.

The councilmen urged that the bans against the firms be dropped after a tour of the Newark, N.J., plant of Johns-Mansville Corp., a manufacturer of the asbestos-cement product.

"IT'S A SHAME that a product this good has been kept out of the bidding," said Councilman Frank Griffin. "I see no reason why these manufacturers cannot be given the opportunity to bid for our business."

James LaPenna, chairman of the council purchasing committee, said the tour of the Johns-Mansville facility produced "overwhelming evidence that asbestos-cement pipe is a quality product and widely used throughout the world."

Joining Griffin and LaPenna in the recommendation were Councilmen Martin Garrett, John Fox, Mansfield Douglas, John Driver, Earl Shacklett and Robert McBride.

A NINTH councilman making the trip, Tom Sharp, said he would make no recommendation concerning the product pending further investigation. Sharp said he wanted to learn as much about the cast iron water pipe now being used by Metro as he learned about the asbestos-cement product during the two-day visit here.

The councilmen toured the facility at the invitation of Johns-Manville officials at no expense to Metro government. The firm had previously told the purchasing committee it was being excluded from bidding because of Lawrence's opposition to the use of asbestos-cement pipe.

The purchasing committee has been investigating Metro's pipe purchasing practices

(Turn to Page 13, Column 1)

Asbestos Pipe Use Backed

(Continued From Page One)

since a probe by THE NASHVILLE TENNESSEAN disclosed that a single cast iron manufacturer has gotten all Metro water pipe business in the last four years.

THE FIRM, JAMES B. Clow & Son, was successful low bidder on all pipe contracts, while its three major competitors were equally successful in the state's other major cities.

Griffin and LaPenna, after viewing quality and durability tests of the asbestos-cement pipe, said it is "apparent" Metro has been "victimized by a lack of true competition among cast iron pipe companies."

Comparing list prices of asbestos-cement and cast iron pipes, LaPenna estimated Metro can save $525,000 over the next 18 months by allowing asbestos-cement manufacturers to bid against cast iron companies.

"I am not saying we should switch entirely to asbestos-cement or that one product is superior," he said. "It is my personal feeling the two products are comparable and all vendors should be allowed to bid."

LAPENNA SAID councilmen who toured the plant will present their findings to the full purchasing committee later this month. The committee will make recommendations to the council.

Comments from other councilmen concerning asbestos-cement pipe were:

John Fox: "I think these firms have a good product and should be allowed to bid. If installed to specifications, the nature of the terrain will not matter."

Martin Garrett: "Our biggest problem is selling it to Mr. Lawrence. I personally think we should let the contractors buy the pipe and that both cast iron and asbestos-cement companies be allowed to try for the business.

John Driver: "I was amazed at the strength and quality of this asbestos-cement material, especially after what we had heard locally. I think the company should have the privilege of competitive bidding. With expenses continuing to go up, it is advantageous to us to save tax money."

Mansfield Douglas: "I was quite impressed and am convinced that the pipe is sufficient to carry water under the stress and strain anticipated in Metro's system. I see no reaon why these companies are not allowed to bid."

Robert McBride: "I feel there are places where asbestos-cement might not work in the local system. At the same time there are places where it will do the job as good as cast iron and at a much lower cost. With a water-sewer expansion program as large as ours, this is a good place for us to save a substantial amount of money."

CRMC-Asb&Health-BODMin-000077

Appendix M

SAINT LUKE'S HOSPITAL
of the Methodist Church
11311 SHAKER BOULEVARD
CLEVELAND, OHIO 44104

December 20, 1967

Mr. F. J. Solon, Jr.
Johns-Manville Corporation
22 East Fortieth Street
New York, New York 10016

Dear Mr. Solon:

You have asked me to submit to you in written form an expression of my opinion with respect to certain questions raised by a letter from Dr. James D. Snell, Jr. addressed to Mr. Robert L. Lawrence of the Metro Water Department in Nashville, Tennessee.

If I interpret Dr. Snell's concern correctly, it is based in part on an overinterpretation of incomplete information with respect to the gastrointestinal system plus some generalizations gleaned from the literature regarding respiratory system cancer and asbestos exposure which he is assuming are applicable to the gastrointestinal system.

He sets forth the reason for his apprehension in his second paragraph of the letter dated November 14, 1967. My response to these follows.

While it is generally accepted by those who have looked into the matter that there is a relationship between the inhalation of "asbestos" fiber and the frequency of occurrence of bronchogenic lung cancer in the population occupationally exposed to the fiber the precise mechanism whereby this relationship is mediated is certainly still moot. The fact that such a relationship seemed to hold in Great Britain as shown by Merriweather in 1955 but did not appear to hold in a pure chrysotile exposure as shown by Truhan and Braun some years later made it apparent that one could not use the word asbestos in a generic way but would have to take sufficient care to know what kind of asbestos might be implicated. At the present moment crocidolite seems to be the form of fiber most strongly implicated. Further information concerning the mechanism of the relationship was presented by Selikoff and Hammond at the American Medical Association Meeting in Atlantic City in June of 1967. They demonstrated that in their careful

prospective study of a group of insulation workers all of their cases of lung cancer developed in men who were moderate to heavy cigarette smokers and not a single case has developed thus far in a non-smoker. This data strongly suggests that the role of asbestos fiber is as a co-carcinogen and not a carcinogen in its own right. Dr. Snell infers that asbestos causes a high incidence of cancer in the lung but it should be pointed out that this relationship even when taken together with cigarette smoking seems to pertain most strongly to insulation workers and there is no supporting evidence to indicate that such a high incidence occurs in all of the other form of occupational exposure. The frequency from the textile mills of Great Britain does not appear to be as high as in the insulation workers reported by Selikoff. The frequency as reported by Enterline more recently in the building products, friction materials, and the U.S.A. textile plants appears to be lower than in the insulation workers thus far reported. I cite this because it seems to me unwarranted to make the inference that asbestos fiber in and of itself causes a high incidence of cancer in the lung and from this make the inference that it is a strong carcinogen and must therefore in very small amounts do the same thing to the gastrointestinal system if swallowed. To summarize this part; in my opinion the current evidence does support the contention that in occupational exposures to asbestos fiber there is a higher incidence of bronchogenic cancer than in non-occupational exposures; the fiber acts as a co-carcinogen; there is no reliable evidence at this time that asbestos by itself acts as an agent to cause bronchogenic cancer; the most likely offending form of fiber is crocidolite; and most importantly, the effect appears to be dose related as well as related to a long latent period between the onset of exposure and the development of the neoplasm. I believe it important to indicate that knowledge of what happens in the lung per se can be transferred to what might happen in the gastrointestinal tract only with the greatest caution, if indeed it can be extrapolated at all to any other organ system.

In the second paragraph Dr. Snell also indicates his belief that there is a high incidence of cancer in the gastrointestinal tract as a result of swallowing asbestos fiber. I have difficulty in knowing what he means by the statement "even in amounts small enough to be visible only under a microscope." Fibers small enough to remain airborne and be

inhaled or ingested are of necessity visible only under a microscope because they are the order of 40 or less microns in length and less than 5 microns in diameter. As to total amounts swallowed over a period of years I don't know what the microscope would do in the way of playing a role in estimating this. Be that as it may, one wonders what evidence he is quoting to indicate a proven high incidence of cancer of the gastrointestinal tract in persons occupationally exposed to fiber. Most likely he is referring to a paper forming part of the symposium on "biological effects of asbestos" held in October of 1964 and published at the end of 1965. This paper by Hammond, Selikoff and Churg indicated a frequency of cancer of the stomach, small intestine and colon about three times as high as the expected whereas even at that date they were quite careful to indicate that the primary source of their information was not entirely reliable since they say and I quote, "taken at face value it would appear that asbestos workers have an abnormally high risk of dying of gastrointestinal cancer. However, we will refrain from drawing conclusions on this matter at the present time." It is of importance that in their most recent paper concerning this general subject and referred to in this letter previously as having been presented at the American Medical Association Meeting in June,1967 they continued to be just as cautious. They again report that the observed rate of cancer of the stomach, colon, and rectum in their groups under intensive study was three times the expected but they state and I quote, "Although this bears out our earlier findings, the number of deaths from these causes was so small that we still refrain from drawing any conclusions at this time." Certainly Dr. Snell's apprehensions nurtured by his belief that a high incidence of gastrointestinal cancer has been proven to occur as a result of the ingestion of asbestos fibers would seem unwarranted.

Since the relationship to bronchogenic cancer appears to be rather clearly a dose related one and the same is true for all known carcinogens, I would think that if any association between asbestos fiber and gastrointestinal cancer exists, it should be dose related. The insulation workers that are constantly under study by Selikoff et al are obviously a quite heavily exposed group. According to various reports emanating from that laboratory as much as 25 per cent of the population under study has asbestosis and this means a heavy exposure. It can be accepted that a very large per cent of

the fibers deposited in the tracheo-bronchial tree of such workers is brought back up and some of this must of necessity be swallowed. In addition, some fiber deposited in the oral and nasal cavities will ultimately find its way into the intestinal tract. I would reason from this, therefore, that in the insulation workers the gastrointestinal exposure to fiber would be high and therefore if there was a strong relationship of fiber ingestion to gastrointestinal cancer it should not be difficult to demonstrate it.

There are some other data in humans bearing on this. Enterline has recently published a study of the death certificates of a large number of workers who manufacture building materials, friction products and textiles utilizing asbestos fiber. He compared the causes of death in these workers to those of a cotton textile processing group. Looking at these data one sees no relationship suggesting an inordinately high frequency of gastrointestinal cancer even when one takes into consideration the factor of dilution caused by including rather large numbers of fairly young and short-term exposed people. Taking all things into consideration, I do not believe there is substantial evidence at this time to support the contention that even the highest intensity of exposures that we know of in industry lead to clear cut increased frequency of gastrointestinal cancer.

There is abundant animal experimentation along these lines. There have been large scale animal experiments studying the effects of asbestos fibers of various kinds and sizes on the pulmonary systems by exposing the animals to airborne fiber. In many of these experiments the intensity of exposure and duration was well over two years and sufficient to produce well developed pulmonary fibrosis. Such studies carried out in Saranac Lake were to my own knowledge always characterized by careful gross examination of the entire body of these animals and this included the intra-abdominal contents. Since receiving information concerning the apprehensions of Dr. Snell I have checked on this matter with the Saranac Lake group and in addition with Dr. Forde McIver at the University of South Carolina. Utilizing all manner of animals including dogs and with observations going up to two and more years in the mouse and on to four or more years in the dog none of the investigators involved in these studies has ever seen anything whatsoever to suggest a relationship between fiber exposure and gastrointestinal or liver cancer in the exposed animals. In fact,

to their best knowledge, they have never seen a tumor of the gastrointestinal tract in these experimental animals. I cite this data because such animals do not cough and spit and of necessity swallow the fibers that are brought back up from the lungs. In addition, the food, especially of the small animals is covered by the settled-out asbestos fibers in the experimental chambers. These experiments are as a rule conducted with exposures for six to eight hours a day, five days a week and the food in general is simply added to that which is already in the feeding boxes. When fresh vegetables are fed, they are placed in the cages in the morning and cleaned out only with the general cleaning of the cages the next day. I would estimate that the ingested fiber in these experimental animals far exceeds that of workers in industry. In mice, the observations were carried out over the lifetime of the animal and for 75 percent or more the expected lifetime in most of the other animals. Although it is difficult to extrapolate from animals to man, the total lack of any evidence whatsoever that in the experimental animal the ingestion of asbestos fiber causes any sort of malignancy in the intestinal tract would seem to me to be important. In fact, it is this total lack of finding of tumors in the gastrointestinal tract in this type of experiment that has obviated the necessity of setting up a full-fledged feeding type of experiment. I understand that one or two investigators are embarking on this kind of study at the present time, although I personally do not see the need for it.

It seems to me, therefore, that Dr. Snell's apprehensions are based on an erroneous impression that a high incidence of gastrointestinal cancer has been proven to exist in persons occupationally exposed. There is evidence that such a relationship does not exist. This is both with respect to humans and experimental animals. In this context I think it should be re-emphasized that the intensity of exposure in all of the circumstances alluded to is far higher than one could conceivably expect in the drinking of water from asbestos cement pipe.

A third type of neoplasm has been implicated recently with the inhalation and consequent ingestion of asbestos fiber. Although Dr. Snell did not mention mesothelioma I presume he may have had this tumor in mind also. This tumor arises from the lining of the pleura space and abdominal cavity or peritoneum. In 1960 Dr. Wagner and his co-workers, at

that time working in a hospital that serviced a rather dispersed population, noted an unusual frequency of occurrence of mesothelioma in the patients admitted to their hospital. In the general population, as will be indicated later, this tumor is one of the exceedingly rare ones and hence the occurrence of only a few cases in a single hospital within a short period of time was rather dramatic and required further investigation. Wagner and his co-workers learned that a factor common to all of their cases was either a history of having worked for a long period of time in the production of asbestos fiber or having had rather intimate contact with it over many years. The non-industrial contact being a strong one in that such individuals had picked short fiber from the tailings heap, had walked or ridden on roads constructed of asbestos-bearing rock, or had washed the clothes of asbestos workers in the mines and mills frequently over many years. Subsequent investigations in the South African asbestos producing regions indicates quite clearly that this unusual frequency of mesothelioma occurred only in those areas producing crocidolite and the chrysotile producing areas failed to show this unusual frequency of mesothelioma. It was of some interest, too, that not all crocidolite producing areas showed a high frequency of mesothelioma. Subsequent to this disclosure, an unusual frequency of mesothelioma has been unearthed in Great Britain where at the present time I am told a total of 276 cases of mesothelioma in the entire British Isles have been located. I do not know over how many years this series of cases were accumulated. Even at this number it continues to be a rare tumor. Retrospective exploration of the life experiences in these identified cases of mesothelioma has shown a bona fide exposure to the inhalation of asbestos fiber such as employment in the asbestos textile industry, the unloading of fiber at the docks or handling of the fiber en route to the mills, etc., in a majority of the cases. In some instances direct employment in such a way has not been demonstrated but a greater than casual contact with fiber has been disclosed such as living in the immediate neighborhood of industrial operations known to disperse fiber into the general environment or washing of clothes of a member of the family employed in the asbestos industry. In the few remaining cases, in the light of the great difficulty of disclosing asbestos fiber exposure by retrospective methods involving questioning of relatives, etc., it is highly probable that an actual greater than casual contact with fiber did occur in all. More recently, a greater than ancitipated frequency of occurrence of mesothelioma has been disclosed in insulation workers and there

is some evidence rather strongly suggesting the same is true in at least some of the asbestos textile employees of the U.S.A. In all of these exposures, crocidolite is again to be found. As was true in the chrysotile exposures of South Africa, a study of similar asbestos exposures in the milling of this type of fiber in the Canadian production area has failed to disclosed any unusual frequency of mesothelioma. A careful study of the Finnish population exposed to anthopholite also has failed to disclose a single case of mesothelioma.

In addition to a strong suggestion that crocidolite is the agent implicated in some way with the occurrence of mesothelioma, there is evidence to suggest that this tumor likewise is dose related. In all of those situations where the exposure can be relatively well documented, the occurrence of mesothelioma has been in persons not only exposed to crocidolite, but also the exposure has been greater than casual even though this tumor apparently has occurred in the absence of sufficient exposure to cause actual pulmonary asbestosis. It would appear that the total exposure may be somewhat less than that needed to relate strongly to bronchogenic carcinoma, nevertheless the exposure is still one that is much greater than casual. By casual exposure I mean the kind of exposure which might occur in persons not working or living daily in contact with known sources of asbestos fiber dissemination. The finding of ferruginous bodies in the majority of the adult population whose lungs come to necropsy examinations suggests rather strongly that the entire population of the civilized world has some--though casual--exposure to the inhalation of fibers amongst which one can reasonably assume asbestos should be included. The finding of these fibers in the lungs indicates that such fibers most assuredly have been swallowed and hence enter the gastrointestinal tract in some as yet unknown numbers. In spite of this probable uniform type of casual exposure to asbestos fiber, Selikoff, Churg and Hammond report in the New England Journal of Medicine, Volume 272, page 560 in 1965 that of the 31,652 persons who were known to have died between the ages of 30 and 89 years and who were members of a follow-up of 1,048,183 persons only three had died of mesothelioma of the pleura and none of mesothelioma of the peritoneum. In the light of what we now know, it can be assumed that 50 per cent or more of these 31,652 persons who died must have had at least enough exposure to fibers,

some of which were doubtless asbestos, to cause ferruginous bodies. It can be further assumed that some unknown quantities of asbestos fiber were ingested during their entire lifetime, beginning with the application of body dusting powder. Since only three subsequently developed mesothelioma it is clear that some quantity of asbestos fiber ingestion is well tolerated, even for life.

There is further evidence along this line which will be presented next spring by Dr. William E. Smith and his co-workers. Pleural mesotheliomata have been produced by the injection of asbestos fiber and other non-asbestos materials in the pleural space of experimental animals. Smith's group have shown that a progressive attenuation of the amount of asbestos fiber placed in the pleura leads to the development of fewer and fewer mesotheliomata and at the one milligram dose no mesotheliomata developed.

With this background of information, what can be said in a direct fashion about the actual problem which raised Dr. Snell's apprehensions. There is some useful information in this regard. One can inquire into the evidence that asbestos fibers are released from asbestos cement pipe. It is my understanding that in predeterminable circumstances asbestos cement pipe may develop an inner lining of carbonates completely shielding the original pipe from contact with the water flowing through it. In other circumstances, the pipe does not in any way disintegrate and therefore releases no fibers. You would know better than I as to the possibilities that repair of pipe might at the time release some fibers but I cannot conceive that this occasional type of fiber release if it did occur could be anything other than a casual type of exposure. In some circumstances I am told that asbestos cement pipe might slowly lose substance from its inner surface and thus release some asbestos fiber. This kind of weathering must be very slow--if rapid, it would be economically unwise to use this pipe under such circumstances. With information concerning the volume of water transiting the system, the area of the inner surface of the pipe and the rate of weathering it should be possible to make some rough calculations of the total fiber dispersal. I would anticipate that the amount ingested would be so low as to be in the casual exposure range where mesothelioma has not developed with an unusual frequency.

F. J. Solon, Jr. December 20, 1967

Even more meaningful to me is the fact that asbestos cement pipe has been in use in water systems throughout the U.S.A. for twenty-five to thirty years in a rather large number of major urban locations. These geographic areas, as for example the Los Angeles Department of Water and Power in California, have medical facilities which are not likely to have overlooked a frequent occurrence of this exceedingly rare tumor.

In this connection some data are available in regard to cancer of the digestive organs which include the gastro-intestinal tract. Data from the National Office of Vital Statistics of the U. S. Public Health Service indicates that from 1947 to 1966 the rate of occurrence of tumor of this body system has dropped from 55.2 per hundred thousand population to 48.4. Substantial amounts of asbestos fiber have been used in various ways from 1930 on in the U.S.A. and one would anticipate that if this fiber was playing a role in the causation of gastrointestinal tumors, it might be expected to have led to an increase in tumor rather than the observed decrease.

For the U.S.A. as a whole, and from the same statistical source, cancer of the digestive organs is reported in 1964 to have been responsible for 5.1 per cent of all deaths. In Los Angeles, California where asbestos cement pipe has been used in very substantial amounts from 1936 on, the reported figure for cancer of digestive organs as the cause of death is 5.1 per cent in 1964. In other cities where asbestos cement pipe has been utilized in the water system for twenty-five or more years, as for example Knoxville, Tennessee; San Antonio, Texas; San Diego, California; Lubbock, Texas; and New Orleans, Louisiana, the per cent is less than the average for the U.S.A. and in Providence, Rhode Island and Miami, Florida, it is slightly above the average namely 5.7 per cent.

I find it difficult to understand the reasoning upon which Dr. Snell bases the last sentence of his third paragraph to the effect that "If <u>any</u> particles were released, current medical knowledge suggests that a rise in certain types of cancer could be expected about twenty to fifty years among the population." I wonder if Dr. Snell might provide us with the information on which he bases his inference that medical knowledge suggests such a development

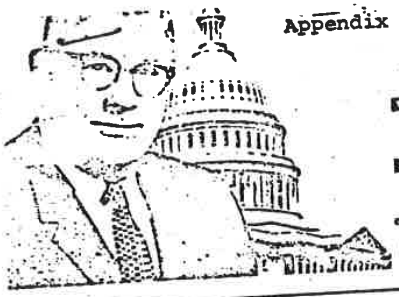
following the release of a few or some determined number of particles into a water system. All of the information that I and others have strongly indicates that the relationship between neoplasia and asbestos fibers is a dose related one and to believe that a single fiber can cause a cancer seems incredible. The medical literature contains ample evidence that the kind of exposure to fiber experienced by those using the fiber in an occupational way is manyfold that of the general population. In the lungs received from persons with several years or more of continous industrial exposure to asbestos fiber the number of ferruginous bodies can only be described by the word "myriads" whereas in the casually exposed lungs it is necessary to digest large parts of the lung or squeeze the juice from large volumes of lung in order to find one or two such ferruginous bodies. In those instances where bronchogenic cancer or mesothelioma appear to occur with greater frequency on a population basis, the number of ferruginous bodies also appears to be much larger than in those casually exposed. I do not believe that Dr. Snell can offer any substantial scientific evidence to indicate that the ingestion of one or a hundred or a thousand asbestos fibers on one or more instances is causally related to the development of mesothelioma. Most assuredly so few fibers cannot be related to gastrointestinal cancer, which appears to be his major worry, since in individuals known to be exposed far more heavily daily over a period of many years there is no acceptable evidence of a higher than anticipated frequency of cancer of this system. If Dr. Snell does have such evidence, we and others would welcome knowing about it.

With best wishes.

Sincerely yours,

George W. Wright, M.D.
Head, Medical Research
Department

GWW:kal



Appendix N

EDWARD J. PATTEN'S

Washington Report

(Not Printed At Government Expense)

VOL. 3, No. 3 | 15th District - N. J. | September, 1967

ENVIRONMENTAL HEALTH: A 20TH CENTURY PROBLEM

Slowly we are learning the tremendous importance of effective environmental health programs. Just as a decent wage and humane time schedule are both needed for peak worker efficiency and happiness, so must a worker be placed in a healthy atmosphere if he is to consistently produce top-level work. The President has stated that reduction of one day's sick leave of every American worker would add $10 billion to the Gross National Product. Industry itself pays out over $2.5 billion a year to compensate idled workers.

Within this framework, the problems of occupational health have grown to major proportions. As new and beneficial uses are discovered for minerals and chemical compounds, new data is often uncovered linking the same wonder product with danger and disease.



Dr. William H. Stewart, left, Surgeon-General of the U.S. Public Health Service, discusses existing environmental health programs with Congressman Edward J. Patten (D-15 Dist.-NJ), right.

So has been the case with asbestos, considered the "twentieth -ury wonder material." Over 3,000 uses are known for asbestos and - $400 million worth is produced annually by over 1 million workers. As the mineral is suitable for use as uncombustible, nonconducting material, asbestos textiles (safety clothing, curtains, brake linings), asbestos cement and floor tile, plastics and paints, are all part of the annual domestic consumption.

STATISTICS ARE GRIM

However, there is another more foreboding set of statistics:

- In one survey, deaths as a result of cancer of the lung, stomach and trachea exceeded the national average by more than 12 to 1.
- Prolonged inhalation of asbestos fibers may result in other often-fatal lung diseases, including pulmonary fibrosis.
- High-level exposure to asbestos has been judged as the probable cause of a 21% increase over the expected death rate for certain workers.
- The injury frequency rate of asbestos workers is more than double the national average.
- If an asbestos worker also smokes, his chances of contracting lung cancer are 92 times greater than if he were a non-smoker.

Clearly, there is a relationship between asbestos dust and serious disease, which is also meaningful to many workers exposed to asbestos in related industries, such as building trades. In fact, experts feel that dust may be a potential health hazard for over 25% of the population.

A Public Health Service (PHS) survey of 30 years ago led to the adoption of a ceiling of the maximum safe amount of asbestos particles in the air, a figure which has been under attack as unsafe and arbitrary. Unfortunately, there is no legislative authority by which the PHS can enforce strict standards or establish new guidelines; the Division of Occupational Health of PHS has only advisory power. It cannot now set strict standards with which industry must comply.

LEGISLATION IS URGENTLY NEEDED

It is to this end that I have introduced a bill* which would give HEW power to both establish and enforce ilistic standards to protect the worker by insuring safer working conditions and the public by producing -fer materials. Such areas as labeling standards and interstate transportation of goods would also come under Federal supervision. HEW control of this severe environmental health problem should be carried out cooperation with the division which possesses the greatest expertise: the Division of Occupational Health of e PHS in the Department of Health, Education and Welfare.

Dr. Murray C. Brown, head of the division, has said: "It is only by maintaining the physical well-being of the man on the job that the nation can continue to hold its position of industrial and economic leadership." By giving HEW authority to insure safety in asbestos control, we would see significant progress in this direction.

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LOS ANGELES TIMES
Los Angeles, California
August 15, 1967

IT MAY BE HEALTH HAZARD

New Theory About Asbestos

BY HARRY NELSON
Times Medical Editor

Evidence is accumulating that asbestos, an almost indestructible mineral with thousands of commercial uses, may be becoming an increasing public health hazard.

It's been known for a long time that asbestos workers are prone to certain lung diseases caused by breathing the fibrous material. But now there are signs that asbestos may affect people not directly involved with mining or using it.

While the evidence implicating nonworkers is still skimpy, it's strong enough for the authors of two recent medical journal articles to say that the disease may be a public health hazard.

Signs of asbestosis, the lung disease resulting from inhalation of asbestos fibers, have been found in persons who live near factories where asbestos is used, in random autopsies in Montreal, Pittsburgh, Miami, Capetown and London and in animals that live near asbestos mines.

Articles by Radiologists

Both of the most recent medical reports are by radiologists. One report is from Philadelphia and the other from New Jersey. The latter article, by Dr. Nicholas G. Demy and Dr. Howard Adler of Somerset Hospital, Somerville, N.J., appears in the American Journal of Roentgenology, Radium Therapy and Nuclear Medicine.

The doctors discount a theory that asbestos eventually disappears from the lungs. Instead, they believe it is fragmented into submicroscopic particles, each of which adds to the disease process.

Nothing in the whole realm of tumor study compares with the way asbestosis is caused, they said. While in the body the asbestos does not wash away, undergoes no chemical alteration or change in physical state and it does not become soluble. Apparently it reacts forever while in the lungs. This belief is based on evidence that the capsule that coats the foreign material eventually disintegrates, releasing the fiber which then starts the disease process over again.

The radiologists studied 47 patients with lung cancer believed resulting from asbestosis. One of them had had only a six-month exposure to asbestos but the rest had had exposures of 15 to 25 years.

Asbestos Has 3,000 Uses

Asbestos fibers are capable of subdividing almost endlessly. Apparently this happens in the lungs also. It is suspected of causing or enhancing lung cancer, mesothelioma or cancer of the pleura or peritoneum and, some think, tuberculosis.

Asbestos has more than 3,000 specific uses attributable to its unusual qualities. It is incombustible, nonconducting and chemically resistant. More than 100 American companies use it to make textiles, tile, cement products, friction materials, paper, paint and plastics.

The second medical report is in the journal Radiology. Drs. Irwin M. Freundlich and Roy H. Greening of Jefferson Medical Center, Philadelphia, examined 187 asbestos workers. They found that 56 "showed some pulmonary change which could be ascribed to the inhalation of asbestos dust."

The changes visible on X-ray films included thickening of the walls of the lung cavity, calcified plaques or patches, fibrous tissues and other signs.

There has been speculation by some researchers that even very small amounts of asbestos in the lungs, such as might be present in the lungs of some urban dwellers, may enhance the effect of tobacco in causing lung cancer.

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Appendix P

THE WASHINGTON POST
Washington, D.C.
December 25, 1967 (P.1)

Rare, Fatal Cancer Is Showing Up Among Those Handling Asbestos

By Thomas O'Toole
Washington Post Staff Writer

A fatal cancer of the chest and abdominal cavities is cropping up among the Nation's asbestos workers.

So rare that 20 years ago it wasn't even in the medical textbooks, the cancer is called mesothelioma, and seems almost peculiar to people exposed to asbestos.

But oddly, those stricken with the deadly disease include a nurse whose father worked in an asbestos plant and a man who handled asbestos for no more than a month while he insulated the plumbing in his own house.

Any attention the disease gets might come none too soon. More than 1 million tons of asbestos is consumed annually these days in the United States, with more than 3000 separate uses being reported for the fiber. There are at least 100,000 asbestos workers in the United States, more than half of whom did not begin working with asbestos until 10 years ago.

In terms of the number of persons involved, the apparent asbestos peril may be even greater than that posed by uranium mines. Last May Labor Secretary W. Willard Wirtz established the first Federal radiation limits for underground uranium mines following disclosure that an estimated 115 men had died from lung cancer in a mining population never higher than 5600.

Mesothelioma was first spotlighted in 1960, when a South African doctor found 32 cases among the people living and working in the Cape of Good Hope asbestos fields. The same doctor turned up 57 more cases in the next two years.

Nobody knows how many Americans have had mesothelioma. Even today, doctors have trouble spotting it — whether they're trying to diagnose it in a person still

See ASBESTOS, A5, Col. 1

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alive or pin it down at autopsy.

But in three separate studies in the last three years, doctors have turned up 71 cases. Oddly, 11 of them appeared to have had no real exposure to asbestos. But the other 60 either worked with asbestos, lived with people who did or lived in neighborhoods where the air was heavily laden with asbestos dust.

The first American study was one run in 1964 by Dr. Irving J. Selikoff of New York's Mount Sinai Hospital. Tracing the lives of 632 New York area members of the Asbestos Workers Union who were on the union rolls before Jan. 1, 1943, Dr. Selikoff found that 255 of them had died by Jan. 1, 1963.

Some of what he found did not surprise him. For example, 12 of the 255 died of asbestosis, a long-known but decreasingly fatal (due to antibiotics) disease brought on by years of breathing in asbestos dust.

But Dr. Selikoff also found that 45 of the men had died of lung cancer, a rate 6.6 times higher than that in the normal adult male population. Even more surprising, he found five deaths due to mesothelioma.

Dr. Selikoff then launched a follow-on study of 307 consecutive deaths among asbestos insulation workers throughout the whole Northeast. Again, to his surprise, he turned up 10 deaths due to mesothelioma.

About the same time, the Pennsylvania State Department of Health began a blind study to find how mesothelioma might be affecting the more than 5000 asbestos workers scattered about the state.

The Department sent questionnaires to 162 hospitals in the southeastern part of the state, asking the hospitals to report all mesotheliomas diagnosed between 1958 and 1963.

Back came 42 documented cases of the disease, only 11 of which could not be traced to asbestos exposure.

Ten victims of the disease turned out to be men who worked in asbestos plants. Eight were people who lived near asbestos plants most of their lives. Three were members of families who had one or more asbestos worker members—a 3-year-old girl whose father was an asbestos engineer, a nurse whose father had worked for 35 years in an asbestos plant and a woman with two sons who worked as asbestos insulators in a shipyard.

Of 10 deaths that seemed to have only a "questionable" connection with asbestos exposures, two turned out to be almost bizarre. One was a Swiss cheesemaker, who worked almost his entire life around a large boiler covered with asbestos insulation that flaked off at the touch. Another was a worker in a brewery, where beer is filtered through pulp filters made essentially of cotton fiber and asbestos.

The most convincing study is the most recent one—conducted by a team of doctors working out of Middlesex General Hospital in New Brunswick, N.J., a few miles from the Nation's largest asbestos plant, one that employs 5000 workers.

In the past three years, no fewer than 19 cases of mesothelioma passed through Middlesex General. Only two of the 19 were not workers at the nearby asbestos plant, one a woman who apparently inhaled asbestos dust in laundering her husband's work clothes, the second a spinster who lived one block from the plant.

A relatively "new" disease, mesothelioma is also one of the most difficult diseases to confront modern medicine.

It is almost impossible to treat. Middlesex General's Dr. Maxwell Borow says that even the most potent anticancer drugs have no effect on it. About all that radiation treatments do, he says, is remove some of the fluid that builds up in the lungs from the disease.

"The disease is 100 per cent fatal," Dr. Borow states, "and usually takes less than a year after diagnosis to run its course."

Nobody knows why it attacks some asbestos workers and not others, or why some victims of the disease get it after an apparently mild exposure to asbestos. The University of Michigan School of Medicine cites one case of a man who was exposed to asbestos for about a month while he insulated his house. Six years later, he was dead of mesothelioma.

Even the nature of the disease is little understood. While it is generally known that the disease attacks the lining of the chest and abdomen, nobody knows how it gets there.

When asbestos dust is inhaled, the fibers get trapped in the lungs, where they form gummy deposits. This explains how asbestosis gets started, and perhaps even lung cancer. One theory is that the gummy substance that builds up around the asbestos fiber lodged in the lung can cause cancer elsewhere in the body. But how does it do it? Nobody knows.

Because it is such a new and little understood disease, mesothelioma is also creating some serious social and economic problems.

No state lists the disease in its workmen compensation laws, so nobody afflicted with it can be paid damages for his affliction. Even now, the first test cases are in the courts, where they may conceivably stay for the next 5 to 10 years.

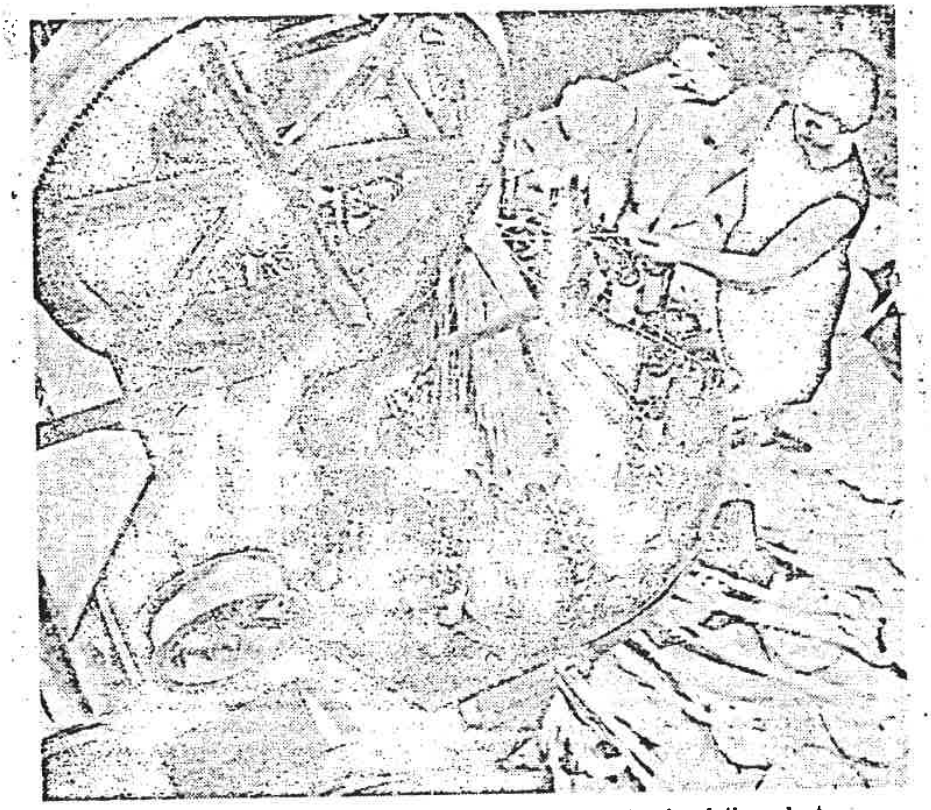
The fact that nobody knows how much exposure to asbestos can bring on the disease has created controversy, too.

Most laws stipulate that asbestos workers be in an environment where there is no more than five million particles of asbestos dust per one cubic foot of air—a regulation that many in the abestos industry fought years to get approved.

But with mesothelioma, the disease might be brought on by exposure to as little as one-tenth or one-hundredth that limit.

Despite obstacles like these, research has begun in a hand-

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A worker operates a braider in a Canadian asbestos insulation plant.

ful of places to find out more about the ailment. Mount Sinai's Dr. Selikoff is now constantly monitoring the 1500 members of the Asbestos Workers Union in metropolitan New York. The Philadelphia local of the same union has started a similiar program with Hahneman Hospital to uncover more information.

Middlesex General's Dr. Borow says that he is in the process of setting up a traveling exhibit to bring attention to the disease. He's doing it with a $3500 grant from the Papermakers Union, which represents the asbestos workers in the New Jersey plant Dr. Borow studied.

It wasn't easy getting the money. Dr. Borow went to 40 organisations before he got it —including the American Cancer Society and the Public Health Service.

Some doctors think the mesothelioma problem is just beginning. "Since the malignancies now being recognized relate to an earlier time period," states Dr. W. D. Norwood, of Richland, Wash., "the health problem in the future may be very extensive and serious."

Indeed, it may be true, as many doctors think, that it takes 20 years of exposure to asbestos to bring on most cases of the disease. If this is so, says Dr. Norwood, "large numbers of malignancies are beginning to occur and will substantially increase in the near future."

Appendix Q

High Rate of Cancer Noted Among Smokers In Asbestos Industry

Combination of Asbestos Dust, Cigarets Poses Great Risk Of Lung Cancer, Study Shows

By a WALL STREET JOURNAL *Staff Reporter*

ATLANTIC CITY — Asbestos workers who smoke cigarets have a ninetyfold greater risk of dying of lung cancer than persons who neither smoke nor work around asbestos, three New York medical researchers said.

The extremely high risk of lung cancer among persons exposed to the combination of asbestos dust and cigaret smoke was uncovered in a study of 370 members of the Newark, N.J., and New York locals of the International Association of Heat and Frost Insulators and Asbestos Workers union. The men are primarily involved in installing asbestos insulation in construction work.

The workers were exposed to a greater amount of asbestos dust than the general population, and all had been occupationally exposed to it for at least 20 years. But, the researchers added that the general population, particularly in big-city areas, is exposed to a slight amount of such particles. As a result, they said, it is important to determine whether cigaret smoking makes this light exposure more hazardous than it would be otherwise.

In a report to the scientific session of the American Medical Association's annual convention here, the researchers said there were 94 deaths among the insulation workers during a 52-month period. This, they calculated, was 46 more than would have been expected among a similar group of men who hadn't been chronically exposed to asbestos.

Most of the men who died—78—were cigaret smokers. And among the smokers, 24 died of lung cancer. No lung-cancer deaths occurred among those who didn't smoke.

Twenty-four lung-cancer deaths was an extremely high rate, the researchers calculated. Among a similar group of smokers who hadn't been exposed to asbestos, statisticians would expect only about three deaths from lung cancer, they said.

"If they had neither smoked nor been exposed to asbestos dust," they said, the expected number of lung-cancer deaths would have been one or none during the 52-month period.

"All people incur a great increase in risk of lung cancer if they smoke cigarets; for asbestos workers the increase in risk is tremendous," they said. The researchers noted that microscopic asbestos fibers, once inhaled, remain permanently in the lung tissues. As a result, "Asbestos workers who don't smoke cigarets should never begin. Those who do smoke should stop immediately."

The study was made by Dr. Irving J. Selikoff and Dr. Jacob Churg of Mt. Sinai School of Medicine and by E. Cuyler Hammond of the American Cancer Society.

Docs Nix Smokes, Drinks but Prescribe The Pill

By MARK BLOOM
Science Editor of THE NEWS

Atlantic City, June 19—Smoking and drinking took it on the chin today at the American Medical Association's annual convention. But sex, as long as it is accompanied by the pill, was given a clean bill of health.

Smoking was pinned to an abnormally high lung cancer death rate among asbestos workers in a study conducted by Mount Sinai Hospital in New York City and the American Cancer Society, supported by the Health Research Council of New York. According to a team headed by Dr. Irving V. Selikoff of Mount Sinai, the study showed that of 283 workers who had a history of smoking, 24 of them died of lung cancer within a 52-month period. During the same period, 87 workers who had never smoked regularly all escaped lung cancer.

Asbestos dust has long been suspected to be a factor in cancer, as has normal air pollution. But the study indicated—while not proving conclusively—that the dust may merely be a triggering agent to a cancer producing agent in cigarets.

"This finding doesn't prove that exposure to asbestos dust has no influence on the risk of lung cancer among nonsmokers," Selikoff said. "However, it suggests that exposure to asbestos dust does not lead to an extremely high risk of lung cancer among nonsmokers."

DAILY NEWS, TUESDAY, JUNE 20, 1967

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Sources of airborne asbestos

- Asbestos-lined ducts used in centrally air-conditioned buildings.
- Asbestos ducts and insulation in home central-heating plants.
- Motor vehicle brake linings and clutch plates.
- Auto undercoatings.
- Asbestos ceiling and floor tiles.
- Asbestos shingles and sidings.
- Construction and demolition
  - Fitting, cutting, and removing asbestos-filled wallboards and floorings, piping and insulation.
- Incineration of asbestos-filled scrap.
- Improperly filtered effluent from asbestos processing plants.

Asbestos: Awaiting 'Trial'

The asbestos industry—whose end products are valued at more than $500 million/year—may be in for a shake-up. It could come in the form of federal legislation limiting the use of asbestos, because asbestos has been accused—though not yet "convicted"—as a significant health hazard. Probable contender for asbestos markets: plastics.

Recent studies have convinced U.S. Public Health Service specialists and other medical authorities that about 40% of all Americans have mild, chronic cases of asbestosis, even though most of them never worked directly with asbestos.

Unlike other airborne dust particles, asbestos fibers have the ability—almost as much as activated carbon—to absorb polycyclic hydrocarbons and arsenicals. Furthermore, says USPHS, in the past 30 years the asbestos-related cancer rate has increased sixfold.

The Inferences: While the average asbestos worker is well protected, the man on the street is not. The 3x1-micron asbestos fibers in his lungs can come from a variety of sources (*table, above*).

And medical experts say there's no way to assess hydrocarbon content in those lung deposits.

American Cancer Society researchers feel certain there is a synergistic relationship among airborne asbestos, smoking and lung cancer. They reason that the nondegradable, hydrocarbon-soaked fibers may well be a constant source of lung irritation.

PHS officials think it may take them up to five years to establish asbestos' true role as an air pollutant. However, Congress may act before the research is finished. Says Representative Robert Watkins (R., Pa.): "We've seen enough evidence already. Asbestos will never get a clean bill of health. With just a little more data we'll move for controls and strict ones."

Some form of asbestos control is in the offing, public health officials are certain, if only part of a larger clean-ambient-air program. However, there is the danger that Congress may enact rigorous controls on the quantity of asbestos that could be used.

In that case both Canada and U.S. asbestos products manufacturers would be hard hit. Of the five forms of asbestos mined today, chrysotile asbestos holds the predominant market position because of its insulating and processing qualities. Canada produces more than 80% of the chrysotile asbestos used in the U.S. In both countries, a number of serious dislocations would occur.

At present, there is no known material that could fill all of asbestos' strategic roles. On the other hand, should federal controls merely call for higher standards for binders and shieldings, that would spark a rise of new products, with plastics taking the lead.

Reason, say industry spokesmen, present polymer technology could easily turn up products to replace asbestos in most end-uses.

Appendix S



ON THE COVER: Test pattern used in adjusting and checking color TV. Each set contains triads of red, blue and green phosphors. Color TV has been greatly improved by the europium-yttrium rare-earth phosphor (p. 79).

CHEMICAL WEEK

Vol. 99, No. 15 October 8, 1966

THIS WEEK IN BUSINESS

5 VIEWPOINT: Wage-price guideposts have broken down, and unless labor and management voluntarily repair them, mandatory controls are inevitable.

7 U.S. Public Health Service and Johns-Manville deny conclusions that asbestos has been shown to be a public health hazard.

25 Seeking "fair share" of low-cost petrochemical feedstocks: As Dow and Hess seem about to get special import quotas, others eye foreign trade zone bids.

27 For companies that store oils, chemicals, other fluids in rented tank farms: accountants' committee suggests safeguards to prevent another "soy oil fiasco."

28 New forum, old debate: Spokesmen for domestic and foreign producers of synthetic organic chemicals sum up latest tariff arguments for AIChE members.

29 Financial revelations coming from chemical companies and divisions: Discretion still prevails over disclosure, but reporting of divisional data to be required.

30 More mergers and acquisitions: Sohio becomes full owner of Mountaineer Carbon; Alco gets Rubber-Plastics Industries; Sherwin-Williams buys Sprayon Products.

31 High court to rule on disputes of big concern to chemical companies—such as conglomerate mergers, franchise dealerships, "piggyback" freight, "hot cargo."

45 Diaz Administration intent on boosting fertilizer and pesticide production to help feed growing population, gives Mexico a better foreign trade balance.

66 'Continental' executives living in Puerto Rico find that the U.S. territory combines the pleasures and problems of a foreign assignment.

110 New orders for nonelectrical equipment are running 23% ahead of last year, but not all six machinery makers are sharing equally in the boom.

THIS WEEK IN TECHNOLOGY

95 Toms River Chemical builds 600,000-gal. rubber-lined waste disposal basin for use in emergencies—such as a breakdown in its effluent discharge pipeline.

96 Pittsburgh Plate Glass is offering a novel process for making strong, crack-free foams of alumina or other refractory oxides.

THIS WEEK IN SPECIALTIES

79 Rare earths are literally lighting their way to new applications in fluorescent and high-pressure discharge lamps, as well as in color TV.

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PAGE #2.

Asbestos Safety Reaffirmed

To THE EDITOR: The article titled Asbestos: Awaiting 'Trial'" (*CW, Sept. 10, p. 32*) contains many inaccuracies, which have led to erroneous assumptions and false conclusions. Briefly, the facts are these:

(1) Asbestos is a uniquely useful product serving the needs of modern man and society, and it is not likely to be replaced by economically feasible synthetic polymers, or anything else, in the foreseeable future.

(2) No published reports, even the most speculative, support the generalized statements in your article regarding health effects of possible exposure to asbestos.

(3) There is no basis for the suggestion that Congress "may act" regarding asbestos use, for no such proposals are being considered by Congress. We are informed that the congressman quoted as predicting action disclaims any knowledge of health evidence relating to asbestos or of proposals to control its use.

(4) No evidence exists to show that asbestos poses health risks for the general public or to show that even 1% of Americans have "mild chronic asbestosis," much less the 40% figure you give in your article.

(5) Regarding your list of "sources of airborne asbestos," there are no data to support the contention in your article that the "man on the street" is exposed to asbestos from these sources, or indeed that these sources contribute asbestos to the ambient air.

(6) We know of no data to support your claim of a sixfold increase in so-called "asbestos-related cancer."

As you doubtless realize, the proper conduct of our business requires us to keep abreast of scientific developments regarding asbestos, both medical and technical. Is is our opinion that synthetic polymers are not likely in the foreseeable future to completely replace asbestos in the many applications for which it is now used. Any synthetics would have to prove superior to natural asbestos and be economically competitive.

As to health aspects, in June of this year the U.S. Surgeon General appeared before the Senate Public Works Subcommittee on Air and Water Pollution, with Senator Edmund Muskie of Maine as chairman, to discuss various problems relating to air-pollution abatement. Surgeon General William Stewart enumerated a number of substances in common use, including plastics and asbestos, about which he said: "The public health hazards that may arise from these aspects of environmental contamination have not been adequately documented. In each instance further investigation is needed to determine whether health is indeed threatened and what control measures may be necessary."

In these days when all substances in our air and water and even the food we eat are constantly under scrutiny, as to their effects on the public, the fact that asbestos is among the subjects of investigation is not surprising. In fact, we have always supported and will continue to support investigations by the U.S. Public Health Service and other research scientists.

ROGER HACKNEY
Vice-President
Johns-Manville Corp.
New York

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 West 42nd St., New York, N.Y. 10036.

To THE EDITOR: In reference to your article, "Asbestos: Awaiting 'Trial'" (*Sept. 10, p. 32*), we know of no scientific evidence supporting the statement that "40% of all Americans have mild, chronic cases of asbestosis."

Even in the asbestos industry, where more is known about exposure levels than among the general population, there is imprecise knowledge about the health effects of exposure to asbestos.

With the cooperation of labor and industry, the Division of Occupational Health has under way a long-range, in-depth study to answer this question, as well as to develop better criteria for the safe handling and manufacture of asbestos. In the meantime, however, the division will continue to promote the application of known control methods so that the workplace can be kept as healthy as possible.

MURRAY C. BROWN, M.D.
Chief
Division of Occupational Health
Department of Health, Education & Welfare
Public Health Service
Washington, D.C.

CW is pleased to set the record straight. Some of those interviewed apparently drew unwarranted conclusions from insufficient and dubious data.—ED.

MEETINGS

Assn. of Official Analytical Chemists, annual meeting, Twin Bridges Marriott Motor Hotel, Washington, D.C., Oct. 10-13.

Technicon International symposium on automation in analytical chemistry, Statler-Hilton Hotel, New York, Oct. 17-19.

Drug, Chemical & Allied Trades Assn., annual meeting, Hollywood Beach Hotel, Hollywood, Fla., Oct. 20-22.

Commercial Chemical Development Assn., discussion of packaging, Drake Hotel, Chicago, Oct. 26-28.

National Assn., of Purchasing Agents, Chemical Group, annual fall conference, Continental Plaza Hotel, Chicago, Oct. 27.

Society of Engineering Science, fourth technical meeting. North Carolina State University, Raleigh, Oct. 31-Nov. 2.

American Society for Metals, national metal congress and exposition. McCormick Place, Chicago, Oct. 31-Nov. 3.

Parental Drug Assn., annual convention, Statler-Hilton Hotel, New York, Nov. 1-4.

Fertilizer industry round-table conference, Mayflower Hotel, Washington, D.C., Nov. 2-4.

The Society of the Plastics Industry, 11th plastics film, sheeting and coated fabrics conference, Waldorf-Astoria Hotel, New York, Nov. 9-19; conference on cellular plastics in transportation, Edgewater Beach Hotel, Chicago, Nov. 15-17.

The Franklin Institute Research Laboratories, fourth annual symposium on the organic-solid state, Philadelphia, Nov. 14.

General Atomic Division of General Dynamics Corp., and Air Force Office of Scientific Research, fundamentals of gas-surface interactions, San Diego, Calif., Dec. 14-16.

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Appendix T

NEWS RELEASE from

THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street, Chicago, Illinois 60610 • • Area Code 312 527-1500

For P.M. Release Monday, May 23, 1966

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Small town's need draws doctor ---------- page 7

DECLINE IN REPORTED MEASLES CASES

CHICAGO--Approximately 12 million American children have been immunized against measles (rubeola) since vaccine was licensed three years ago, and there has been a major decline in reported cases.

The Medical News section of the current (May 23) Journal of the American Medical Association reports these preliminary figures from the U.S. Public Health Service:

During the first 17 weeks of this year, reported cases were down to 125,966, compared with 162,029 for the same period in 1965. Last year's total reported cases (266,222) were less than half the number of a decade earlier (555,156 in 1955).

"We really are pretty far along toward measles eradication right now," said Robert J. Warren, M.D., chief of the Childhood Virus Disease Unit at the PHS' Communicable Disease Center in Atlanta, Ga.

Rubeola incidence shows periodic peaks, and past experience had indicated that major outbreaks might be expected in the U.S. early this year.

The chief of the Communicable Disease Center, David J. Sencer, M.D., cautioned, however, that reported measles cases probably represent only about 10 per cent of the actual number.

Even with immunization of an estimated 12 million youngsters--reducing measles-susceptible population by about 40 per cent--there are more than 12 million left, said Dr. Warren.

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Between 2 million and 4 million of these will have to be immunized to accomplish measles eradication, he said, "if we pick the right children."

The "right children" are those living in lower socioeconomic areas, to some extent those in rural areas, and the young school-age susceptibles, he said.

"In most areas, we'll be on the verge of eradication a year from now," he said. "There may be pockets of measles cases where all concerned haven't done enough."

A key factor in eradicating measles is the cooperation of practicing physicians, CDC Chief Sencer emphasized. Physicians should include measles immunization in their private practices and help educate parents to the seriousness of the disease.

The annual death rate attributed to measles continues to average more than 400 in recent years, Dr. Sencer said. If the ratio of cases to fatalities holds, however, final figures for 1965 may show a decline in deaths to about 240.

Some children react to the "live" vaccines being used, but this has been "greatly overplayed," Dr. Sencer said. "Children tolerate measles vaccine very well."

About 15 per cent of those receiving two types of live attenuated measles vaccines may experience rather high fever, beginning about the sixth day after vaccination, and lasting no longer than five days, the PHS has said.

One vaccine type (Edmonston strain), "may have about twice this frequency of such responses," the PHS Advisory Committee statement said, but continued, "the great majority of reports indicate that even children with high fever experience relatively little discomfort..., and reactions often go unnoticed by the parents.

Because most adults have had measles, there has been little vaccination of older persons, except in relatively isolated areas where few adults have been exposed to measles.

Limited data, the PHS said, "indicate that in the adult, reactions to vaccine are no more common than in children."

To come closer to eradication of measles in this country, said Dr. Warren, these three things must be done:

--As many pre-school children as possible must be immunized.

--Efforts should increase to immunize school children, whether there is a measles epidemic or not.

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--Epidemics should not be tolerated when they start.

Extensive campaigns, such as the recent one in Rhode Island and one planned this month in Delaware will be important factors in eradicating measles, Dr. Warren predicted.

Kansas was the first state to amend school entry requirements to include measles immunization, he said, and several other states apparently are following suit.

Some persons should not receive measles vaccine, or should postpone immunization, he said. These include pregnant women, victims of tuberculosis, leukemia, lymphomas and other generalized malignancies, and persons who are hypersensitive to vaccine components or have recently received other live-virus vaccines.

The CDC's Dr. Sencer sees the day when a single case of measles in the U.S. "may be sufficient to prompt an epidemic investigation."

Even then, Dr. Warren added, it will be necessary to keep immunization levels high until measles is eradicated from the world.

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ASBESTOS IN
URBAN AIR

CHICAGO--Asbestos in the air might someday be a new hazard of urban living.

The concentration of asbestos particles in urban air probably isn't of major concern now, emphasize two medical investigators in a current publication of the American Medical Association.

They point out, however, that the wear of automobile clutch and brake linings, the weathering of asbestos roofing--even the wearing of floor tile containing asbestos--are certain to increase airborne concentrations of the material.

Inhaled in sufficient quantities, asbestos can cause lung disease, including malignant tumors.

Asbestos is virtually indestructible. The most commonly used type has a tendency to break into hair-like fibers, some of which are so small they cannot be seen with an ordinary microscope.

If inhaled into the lungs, the sharp fibers move downward, concentrating in the base of the lungs or in adjacent tissues. Protein and iron encrustations form around the fibers, producing "asbestos

bodies." Man and guinea pigs seem to be the only animals in which these formations occur, but the result in their bodies can be development of a tumor.

The authors of the report are J.G. Thomson, M.D., of the Medical School, University of Cape Town, South Africa, and Wallace M. Graves, Jr., M.D., formerly of the University of Miami School of Medicine, Miami, Fla., and now of Professional Medical Laboratories, Fort Myers, Fla.

When they reviewed the autopsies of 500 Miami residents aged 15 and over, they found that asbestos bodies were present in the lungs of 30 per cent of the males and 20 per cent of the females. These findings were similar to an earlier Cape Town, South Africa, survey by Dr. Thomson.

The authors emphasized, however, that none of the deaths were due to asbestos inhalation or, in fact, to any kind of lung disease. Only a few of the males (about 1 in 17) had what might be considered significant concentrations of asbestos bodies in their lungs.

The survey did not indicate the concentration of asbestos particles in Miami air. It showed only that urban dwellers are exposed to some asbestos inhalation, a phenemenon of modern times.

"The use of asbestos has increased in amount and variety in the past 30 years to a degree unprecedented in any other common mineral," the authors said. "Few are aware of the extent to which there has been created in recent years in towns and cities what could be called an asbestos environment."

World asbestos production now exceeds 3 million tons a year, five times that of 20 years ago. The United States consumes one-fourth of all production.

In earlier times, workers in asbestos mines and factories were frequent victims of lung diseases. Factory dust control eliminated many of these hazards, but now smaller quantities of airborne asbestos are found in many places.

Commenting on the report, an editorial in the current (May 23) Journal of the American Medical Association said: "Asbestos is now a hazard in an increasing variety of occupations involving asbestos or asbestos-containing products, such as asbestos cement, insulation, paint and plastic, ship building, and in the construction industry."

The lung disease observed in these workers is usually milder than that seen earlier in asbestos-factory workers. However, after being exposed to asbestos for several years, malignant tumors may develop.

"Unlike the older population which had no exposure to asbestos until recently, the young urban dweller has the exposure of a lifetime before him," the editorial said. "The investigators predict that urban air contamination by asbestos will continue to increase. What is not known is just how much asbestos must be present before (malignant tumors) result."

The report appears in the current (May) Archives of Pathology, published by the AMA.

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SWIMMING POOL
SAFETY MEASURES

CHICAGO--If you're installing a backyard swimming pool, you can ensure peace of mind by "kidproofing" it to prevent accidents.

The current (June) Today's Health magazine, published by the American Medical Association, lists several suggestions for making backyard pools safer.

The suggestions are based on the first national study of pool drownings, in which newspaper reports of drownings in 1965 were used as the source of information.

Of the 472 pool drownings last year, 246 occurred at private residences. The majority of victims drowned in home pools owned by their own families, and 155 of these victims were under age five.

Three chief causes of drownings were "temporary" lack of qualified adult supervision; inadequate pool protection, such as fences, and victims' inability to float or swim.

Such tragedies can be prevented, says the author, Daniel P. Webster, a recreation consultant in the Division of Accident Prevention, U.S. Public Health Service.

To make a pool safer, he suggests these things:

1. Surround the pool with a fence or wall at least six feet high. The fence should have barriers at the top to prevent climbing, and should extend at least six inches into the ground to prevent toddlers from burrowing under it.

2. Fence framing and braces should be on the inside to eliminate handholds a child might use as a ladder.

3. Trim foliage so the pool area can be observed from outside.

Appendix U

HARDESTY - 963-7734
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U. S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE
Public Health Service
Division of Occupational Health

PROFESSIONAL RELEASE
FOR IMMEDIATE RELEASE

December 9, 1966

Cincinnati, Ohio: Exposure to high levels of asbestos dust 20 to 30 years ago are probably responsible for a 21% increase in the death rate among certain workers in a large group recently studied by the Public Health Service.

This excess was due to cancer of the lung and gastrointestinal tract and to asbestosis. In other asbestos-using industries studied where dust levels were relatively low even though there was long-term exposure, the death ratio were much lower.

The report was presented to 22 experts on environmental disease attending a Conference on Asbestos Research sponsored by occupational health officials of the Public Health Service here this week.

"While dust levels have been sharply reduced in the asbestos textile industry where the excess mortality was found, the finding adds to the growing evidence that asbestos exposure is associated with cancer of the lung," said Dr. Murray C. Brown, Chief of the Division of Occupational Health, who made the report.

Dr. Brown's report was based on research being conducted by Dr. Philip Enterline of McGill University and Dr. Mildred Kendrick of the Division of Occupational Health. Their data is taken from the Social Security Administration records for 21,755 men who had worked in the three industries and from death certificates from State health departments.

The Conference was held to exchange information on asbestos research programs now underway and to identify gaps in research as well as areas needing greater attention.

The conferees agreed on the need for a broader attack on the many problems related to asbestos as an industrial as well as a potential environmental contaminant. High on the list of research priorities were studies of population groups with both heavy and light exposures to asbestos fibers. In making such investigations the types of asbestos as well as other associated factors must be considered in evaluating both types of exposures. It was pointed out that is is not known whether asbestos mineral fibers are vehicles or carriers of carcinogenic chemicals or are active themselves.

The group stressed that there must be expanded laboratory animal studies of the effects of different types of asbestos dusts, alone and in combination with various metals and hydrocarbons. They said that present methods for the accurate indentification of asbestos fibers in tissue are inadequate and must be improved.

There was also concern about the need for standardization of diagnostic methods, better diagnostic terminology for pathologic and radiographic description of lung changes and pleural tumors. Similiarly, techniques for the collection, identification, and quantitation of asbestos fibers in the industrial and community environment need refinement and standardization.

"This latest information indicates that asbestos is causing problems, and we intend to move rapidly toward an intensified program to get answers to some of the more urgent questions," Dr. Brown told the conferees.

CRMC-Asb&Health-BODMin-000103

In the meantime, it is important that those producers and users who are not showing proper regard to the health hazards of asbestos dust institute controls which have already been shown to reduce the dust problem."

"While we really do not know how controls can be applied in all of the endless varieties of work situations and sites, these questions can be answered through the types of diligent painstaking work that have been outlined at this meeting," Dr. Brown concluded.

Asbestos is a generic term applied to a number of fibrous crystalline silicate minerals. Although chemically they are grouped as hydrated silicates, there is a great variation in the degree of hydration, complex composition of the silicate, and physical properties of the crystalline fibrous structure. These differences make it difficult to assess the fibers' effects on the lung.

Although asbestos has been known for centuries, it has only been a mineral of significant industrial importance for about 75 years. With outstanding properties of chemical resistance, fibrous structure, and incombustibility, the material is used in practically every major industry. Over one million workers are involved in the manufacture or handling of asbestos products.

Major applications include textile manufacturing, felts, ropes, roofing and flooring materials, asbestos-cement pipes, gaskets, insulation, special papers, filters, plastics, and brake linings.

Current domestic consumption of the mineral in the manufacture of asbestos products is nearly 800,000 tons. Of the three forms of asbestos, chrysotile accounts for about 95 percent of this figure, with amosite at

at about 20,000 tons and crocidolite at about 10,000 tons making up the remainder. Because most of the mineral is imported into this country, researchers in the field feel that the greatest potential health problems in America exist for those who work with asbestos rather than for those who mine it.

* * * * *

ENVIRONMENTAL CONTROL REPORT #3
SECTION #3, ENVIRONMENTAL AND HEALTH STUDIES
NOVEMBER 1, 1967

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ENVIRONMENTAL AND HEALTH STUDIES

The following is a progress report of environmental and health studies in which Johns-Manville is actively participating:

FIBROUS DUST STUDY
INDUSTRIAL HYGIENE FOUNDATION OF AMERICA
CONTACT - ROBERT T. P. de TREVILLE, M.D.
COORDINATORS - H. M. JACKSON AND C. L. SHECKLER

This study involves the investigation into four various types of asbestos; chrysotile, amosite, crocidolite, and synthetic. In addition, fibrous glass, mineral wool, and some organic fibers will be studied.

Progress has been reported at the Industrial Hygiene Foundation Meeting on October 11, 1967. Dr. John M.G. Davis presented a paper entitled "Asbestos Bodies and Bioeffects".

Dr. Davis reported on his research work at the University of Cambridge, England, in conjunction with the research being conducted at the Industrial Hygiene Foundation concerning fibrous dust.

stated that experimental production of asbestos-like bodies were produced in msters. The dusts used to produce these bodies contained no asbestos whatsoever but included aluminum silicate, glass fiber, carborundum, man-made textile fiber and elastin. All of these foreign materials produced bodies in the injection sites of the animals.

The work by Dr. Davis at Cambridge confirms the early findings of Dr. Paul Gross at IHF, that numerous substances other than asbestos can produce the asbestos-like or "ferruginous" bodies in tissue.

These findings cast considerable doubt on the theory that a great segment of the urban population has asbestos bodies in their lungs.

The investigation of fibrous materials is continuing. Extensive animal exposures and evaluation of tissue response will be necessary in order to reach any firm conclusions.

BRAKE LINING DUST STUDY
INDUSTRIAL HYGIENE FOUNDATION OF AMERICA
CONTACT - ROBERT T. P. de TREVILLE, M.D.
COORDINATOR - H. M. JACKSON

This study involves the pathogenicity of brake lining dust by animal injection creening tests.

BRAKE LINING DUST STUDY (Cont'd)

The long term animal inhalation and injection research proposal submitted by the Industrial Hygiene Foundation is currently being reviewed by Dr. George Wright and the Institute of Environmental and Occupational Health Scientific Advisory Committee.

This review is being conducted to determine recommendations for the research design and implementation.

Recommendations from the IEOH can be expected within the next two months.

COALINGA FIBRE STUDY
INDUSTRIAL HYGIENE FOUNDATION OF AMERICA
CONTACT - ROBERT T. P. de TREVILLE, M.D.
COORDINATOR - H. M. JACKSON

The purpose of this study is to compare the pathogenicity of Coalinga fibre with other chrysotile by animal injection screening tests.

The animal tissue reaction to the Coalinga asbestos fibre was approximately the same as that of the Canadian Chrysotile. From a disease producing and environmental control standpoint, Coalinga fibre should be regarded the same as our Canadian fibre.

This study has been completed. The results are in accordance with the foregoing comments as reported in the August 1, 1967 report.

EPIDEMIOLOGICAL STUDY OF THE CANADIAN
GENERAL POPULATION
INSTITUTE OF OCCUPATIONAL ENVIRONMENTAL HEALTH
CONTACT - GEORGE WRIGHT, M.D. AND J. C. MAC DONALD, M.D.
COORDINATOR - K. V. LINDELL

This study proposes to relate the health status of asbestos exposed population to the non-exposed population.

Members of the Institute of Environmental and Occupational Health working committee will be meeting with the United States Public Health Service on November 1, 1967. The purpose of the meeting is to further the development of standard criteria for general chest x-ray interpretation and classification.

ESTABLISH LIBRARY OF WORLD WIDE ASBESTOS
RESEARCH AND HEALTH STUDIES
INSTITUTE OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH
CONTACT - GEORGE WRIGHT, M.D. AND P. V. PELNAR, M.D.
COORDINATOR - K. V. LINDELL

This project is designed to assemble information on world-wide asbestos research and health studies for future reference and distribution upon request.

Considerable medical, scientific and other published information concerning asbestos is being forwarded to Dr. Pelnar from the J-M Environmental Health Committee.

Dr. Pelnar attended the Industrial Hygiene Foundation meeting on October 10-11, 1967.

This is a continuing project and progress is being made.

ASBESTOS INDUSTRY STUDY
UNITED STATES PUBLIC HEALTH SERVICE
CONTACT - LEWIS J. CRALLEY, PhD.
COORDINATORS - H. M. JACKSON AND C, L. SHECKLER

This is a 7 to 10 year environmental, clinical, and epidemiological study of asbestos and workers exposed to asbestos in the United States.

Field units of the United States Public Health Service conducted an environmental re-survey of the Manville Plant Asbestos Textile Department. The asbestos textile operations of other companies were also re-surveyed. The purpose of periodic re-surveying is to compile data on types of exposures and evaluate various sampling methods.

Dr. Lewis Cralley of the U. S. P. H. S. attended an Asbestos Textile Institute meeting on October 5, 1967. He requested cooperation of A.T.I. member companies to proceed with the epidemiological and clinical phases of this study. Full cooperation was assured and the epidemiological phase of the study is anticipated to be underway by January 1, 1967. The clinical phase will be started within one year.

E.H. Wells and C. L. Sheckler attended the A.T. I. meeting and discussed further J-M participation with Dr. Cralley.

BRAKE LINING DUST STUDY
UNITED STATES PUBLIC HEALTH SERVICE
CONTACT - LEWIS J. CRALLEY, PhD.
COORDINATOR - H. M. JACKSON

The purpose of this study is to determine presence of asbestos fibre in dust from brake lining wear.

There have been no formal reports made to date by the United States Public Health Service in reference to this study. No further laboratory work has been initiated.

Dr. Lewis J. Cralley of the U.S.P.H.S. endorses the Industrial Hygiene Foundation proposal now being considered by the Institute of Environmental and Occupational Health Committee.

It is anticipated that the U.S.P.H.S. will await further developments concerning the I.H.F. proposal.

INSULATION WORKERS HEALTH STUDIES
UNITED STATES DEPT. HEALTH, EDUCATION AND WELFARE
CONTACT - I. J. SELIKOFF, M.D.; C. W. COOPER, M.D., AND OTHERS
COORDINATORS - H. M. JACKSON AND C. L. SHECKLER

These are nation wide environmental, clinical, and epidemiological studies of insulation workers (Asbestos Workers).

At a recent meeting between the National Insulation Manufacturers Association Health Committee and Dr. Irving Selikoff, which was attended by C. L. Sheckler, Dr. Selikoff indicated that questionnaires concerning work histories and chest X-rays of thousands of Heat, Frost, and Asbestos Workers have been assembled in his Mt. Siani Hospital laboratory for study and analysis. He again emphasized the statistical data regarding causual relationship between asbestos dust exposure, smoking and primary lung cancer.

The Western Industrial Health Conference Asbestos Symposium was held on September 29, 1967. Dr. Clark Cooper discussed studies of San Francisco Bay Area insulation workers conducted by him at the University of California. He has examined approximately 400 workers thus far. Of the total examined, he indicated 42% were noted to have asbestos bodies present in the lungs. Dr. Cooper expressed the opinion that the asbestos dust, threshold limit standard of 5.0 million particles per cubic foot of air was not adequate and merely minimized, but did not eliminate pulmonary diseases.

ANALYSIS OF URBAN AIR SAMPLES FOR ASBESTOS FIBRE
DEPT. OF OCCUPATIONAL ENVIRONMENTAL HEALTH
WAYNE STATE SCHOOL OF MEDICINE
CONTACT - A. J. VORWALD, M.D.

The purpose of this study is to determine tissue reaction of animals from dust collected in the urban atmosphere.

Dr. Vorwald has reported that numerous fibers, some of which may be asbestos, were identified in the dust contained in the urban air samples.

An analysis of the lung tissues of exposed animals revealed no fiber and no tissue reactions.

A meeting has been arranged on November 1, 1967, at the J-M Research Center for discussions with Dr. Vorwald's staff and J-M personnel concerning techniques for the specific identification and quantification of the fibers in the urban air samples.

AIR DUCT EROSION TESTS
KETTERING LABORATORIES
CONTACT - R. A. KEHOE, M.D.
COORDINATOR - R. E. NAYLOR

The purpose of this study is to investigate erosion effects of air flow through fibre glass ducts.

The tests were conducted at the Owens-Corning Research Center under the direction of Kettering Laboratories.

Approximately 32 tests were conducted with duct liner and duct system materials. Examination of the samples indicated only 1 fiber found during the duct liner tests. This is believed to have come from a cut joint. No fibers were found during the duct system materials tests.

This study has been completed and a final report from Kettering Laboratory is due.

FIBROUS GLASS AND MINERAL WOOL INDUSTRY STUDY
UNITED STATES PUBLIC HEALTH SERVICE
CONTACT - LEWIS J. CRALLEY, PhD.
COORDINATORS - H.M. JACKSON AND C. L. SHECKLER

This is a 7 to 10 year environmental, clinical, and epidemiological study of fibrous glass and mineral wool to determine effect of workers exposed to these materials in United States.

FIBROUS GLASS AND MINERAL WOOL INDUSTRY STUDY (Cont'd)

General information regarding availability of personnel records, numbers of employees, etc., was forwarded to Dr. Cralley for each J-M Fiber Glass Plant. Similar data will be forwarded for plants producing mineral wool products.

COOPERATIVE ASBESTOS ENVIRONMENTAL
HEALTH PROJECT WITH DR. SELIKOFF'S
GROUP AT MT. SINAI HOSPITAL, N.Y.C.
CONTACT - IRVING J. SELIKOFF, M.D.
COORDINATOR - F. L. PUNDSACK

The objective of this project is to furnish characterized asbestos samples in prescribed particle size ranges for use in Dr. Selikoff's clinical studies. In addition, our objective is to furnish separated components of milled asbestos (such as the magnetic and non-magnetic rock fractions) for clinical studies. J-M has also agreed to furnish asbestos fiber treated with various agents which it is believed may modify the biological behavior of the fiber.

Four meetings have been held with Dr. Selikoff and his group. The most recent meeting was September 26, and the next meeting will be January 10, 1968. J-M has furnished Dr. Selikoff with over one-half dozen samples of asbestos treated in various ways to affect the surface chemistry of the fibers. The purpose of these treatments is to see if the biological behavior of the fiber can be altered. These treatments include heat treatment and treatment with chemical agents such as acetic acid, oleic acid, gelatine, and organo-silane compounds. Dr. Selikoff and his group will evaluate the fibers with physical adsorption tests and select the most promising treated fibers for further biological studies with animals.

In addition to the treated asbestos samples, J-M has furnished Dr. Selikoff respirable size fractions of "pure" Jeffrey asbestos fiber, non-magnetic, non-ferrous serpentine rock, and magnetic rock. It is Dr. Selikoff's intention to use this type samples in animal studies.

EPIDEMIOLOGICAL STUDY OF J-M RETIRED EMPLOYEES
UNIVERSITY OF PITTSBURGH
SCHOOL OF PUBLIC HEALTH
CONTACT - PHILLIP ENTERLINE, PhD.
COORDINATOR - H. M. JACKSON

This is an epidemiological study to determine and analyze the life span, causes of death and possible causal relationship to work exposures of J-M retired employees. Comparisons will be made between this group and similar age groups in the general population.

EPIDEMIOLOGICAL STUDY OF J-M RETIRED EMPLOYEES (Cont'd)

...r. Enterline is currently reviewing samples of the data available and will submit a proposal for the complete study within the next few weeks.

Extensive employment and retirement data have been obtained from J-M plant, mine, and sales locations and are being prepared for Dr. Enterline's study.

Social Security records are being obtained for approximately 200 retired employees to supplement the data from several locations.

MEETINGS, CONFERENCES, AND GENERAL INFORMATION
PERTINENT TO ENVIRONMENTAL AND HEALTH STUDIES

The comparison and correlation of information concerning British and J-M Asbestos Textile Industrial Hygiene information is continuing. Dr. S. Holmes has provided us with a sample of a sealed container used to transport fiber in the British Textile operations. Also, additional dust sampling data have been exchanged.

J-M Health Task Force meetings were held on August 15 and October 17. On both occasions the Health Task Force was briefed on the latest developments concerning ...e asbestos health problems, adverse publicity, scientific and medical developments, ...tigation, legislation, etc. Specific programs were presented and initiated to handle these problems.

Dr. J. Le Poutre, Eternit S.A., Belgium, visited the Manville Plants on September 1, 1967. The visit included a plant tour and discussion of asbestos health problems with C. L. Sheckler and Dr. E. I. Merrill.

Hill and Knowlton representatives, our public relation consultants, met with J-M Public Relations, Research and Environmental Control personnel at the Research Center on September 11, 1967. The purpose of the meeting was to brief Hill and Knowlton on the health problems concerning asbestos and demonstrate its use by touring the Research Center and Manville Pipe Plant.

A review of the Quebec Asbestos Mining Association Industrial Hygiene services and correlation of I. H. survey information was discussed by C. L. Sheckler and W. Bonneville at a meeting in Thetford Mines, Quebec, Canada, on September 20, 1967. Plans were initiated for an exchange of data regarding dust counting and noise evaluation procedures.

Dr. Jean Avril, Medical Director of Ferrodo, France, visited the Research Center and Manville Plants on September 25, 1967. E. M. Fenner and W. C. Streib guided Dr. Avril on a tour of the operations and along with Dr. E. I. Merrill, discussed asbestos health and environmental control problems.

MEETINGS, CONFERENCES, AND GENERAL INFORMATION
PERTINENT TO ENVIRONMENTAL AND HEALTH STUDIES (Cont'd)

An Asbestos Textile Institute Meeting was held on October 5-6, 1967. The Air Hygiene Committee devoted the entire meeting to a discussion of the asbestos health problems confronting the industry. Dr.Lewis Cralley, United States Public Health Service briefed the committee on the status and plans regarding their Asbestos Industry Study. The A.T.I. approved the purchase of an electronic dust counter to be used by member companies. This equipment will afford an opportunity for exchange of consistent data regarding dust concentrations. E.H. Wells and C. L. Sheckler attended and discussed the health program in detail with Dr. Cralley and A. T. I. representatives.

The National Insulation Manufactures Association Health Information Program is progressing on schedule. A meeting of the Associated Asbestos Contractors of the South Eastern states was held on October 9, 1967. C. L. Sheckler and the NIMA group presented their health and safety program. The response was exceptionally good. Work is continuing on programing for next year's presentations. A meeting was held with Dr. I. J. Selikoff to discuss his reviews on the H.F.I.A.W. medical program. Also, work is progressing on preparation of recommended codes of practice for handling insulation materials including asbestos, fiberous glass and mineral wool.

A meeting of the Industrial Hygiene Foundation of America was held on October 10,1967. The program included considerable discussion concerning air and water pollution also solid waste disposal. An excellent presentation was made by F. J. Solon entitled "Communicating the Effectiveness of Industry's Hazard and Pollution Controls-Whose Job?". The program included speakers from Eastman Kodak, Owens-Corning Fiberglas, U. S. Dept. of Health, Education and Welfare, and the American Cancer Society.

An Asbestos-Cement Building Products Industry Health and Safety Committee has been created. This committee will include representatives of Certain- Teed. Ruberoid, Flintkote and Johns-Manville. C. L. Sheckler has arranged a meeting for November 9, 1967 to initiate work on recommended codes of practice for handling asbestos-cement building products.

During this reporting period, Environmental Control Department personnel visited Waukegan, Chicago, Joliet, Rockdale, Nashua, Billerica, Tilton, Lawrence, Jeffrey, Asbestos, Cleveland, Marrero, Natchez, Green Cove, Savannah, New Orleans Marshville, and Laurinburg Plants. These visits included tours of the operations, evaluations of housekeeping, dust, noise, fume and general industrial hygiene control, air and water effluent and waste disposal. In addition, the management of each plant was briefed on the purpose, objectives, and operation of the Environmental Control function.

Appendix W

Environmental Control Department
Research & Engineering Center
January 2, 1968

CONFIDENTIAL

W. P. Raines - GHQ

Water Contamination Studies

The water contamination studies planned by the Research Center are in three groups. In the first two the samples collected will be checked as follows:

(1) Filtration tests, and microscopic examination of the particulate matter to detect asbestos, if present.

(2) Water hardness.

(3) Water pH.

(4) Iron content of the water.

The Group I program involves tests of water from Bound Brook, N. J., "an all cast-iron pipe town" and Manville, N. J., "an all asbestos-cement pipe town". The sampling and testing program will begin immediately after the first of the year. Samples will be taken weekly from each town. The program will continue until definitive results are obtained.

The Group II test program involves water samples from the following cities:

Globe, Arizona
San Diego, California
Long Beach, California
Providence, Rhode Island
Wichita, Kansas
Memphis (Capleville District), Tennessee.

Two samples will be taken from each city. The first sample will be the source water before it has passed through asbestos-cement pipe and the second will be water after it has passed through the pipe. Samples from Globe, San Diego, and Long Beach have been received and the others are due soon.

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The Group III tests will be made on a new pipe test loop stand under construction at the Research and Engineering Center. This test stand will permit controlled studies of the erosion or disintegration of asbestos-cement pipe by water of different pH and hardness values. The system utilizes a 30-ft test run of asbestos-cement pipe and is equipped with fairly sophisticated control equipment. The water run through the test will be filtered and examined for asbestos fiber content. The water, which will not be recirculated, will be continuously and automatically adjusted to the proper pH and hardness values. This system is scheduled to be in operation in April 1968. The first long-term test is planned with very severe water conditions insofar as asbestos-cement pipe is concerned - low pH and low hardness.

E. M. Fenner

EMF/ems

cc: F. L. Pundsack
J. H. Swensen
File
C

CRMC-Asb&Health-BODMin-000116

J-M Policy

As Discussed at the Division Managers' Meeting.
August 28, 1967

1. We must operate clean mines, mills, and plants with m[illegible] noise and physically safe operations.

2. We must operate at speeds and conditions that will g[illegible] those results. For some operations this may increase dire[illegible] dust costs. We will accept this increase in view of the c[illegible]stances involved.

3. The Environmental Control Standard Practices will be [illegible]ed in all J-M locations.

4. Each mine, mill, and plant will designate, in writing, [illegible] areas and jobs that require special safety and personal pro[illegible]n equipment. Every person from president to janitor m[illegible]r this equipment when in designated areas.

5. Special rules for asbestos and other toxic dusts will [illegible]nforced as follows:

   A. Eliminate all extraneous dusts, including visible [illegible] that are below the threshold limits.

   B. Maintain equipment in good condition or it must b[illegible] down. For instance, a hole in the casing of a bucket el[illegible] will not be tolerated. There must be no dust or fibre [illegible]ing from the process.

   C. All buildings, structures, etc., and all equipmen[illegible]ll be free of extraneous dusts that will cause atmosphe[illegible]ontami-nation.

   D. Eliminate the use of brooms, brushes, and hand sh[illegible]. Use mechanical equipment and vacuum cleaners.

   E. Management and Supervision must be indoctrinated [illegible]ve a positive attitude toward dust control and housek[illegible]. Maintaining a clean operation is equally as impor[illegible]e production. Supervision must instruct our workers [illegible] we intend to operate clean locations and insist that [illegible]be done.

   F. Asbestos fibre and toxic material bags must be seal[illegible] Men performing this cleanup function must wear approv[illegible] respirators and gloves.

CRMC-Asb&Health-BODMin-000117