

Arthur Langer deposition in Jr V case
(4/13/2023)

43. (Ex 12) Nov. 10, 1971 AML tells Dr. James Hildeback-Smith of Jr-V that chrysotile was found in the product and in human tissue
- 48-49 Langer + Rohl publ. 1976 paper on talc analysis
(Ex 15) FDA symposium
- 50-52 (Ex 16) pictures in a paper on talc analysis
- 55 Norm Estlin of CTFA said chrysotile was sodium sesquicarbonate
- 56 and had provided Langer's paper to J&J
- 62 AML coauthored w/ Pooley, who withdrew their paper presentation at Edinburgh under pressure
- 63 it appears that J&J CEO and president met w/ Dr. Chalmers at Mt. Sinai in 1976 (AML not there)
- 64 He found chrysotile but no amphiboles in VBP
- 65-66 J. S. Swagerman incl. Bruce Bishop met AML in 2017, and he told them he found A in VBP
AML also told that to journalist in 2018
- 96-97 (Cross) shown poor copy of news report in which he is quoted saying he found only a "bare trace" in baby powder (1972)
- 102-103 Pooley + McCrone (Stewart) did not find chrysotile in samples of the same lot of VBP they sent AML. AML did not know of these tests, he wasn't told.
- 108 in mid 1970s the lab got a superior EM w/ 10x the magnification and ability to determine chemistry
- 110 1976 paper 'seminal' found no amphiboles in talcs (4) from Jr-V, ~~exp.~~ Asked if there was no chrysotile in Jr-V samples, AML said No
- 118 The list of products in 1976 paper was prepared by someone else, not AML.
- 142 publ. in 1979 ~~that~~ + Disease
- 146 AML: gov says no safe level
- 148 Risk of contamination found in JBP a "phantom risk"
- 150 Langer goes on to say chry. doesn't cause Per. meso

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SUPERIOR COURT OF CALIFORNIA
COUNTY OF ALAMEDA

ANTHONY HERNANDEZ VALADEZ,)
Plaintiff,)
v.) CASE NO. 22CV012759
JOHNSON & JOHNSON, et al.,)
Defendants.)

VIDEOTAPED DEPOSITION OF ARTHUR M. LANGER, Ph.D.
Williamsburg, Virginia
Monday, April 3, 2023
9:56 a.m.
Pages 1 - 249

Reported by: Penny C. Wile, RMR-CRR
Job No. AW5806091

1 Videotaped deposition of ARTHUR M. LANGER, Ph.D.,
2 held at:

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6 WILLIAMSBURG LODGE
7 310 S. England Street
8 Williamsburg, VA 23185
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12 Pursuant to agreement, before Penny C. Wile,
13 Registered Merit Reporter, Certified Realtime Reporter,
14 and Notary Public for the Commonwealth of Virginia.
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(Via Videoconference)

Also present: Jeremy Belcher, Videographer

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P R O C E E D I N G S

THE VIDEOGRAPHER: We are now on the video 09:56:00
record. Today's date is April 3rd, 2023, and the time 09:56:01
is 9:56 a.m. Today's witness is Arthur Langer. Counsel 09:56:05
have agreed to waive the usual videographer's 09:56:09
introduction. 09:56:12

Will counsel please introduce themselves, 09:56:12
starting with plaintiff's counsel, and the court 09:56:14
reporter will please swear in the witness? 09:56:14

MR. SATTERLEY: Good morning. Joe 09:56:16
Satterley on behalf of Anthony Hernandez Valadez. 09:56:17

MR. ASHBY: Good morning. Matthew Ashby 09:56:21
for Johnson & Johnson and LTL. 09:56:22

MR. CHARCHALIS: Good morning. Mitchell 09:56:26
Charchalis on behalf of the retailer defendants. 09:56:28

MR. SATTERLEY: If you could swear the 09:56:32
witness. 09:56:33

(Exhibit A was marked and
attached to the transcript.)

ARTHUR M. LANGER, Ph.D.,
having been sworn, testified as follows:
EXAMINATION BY COUNSEL FOR THE PLAINTIFF: 09:56:42
BY MR. SATTERLEY: 09:56:42
Q. Good morning. Introduce yourself to the 09:56:43

1	jury.	09:56:45
2	A. I am Arthur M. Langer, L-A-N-G-E-R. My	09:56:46
3	current status is professor emeritus. The title, of	09:56:56
4	course, is long and lengthy, as a professor emeritus of	09:57:00
5	the doctoral program in earth and environmental sciences	09:57:04
6	at the graduate school of City University of New York.	09:57:09
7	So I'm retired. That's a long term for retirement.	09:57:16
8	Q. We're here in a case for Anthony Hernandez	09:57:19
9	Valadez involving his exposure to Johnson & Johnson.	09:57:22
10	Have I asked you to tell us a little bit about your	09:57:25
11	history with regards to Johnson & Johnson?	09:57:28
12	A. Johnson & Johnson specifically. Johnson &	09:57:32
13	Johnson was a -- a producer of a talcum powder available	09:57:41
14	to the general public. When I first started at Mount	09:57:47
15	Sinai, as the Mount Sinai Hospital, in 1965 I became	09:57:55
16	interested in the study of baby powders, just generic	09:58:01
17	baby powders. As a result of our study at Mount Sinai	09:58:06
18	on the occurrence of objects called asbestos bodies in	09:58:13
19	the lungs of people in the general population coming to	09:58:19
20	autopsy in New York City, the asbestos body was a marker	09:58:26
21	for -- following the exposure to asbestos dust in the	09:58:34
22	workplace and used as an index of exposure.	09:58:40
23	It was an interesting marker indicating	09:58:48
24	that the agent responsible for scarring of the pulmonary	09:58:52
25	tissues, the lung tissues, was the fiber itself. We	09:59:02

1	found in a study of 3,000 consecutive autopsies in New	09:59:09
2	York City that a number of these individuals who came to	09:59:13
3	autopsy had what appeared to be asbestos bodies in their	09:59:16
4	tissues.	09:59:21
5	We could not determine where their	09:59:25
6	exposures to these mineral fibers occurred. We were	09:59:29
7	interested in the source of either asbestos or	09:59:35
8	elongated -- today we refer to them as elongated mineral	09:59:41
9	particles. We were seeking sources of fiber, of mineral	09:59:47
10	fiber, to explain why these objects were present in	09:59:57
11	these tissues and no other exposure could be -- could	10:00:02
12	account for these objects.	10:00:10
13	I at that time as a mineralogist suggested	10:00:14
14	that there were other mineral products that contain	10:00:19
15	fibers that may form these bodies. They were later	10:00:28
16	called ferruginous bodies because these objects were	10:00:34
17	coated with an iron protein material.	10:00:38
18	And one of the products which was commonly	10:00:41
19	used by persons in the general population were powders,	10:00:44
20	talcum powders. And so you asked specifically for	10:00:51
21	Johnson & Johnson. The -- one of the canisters that we	10:00:56
22	originally studied was a -- a Johnson & Johnson Baby	10:01:04
23	Powder, but the -- the study was a study of a generic	10:01:09
24	group of materials marketed as powders, talcum powders.	10:01:15
25	So you -- your -- your question is did we	10:01:26

1	include Johnson & Johnson? Well, it just happened.	10:01:28
2	Q. Sure.	10:01:31
3	A. But there were lots of other powders that	10:01:32
4	we studied.	10:01:35
5	Q. So --	10:01:39
6	MR. ASHBY: Just let me ob -- object as	10:01:40
7	nonresponsive. Object --	10:01:42
8	BY MR. SATTERLEY:	10:01:43
9	Q. So we're going to talk specifically about	10:01:43
10	Johnson & Johnson in more detail, and we're going to	10:01:45
11	talk about your history. And I've marked as exhibits	10:01:47
12	some photographs.	10:01:50
13	And before I get to the photographs, did	10:01:50
14	you in 1971 identify chrysotile asbestos in Johnson's	10:01:52
15	Baby Powder?	10:02:01
16	A. Yes.	10:02:01
17	Q. Did --	10:02:04
18	A. Yes.	10:02:04
19	Q. Did you meet a Dr. Gavin Hildick-Smith in	10:02:05
20	1971?	10:02:08
21	A. Approximate at that time, yes.	10:02:10
22	Q. And did you advise -- oh, did you	10:02:12
23	understand he -- he -- Dr. Gavin Hildick-Smith to be	10:02:15
24	with Johnson & Johnson?	10:02:19
25	A. Yes.	10:02:19

1 Q. And did you advise him that you found 10:02:20
2 chrysotile asbestos in Johnson's Baby Powder? 10:02:23
3 A. Oh, you're using the word advise. I -- I 10:02:25
4 told him at a -- a seminar that these were my findings, 10:02:28
5 yes. 10:02:36
6 Q. And we'll talk about -- oh, did you later 10:02:36
7 in the '70s look at more Johnson & Johnson Baby Powder? 10:02:39
8 A. Yes. 10:02:43
9 Q. Okay. We'll talk about that in more 10:02:43
10 detail. 10:02:45
11 Let's go to the photographs. 10:02:45
12 (Exhibit 1 was marked and 10:02:45
13 attached to the transcript.) 10:02:45
14 BY MR. SATTERLEY: 10:02:45
15 Q. Exhibit 1, I've -- I've handed to Johnson 10:02:49
16 & Johnson's attorney, these -- these photographs. 10:02:51
17 Let's -- let's talk about them. If you could flip them 10:02:52
18 around and show the camera and -- and -- and -- and tell 10:02:54
19 us all who -- and right over here, Dr. Langer. 10:02:57
20 A. Oh, hello. 10:03:02
21 Q. Okay. All right. So who's in these -- 10:03:02
22 who's in Exhibit 1? Who's -- who's represented here? 10:03:05
23 A. Okay. May I? There are four seated 10:03:08
24 figures and two standing figures. The figure 10:03:16
25 immediately on the left side of the photograph seated is 10:03:19

1	Dr. Mortimer Bader, B-A-D-E-R. Morty Bader was in the	10:03:25
2	Department of Medicine, Mount Sinai Hospital, later in	10:03:32
3	the Department of Medicine, Mount Sinai School of	10:03:35
4	Medicine. Morty Bader developed the pulmonary function	10:03:38
5	laboratory in the Department of Medicine.	10:03:44
6	Morty Bader was the senior author in	10:03:48
7	the -- of the study of asbestos-exposed workers in	10:03:56
8	Patterson, New Jersey at the facility called Unarco.	10:03:59
9	And it was he and Irving Selikoff and a number of others	10:04:04
10	in the Department of Medicine that defined asbestosis as	10:04:08
11	a pulmonary alveolar block syndrome, which was a major	10:04:15
12	contribution at that time.	10:04:21
13	The disease, the scarring of the lungs,	10:04:23
14	was in a pattern which was not like a -- silicosis, but	10:04:26
15	the -- the asbestosis was, I suppose you could use the	10:04:34
16	word, more sinister in that the scarring was minimal,	10:04:39
17	but it occurred at the exchange of gases from oxygen and	10:04:44
18	carbon dioxide, an alveolar capillary block, which the	10:04:51
19	scar tissue was at that narrow, small tissue of a -- a	10:05:01
20	-- a single cell.	10:05:10
21	Q. And who's next to him?	10:05:11
22	A. Next to him, in the center basically, is	10:05:12
23	Kyler Hammond.	10:05:19
24	Q. And -- and who is Kyler Hammond?	10:05:20
25	A. Kyler Hammond was involved in the	10:05:22

1	development of the design of the insulation workers, the	10:05:28
2	study by Irving Selikoff and colleagues. Kyler Hammond	10:05:32
3	was the vice president of statistics and epidemiology at	10:05:37
4	the American Cancer Society. He was a statistician, an	10:05:42
5	epidemiologist. And it was his studies with Irving	10:05:48
6	Selikoff that defined the -- the hazards associated with	10:05:55
7	asbestos-containing products.	10:06:02
8	Q. And is Selikoff, Dr. Selikoff, sitting	10:06:04
9	next to Dr. Hammond?	10:06:07
10	A. Next to Kyler Hammond is Irving Selikoff.	10:06:08
11	Irving Selikoff, of course, of -- an American icon in	10:06:12
12	occupational medicine. Irv studied -- actually, his	10:06:17
13	major contribution to the study of asbestos workers and	10:06:24
14	their diseases -- his major contribution was -- the	10:06:29
15	initial studies of asbestos diseases was carried out	10:06:39
16	among miners and millers and factory workers engaged in	10:06:43
17	the -- in the fabrication of products. But Irving	10:06:52
18	brought the products into the workplace and extended it	10:06:56
19	beyond the workplace, to family members and the general	10:07:04
20	environment. Irving, of course, made his name with the	10:07:07
21	application of isoniazid and the winning of the Alaska	10:07:16
22	Award for Clinical Trials. That was approximately 1953	10:07:21
23	or '4.	10:07:25
24	Sitting next to Irving Selikoff is Robert	10:07:27
25	Schnitzer. Robert Schnitzer, pharmacologist, M.D. He	10:07:32

1	was chief pharmacologist for IG Farben in Germany. He	10:07:37
2	was brought out of what -- I think of Dachau by Hoffman	10:07:43
3	LaRoche. They took him over to Canada and then down to	10:07:52
4	Nutley, New Jersey where he worked on isoniazid and	10:07:59
5	developed that compound at the same time Waksman did for	10:08:04
6	the treatment of tuberculosis.	10:08:07
7	Q. Who's standing?	10:08:09
8	A. Standing on the left side, a biologist,	10:08:10
9	Dr. Victor Baden. He and I worked and -- worked	10:08:15
10	together in the study of asbestos bodies and fibers in	10:08:22
11	the lungs of persons in New York City.	10:08:26
12	And this young guy standing to the	10:08:33
13	absolute right is what I looked like -- what I looked	10:08:35
14	like long ago.	10:08:39
15	Q. This is early in your career?	10:08:40
16	A. Very early in my career, yes. This is	10:08:41
17	about 1960, maybe '67.	10:08:44
18	Q. So you're a mineralogist?	10:08:47
19	A. I am trained, yes, in mineralogy. I was	10:08:50
20	trained at Columbia University. I have a master's and a	10:08:54
21	Ph.D. from Columbia University. I studied various	10:08:58
22	mineralogical issues.	10:09:04
23	I was recruited by Irving Selikoff in 1965	10:09:06
24	to join his newly formed unit, Environmental Sciences	10:09:11
25	Lab -- actually, it was Environmental Medicine. This	10:09:17

1	predated the Environmental Sciences Laboratory. He	10:09:20
2	recruited me. He was interested in having a	10:09:25
3	mineralogist as part of his -- part of his team to	10:09:34
4	explain and explore the mineral issues associated with	10:09:40
5	the diseases observed following the inhalation of	10:09:48
6	colloidal particles in atmospheres.	10:09:53
7	Q. As a mineralogist did you publish with	10:09:56
8	Dr. Selikoff?	10:09:59
9	A. Many papers, yes.	10:10:00
10	Q. And we'll -- and we'll talk about some of	10:10:01
11	those a little bit later.	10:10:03
12	With regards to your work with	10:10:05
13	Dr. Selikoff and these other scientists at Mount Sinai	10:10:08
14	in the 1960s, did both you and Dr. Selikoff become	10:10:11
15	interested in talc issues?	10:10:14
16	A. Yes, of course.	10:10:18
17	Q. Who is -- well, yeah, who's Dr. Lewis	10:10:19
18	Cralley?	10:10:22
19	A. Lew Cralley was the -- the head of the	10:10:23
20	occupational -- the -- it's occupation -- well, the	10:10:30
21	specific name, occupational health, or the -- yes, the	10:10:35
22	occupational health unit within the Public Health	10:10:42
23	Service with the laboratories in Cincinnati, Ohio.	10:10:50
24	Lew Cralley was very important at that time because his	10:10:55
25	group -- this is Jeremiah Lynch and Howard Ayer. They	10:11:01

1	were -- they were studying the unit of the metric used	10:11:09
2	to measure dust in the workplace for asbestos. The unit	10:11:17
3	at the time -- this is in the early '60s. The unit at	10:11:24
4	the time were million particles per cubic foot of air.	10:11:30
5	But the British, studying the very same	10:11:36
6	problem, found that the disease asbestosis did not	10:11:39
7	correlate very well with million particles per cubic	10:11:43
8	foot. If it's asbestos, asbestos disease, it is the	10:11:46
9	asbestos fiber concentration in the aerosol which is	10:11:53
10	important. So in order for the occupational health unit	10:11:59
11	to establish some kind of standard -- 1965-1966 the	10:12:03
12	national standard for asbestos was --	10:12:17
13	Q. Well, let me stop you there, Dr. Langer.	10:12:18
14	I apologize. On Dr. Cralley what I wanted to ask you	10:12:20
15	about, did you interact with him with regards to talc	10:12:23
16	issues in the -- in the 1960s?	10:12:25
17	A. Oh, yes, of course. Yes. Yes. Yes.	10:12:27
18	I -- that was the predicate. That was the -- the	10:12:29
19	preliminary introduction.	10:12:30
20	Q. How -- how did --	10:12:31
21	A. Sure I knew Lew Cralley.	10:12:32
22	Q. How -- how did -- how did you get involved	10:12:34
23	with Dr. Cralley with regards to talc issues?	10:12:36
24	A. We -- we. Irving Selikoff, Kyler Hammond,	10:12:40
25	occasionally others, and I visited the -- the unit, the	10:12:47

1 laboratory, in Cincinnati, Ohio. We would fly down and 10:12:55
2 have meetings with them. We were interested in the 10:13:00
3 asbestos standard. We were interested in what they were 10:13:07
4 doing in the workplace. We saw their electron 10:13:09
5 microscopy unit that they were setting up. And we spoke 10:13:18
6 with, of course, Ayer and Lynch. And we were -- we gave 10:13:20
7 seminars. We actually had presentations. If -- if we 10:13:34
8 were to go into Cincinnati, Ohio, we would give updates 10:13:37
9 on our studies and the literature. And so we would do 10:13:41
10 that. And as we spoke, we spoke about the nature of the 10:13:43
11 asbestos bodies. 10:13:54
12 Q. Uh-huh. 10:13:54
13 A. And we were unsure of the cores of the 10:13:55
14 asbestos bodies. We have all kinds of instrument 10:13:58
15 packages -- 10:14:02
16 Q. Uh-huh. 10:14:02
17 A. -- to look at the -- at the stuff that we 10:14:02
18 recovered from lungs. 10:14:04
19 In terms of Lew Cralley, we broached the 10:14:05
20 subject of consumer talcum products as sources of fiber. 10:14:16
21 He had a -- 10:14:21
22 Q. And when was this? Approximately what 10:14:21
23 timeframe are we talking about here? 10:14:23
24 A. 1966. May -- maybe '67 as late. But 10:14:26
25 '66 -- '60 -- it may even be earlier. Late '65. But 10:14:30

1 nevertheless, we shared our information with them. We 10:14:35
2 said, Gee, there are 3,000 people with these objects 10:14:41
3 called asbestos bodies; where are they being exposed and 10:14:46
4 to what. So we shared our concern regarding consumer 10:14:49
5 products, which included talcum powder. 10:14:54
6 He, on the other hand, went beyond this. 10:14:58
7 His paper in 1968, he presented again at the 10:15:02
8 Johannesburg International Pneumoconiosis Conference in 10:15:06
9 1969, and he said, Yeah, here are electron 10:15:12
10 photomicrographs and -- of the 20-whatever-odd sources 10:15:15
11 of fiber. The people in the general public among those, 10:15:21
12 he has a couple of electron micrographs showing fibers 10:15:29
13 from talc, talcum powder. 10:15:34
14 Q. And we'll get -- I think I'm going to mark 10:15:37
15 his paper in a little bit. 10:15:40
16 (Exhibit 2 was marked and 10:15:40
17 attached to the transcript.) 10:15:40
18 BY MR. SATTERLEY: 10:15:40
19 Q. Let's go to Exhibit 2, the pho -- the next 10:15:42
20 photograph we have. Who -- who is in Exhibit 2 there? 10:15:44
21 A. Exhibit 2. Well, that's my co-author -- 10:15:46
22 author. That is Arthur Rohl. Arthur Rohl. 10:15:50
23 Q. And was he a mineralogist as -- 10:15:55
24 A. He was a mineralogist. He was at Columbia 10:15:57
25 at the same time I was there. 10:16:00

1	Q.	Did you and he publish papers together?	10:16:02
2	A.	Yes, we published a number of papers	10:16:04
3		together.	10:16:07
4	Q.	Was he a good mineralogist?	10:16:07
5	A.	Terrific. Smart guy. Smart.	10:16:09
6	Q.	As a mineralogist did you and Dr. Rohl	10:16:12
7		study geology as well?	10:16:15
8	A.	Yes, of course. Yes.	10:16:16
9	Q.	Explain the -- the connection between	10:16:18
10		geology and mineralogy.	10:16:20
11	A.	Mineralogy is a subdiscipline within	10:16:27
12		geology. If you're interested in fossils you're a	10:16:29
13		paleontologist. If you're interested in dinosaurs	10:16:33
14		you're a vertebrate paleontologist. If you're	10:16:36
15		interested in the structure of the earth and the -- the	10:16:38
16		physics of the earth you're a geophysicist. Chemistry,	10:16:41
17		you're a geochemist, bup, bup, bup, bup. And	10:16:44
18		petrologist -- I -- I studied at Columbia petrology,	10:16:51
19		which is the origin of rocks and rock systems and the	10:16:54
20		minerals that constitute different kinds of mineralogic	10:16:58
21		units, and from that I went into mineralogy.	10:17:05
22	Q.	Did you and Dr. Rohl publish on the	10:17:07
23		mineral assemblages that are found in talc products?	10:17:09
24	A.	Very interesting. Very important.	10:17:13
25		Talc itself -- the origin of talc in	10:17:17

1 nature in terms of the -- the temperatures, the 10:17:20
2 pressures, water content, and the processes by which 10:17:31
3 minerals form, inevitably -- I'm saying it's inevitable 10:17:35
4 that certain other minerals occur with talc. These may 10:17:45
5 be serpentine minerals, lizardite -- that's a platy -- a 10:17:53
6 platy mineral. Lizardite. Antigorite, another platy 10:17:57
7 peculiar mineral. The serpentine mineral, which 10:18:03
8 includes chrysotile which is asbestos. And could 10:18:07
9 include various carbonate minerals; calcite, dolomite, 10:18:07
10 and so on. Micas, which is sheet silicates. 10:18:22
11 And I think you are correct that there are 10:18:26
12 mineral assemblages that occur with talc. And, of 10:18:29
13 course, it is the processing of the talc, the 10:18:37
14 beneficiation, the milling of the material, that is used 10:18:40
15 to separate talc from other minerals. 10:18:46
16 Q. Well -- 10:18:51
17 MR. ASHBY: Just object. Non-responsive. 10:18:51
18 Move to strike. 10:18:53
19 BY MR. SATTERLEY: 10:18:53
20 Q. And we'll -- and we'll go through that in 10:18:54
21 a little more detail. Let's go to Exhibit 3? 10:18:58
22 (Exhibit 3 was marked and 10:18:58
23 attached to the transcript.) 10:19:01
24 MR. CHARCHALIS: Sorry, Joe. I just want 10:19:01
25 to join in that objection. And, Joe, do you -- do you 10:19:02

1 have a problem if we do one objection -- 10:19:04

2 MR. SATTERLEY: Sure. 10:19:04

3 MR. CHARCHALIS: One objection for all, so 10:19:07

4 I don't cut you guys off? 10:19:08

5 MR. SATTERLEY: Sure. No problem. You 10:19:09

6 can join -- I -- I assume you're going to join in every 10:19:10

7 of Matt's objections. 10:19:13

8 MR. CHARCHALIS: Thank you. 10:19:14

9 MR. ASHBY: Very few that I make. 10:19:14

10 MR. SATTERLEY: Okay. 10:19:17

11 BY MR. SATTERLEY: 10:19:17

12 Q. So let's go to Exhibit 3. 10:19:18

13 What is Exhibit -- who's in Exhibit 3? 10:19:19

14 A. In Exhibit 3 is -- Irving Selikoff is 10:19:20

15 seated there in front of a light box looking at a -- 10:19:23

16 a -- chest x-rays. The standing gentleman is Jack 10:19:26

17 Churg. Jacob Churg, of course, is one of the co-authors 10:19:33

18 on many of the papers with Irving Selikoff. In fact, 10:19:37

19 Selikoff, Churg, and Hammond are the -- the three 10:19:42

20 principals defining asbestos exposure following product 10:19:46

21 use and product application, installation, among workers 10:19:57

22 that are not miners and millers and are not factory 10:20:02

23 workers. These are outside of the bounds. They -- 10:20:06

24 Q. Was there a big conference in New York 10:20:13

25 City in the mid '60s where Jacob Churg and Dr. Selikoff 10:20:14

1	and Kyler Hammond sort of chaired that conference?	10:20:18
2	A. That con -- the major conference,	10:20:21
3	Biological Effects of Asbestos, Volume 132, held in New	10:20:28
4	York City in October 1964. The -- the publication was	10:20:34
5	the 31st of December 1965, which means that the	10:20:42
6	conference proceedings of 1964 would not have been	10:20:48
7	distributed to the general consuming public until early	10:20:54
8	1965.	10:21:02
9	Q. Was that a big conference in New York	10:21:06
10	City?	10:21:08
11	A. It was a -- a benchmark. It was a	10:21:08
12	benchmark. In fact, it -- it involved both sides of the	10:21:12
13	asbestos issue because even then, in 1964, there were	10:21:18
14	sides, there were viewpoints, there were contingencies	10:21:28
15	that stood in opposition. One side was industry and the	10:21:34
16	other side, generally so, academics.	10:21:41
17	Q. Let's keep going through these	10:21:47
18	photographs. I love these photographs. The next one I	10:21:48
19	think I marked as Exhibit 4. And I appreciate you	10:21:49
20	sharing these photographs with me.	10:21:51
21	(Exhibit 4 was marked and	10:21:51
22	attached to the transcript.)	10:21:51
23	BY MR. SATTERLEY:	10:21:51
24	Q. This is one of my favorites. What is this	10:21:53
25	one?	10:21:55

1	A.	I am seated at --	10:21:55
2	Q.	You can flip it around for the camera.	10:21:58
3	A.	Oh. I'm sorry. Okay.	10:22:00
4	Q.	Oh, I think you -- you -- did you skip	10:22:02
5		past this one (indicating)?	10:22:04
6	A.	Yeah. No. No, I did not. But I think I	10:22:06
7		may have skipped past this one (indicating).	10:22:09
8	Q.	Okay. We'll -- we'll come back to them	10:22:11
9		all.	10:22:13
10	A.	Okay.	10:22:14
11	Q.	Okay. And go ahead.	10:22:17
12		MR. ASHBY: Which exhibit is this one now?	10:22:19
13		THE WITNESS: This is Exhibit 4.	10:22:22
14		MR. ASHBY: Okay.	10:22:24
15		BY MR. SATTERLEY:	10:22:24
16	Q.	This -- this is -- they got out of order a	10:22:24
17		little bit. The Exhibit 4 is you're at the -- is that	10:22:26
18		you at the microscope?	10:22:29
19	A.	Yes. I'm seated at a -- a JEOL, Japanese	10:22:30
20		Electron Optical Laboratory, model 100CX -- boy, that	10:22:36
21		was a good scope -- interfaced with a Tracor Northern	10:22:42
22		Energy-Dispersive X-Ray Spectrometry system, which means	10:22:45
23		that one could obtain photographic images of an object	10:22:52
24		one is -- was viewing on the EM, electron microscope,	10:23:01
25		screen.	10:23:06

1	One could change controls to focus in the	10:23:08
2	back focal plane of an -- of an image, focus on the	10:23:15
3	diffracted electrons that were -- that were generated in	10:23:19
4	the -- in the crystalline particle I was scanning. And,	10:23:26
5	of course, I could focus a beam on the particle and	10:23:32
6	generate the chemical signal. So I could determine the	10:23:36
7	morphology, the structure, and the chemistry of the	10:23:42
8	particle I was looking at.	10:23:45

9	Q. And when the jury hears the term	10:23:47
10	transmission electron microscope, is that what you're	10:23:50
11	sitting in front of?	10:23:53

12	A. Yes, exactly.	10:23:54
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13	Q. And is -- in your experience as a	10:23:55
14	mineralogist did you utilize this device on a regular	10:23:58
15	basis?	10:24:02

16	A. Yes. Routine, yes.	10:24:02
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17	Q. And -- and -- and was this a good piece of	10:24:04
18	equipment to evaluate a talcum powder for the presence	10:24:08
19	of fibrous mater -- materials?	10:24:12

20	A. Any materials, yes.	10:24:13
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21	Q. Okay. Let's keep going. We've got a	10:24:15
22	whole bunch of photographs here.	10:24:17

23	(Exhibit 5 was marked and	10:24:17
24	attached to the transcript.)	10:24:17

25	BY MR. SATTERLEY:	10:24:17
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1 Q. Exhibit 5, what -- is this another 10:24:19
2 photograph of you? 10:24:21
3 A. This is another photograph of me sitting 10:24:22
4 at the electron microscope console. 10:24:24
5 Q. And is this in the laboratory there in -- 10:24:28
6 in New York City? 10:24:34
7 A. This would be in the -- it's probably in 10:24:35
8 the second facility. We had several facilities at Mount 10:24:42
9 Sinai. We started off in the surgical pavilion. We 10:24:48
10 then had laboratories constructed in the north building. 10:24:52
11 And this photograph was taken in the Nathan Cummings 10:24:57
12 Basic Science Building. So there were several 10:25:07
13 facilities, which explains lots of -- I've been asked 10:25:09
14 what I've done with various documents. We moved three 10:25:20
15 times, and I tried to get rid of stuff that was just 10:25:23
16 taking up space. 10:25:26
17 (Exhibit 6 was marked and 10:25:26
18 attached to the transcript.) 10:25:26
19 By MR. SATTERLEY: 10:25:26
20 Q. The next one is now my favorite one I was 10:25:32
21 talking about earlier. And -- and -- and this is 10:25:34
22 Exhibit -- is this 6 now, Exhibit 6? 10:25:36
23 A. This is Exhibit 6. 10:25:39
24 Q. And tell me about this photograph. 10:25:40
25 A. Well, this -- Irving Selikoff and I 10:25:44

1 occasionally had lighter moments. And Irving and I are 10:25:48
2 standing in his conference room, his office. And he had 10:25:55
3 a large blackboard in there. And I was explain -- I had 10:26:01
4 explained to him the -- the nature of isolating -- on 10:26:06
5 the basis of chemistry of isolating amosite from 10:26:13
6 crocidolite, from anthophyllite, from chrysotile, and so 10:26:17
7 on and so forth. And I had gone through this whole 10:26:23
8 rigmarole. And Irv was very kind and attentive but 10:26:31
9 didn't know what in the hell I was talking about. 10:26:37
10 Q. So you were explaining the different fiber 10:26:39
11 types of asbestos, whether it be anthophyllite -- 10:26:40
12 A. How I could distinguish them and why they 10:26:43
13 had -- if you note on that board, there are these 10:26:46
14 circles. These circles (indicating). 10:26:49
15 Q. Uh-huh. 10:26:57
16 A. Those circles defined a whole field 10:26:57
17 because individual particles had certain variation, 10:27:00
18 especially if you had bundles, bundles of -- of fibrils. 10:27:05
19 It incorporated small amounts of other minerals. And so 10:27:11
20 there were fields that defined anthophyllite, fields 10:27:21
21 that defined amosite. That has a little more iron or a 10:27:24
22 little more silica, bup, bup. Crocidolite, sodium 10:27:28
23 fluctuated. 10:27:32
24 But Irv and I -- I explained all this. 10:27:34
25 And I had said something to the effect about 10:27:38

1 Johns-Manville. I'm sure it was negative. And the -- 10:27:40
2 we had a -- a laugh. 10:27:47
3 We were a favorite topic of the -- what 10:27:52
4 department was it? It -- we had a -- a department in -- 10:27:59
5 at Mount Sinai that was -- that coordinated public 10:28:01
6 relations. And so there was an annual report. Well, 10:28:08
7 they photographed us in about 10 annual reports. And 10:28:12
8 Irv and I would have a good laugh over it. Yeah. 10:28:18
9 Q. So you were -- as a mineralogist and 10:28:21
10 someone who worked on the transmission electron 10:28:24
11 microscope, you were the person that explained to 10:28:27
12 Dr. Selikoff the various chemical makeup of the fibers? 10:28:29
13 A. That's right. 10:28:34
14 Q. And that's what you're doing here? 10:28:34
15 A. Yes. 10:28:36
16 Q. Okay. 10:28:37
17 A. How you could distinguish. Because on the 10:28:38
18 EM -- on the TEM screen, the viewing screen, you saw an 10:28:40
19 object that was opaque or linear. And if -- if you 10:28:46
20 diffracted you would see it was an amphibole structure, 10:28:53
21 but you wanted to distinguish among the amphibole fiber 10:28:57
22 types; amosite, crocidolite, anthophyllite, tremolite, 10:29:01
23 actinolite. You wanted to distinguish among the 10:29:07
24 amphiboles, and so we did that on the basis of the 10:29:10
25 chemistry. 10:29:13

1	Q.	I see. Great. Great.	10:29:14
2	A.	So it was very -- very important.	10:29:15
3	Q.	Let's go to the next photograph, Exhibit	10:29:21
4	7.		10:29:23
5		(Exhibit 7 was marked and	10:29:23
6		attached to the transcript.)	10:29:23
7	BY MR. SATTERLEY:		10:29:23
8	Q.	Who's in this photograph, and where are	10:29:23
9	you guys located?		10:29:24
10	A.	This photograph was taken at a meeting in	10:29:26
11	Bochum -- Bochum, Germany.		10:29:33
12	Q.	In Germany?	10:29:35
13	A.	Yeah. The Ruhr Valley.	10:29:36
14	Q.	And who -- who's here, and -- and what are	10:29:41
15	you guys doing?		10:29:42
16	A.	What are we doing? Left to right	10:29:43
17	standing, I am over here in the extreme left.		10:29:45
18		Now, I hate to say this, but the woman	10:29:51
19	immediately to my left is a physician from Israel, and I		10:29:55
20	forgot her name. I -- I really apologize. However,		10:30:03
21	next to her is Ruth Lillis.		10:30:05
22	Q.	Who's Ruth Lillis?	10:30:08
23	A.	Ruth Lillis was a member of our group.	10:30:10
24	She -- she and her husband Mike, also a physician, left		10:30:13
25	Romania and never looked back. She attended a		10:30:22

1	conference and sought asylum.	10:30:24
2	Next to Ruth Lillis is Yehuda Lerman, an	10:30:28
3	Israeli physician who studied with us.	10:30:37
4	Next to Yehuda, with the mustache, that is	10:30:37
5	Alf Fischbein. And Alf did many studies with us.	10:30:41
6	And next to Alf, this young guy over here	10:30:43
7	on the end, that's Ned Holstein, or Edwin Holstein as	10:30:46
8	you call.	10:30:51
9	We were all -- it was the nature of our	10:30:54
10	group -- we were doing so many things, many exciting and	10:30:56
11	important things, which demanded that we send a whole	10:31:01
12	group of people because everyone was working on	10:31:06
13	important aspects. At this time Ruth and Alf, for	10:31:11
14	example, were doing the family member study of the	10:31:15
15	Unarco workers.	10:31:19
16	Q. The take-home exposure type?	10:31:22
17	A. Take-home exposure, yes.	10:31:23
18	Q. Okay. Are you the only mineralogist in	10:31:25
19	this picture?	10:31:27
20	A. Yes.	10:31:28
21	Q. Okay.	10:31:28
22	A. In fact, I chaired the session on	10:31:28
23	silicosis, Mechanisms of Silica Interaction with Cells,	10:31:30
24	Cell Membranes.	10:31:36
25	It was a good meeting.	10:31:38

1	(Exhibit 8 was marked and	10:31:38
2	attached to the transcript.)	10:31:38
3	BY MR. SATTERLEY:	10:31:39
4	Q. And one more photograph right behind -- I	10:31:39
5	think there's one more. And it may be Exhibit 8.	10:31:41
6	A. My -- my favorite colleague, if you can	10:31:46
7	believe it. My favorite colleague. That's Robert	10:31:49
8	Schnitzer. Robert Schnitzer had a fascinating personal	10:31:53
9	history. Robert Schnitzer, as I said, developed	10:31:57
10	isoniazic -- isoniazic -- isonicotinic acid derivative,	10:32:08
11	he rendered it less toxic, and has been credited for the	10:32:12
12	invention of one of the first anti-tuberculosis drugs,	10:32:23
13	chemotherapeutic drugs, used worldwide. Of course,	10:32:32
14	there's -- the one that is frequently touted is	10:32:38
15	Waksman's study of certain antibiotics in the treatment	10:32:41
16	of tuberculosis. But Robert Schnitzer, wonderful man.	10:32:47
17	Wonderful man. It was an honor to know him.	10:32:55
18	Q. We talked earlier about Dr. Cralley.	10:33:08
19	We'll mark as Exhibit 9 -- if you'd hand that to counsel	10:33:14
20	there.	10:33:22
21	(Exhibit 9 was marked and	10:33:22
22	attached to the transcript.)	10:33:22
23	BY MR. SATTERLEY:	10:33:22
24	Q. This is Exhibit 9. Is this the paper that	10:33:22
25	you mentioned was published in 1968 by Cralley and	10:33:24

1	others regarding the fibrous and mineral content of	10:33:28
2	cosmetic talc products?	10:33:34
3	A. Yes.	10:33:35
4	Q. And if you'd flip over to page 3, or	10:33:35
5	the -- actually to page 352 -- it's the third page --	10:33:38
6	does it have photomicrographs?	10:33:42
7	A. Yes.	10:33:44
8	Q. Explain to the folks on the jury, what is	10:33:44
9	a photomicrograph?	10:33:46
10	A. A photomicrograph. This is the way a	10:33:49
11	transmission electron microscope works. A beam of	10:33:56
12	electrons are generated at a source. The beam of	10:34:05
13	electrons scatters, so there is a system, a lens	10:34:12
14	system -- now, it's not a glass lens like you have a --	10:34:19
15	a lens in a pair of eyeglasses, but, rather, it is a	10:34:22
16	device in which there are coils through which you pass	10:34:27
17	currents. And the current has an electromagnetic field.	10:34:33
18	And so as these electrons that are generated pass	10:34:41
19	through these coils they're stretched. And they are	10:34:46
20	stretched, and there is no distortion of the -- of --	10:34:52
21	the field density.	10:34:58
22	And this is passed through -- it's focused	10:35:02
23	on a particle, an objective lens. Passes through a	10:35:05
24	solid substance in a specimen stage. And the -- the	10:35:10
25	image is an image in which electrons are stopped or	10:35:18

1 electrons pass through. When electrons stop the image 10:35:24
2 is dark. When the im -- image -- when the electrons are 10:35:29
3 passed through the image is light. And these are 10:35:35
4 dropped down on a -- a -- a zinc sulfide screen. 10:35:43
5 Q. Uh-huh. 10:35:43
6 A. And it's phosphorescent. And the -- the 10:35:47
7 particle is defined by shades of light and dark. 10:35:55
8 Q. Is it -- is -- is it sometimes referred to 10:35:59
9 as morphology, the appearance of the structure? 10:36:01
10 A. The appearance of the structure tells you 10:36:04
11 the form. 10:36:09
12 Q. If you could hold -- 10:36:09
13 (Speaking simultaneously) 10:36:09
14 If you just could hold the -- 10:36:10
15 A. Yeah. 10:36:10
16 Q. Hold -- hold the photomicrograph up and -- 10:36:12
17 on page 352 so the folks on the jury can see what we're 10:36:14
18 talking about. 10:36:20
19 And did you and Dr. Rohl in some of your 10:36:20
20 publications have photomicrographs to show what the -- 10:36:22
21 A. Exactly. 10:36:25
22 Q. -- shapes -- shapes are? 10:36:26
23 A. Yes. 10:36:27
24 Q. Okay. And are we -- are you able to see 10:36:27
25 from this that there are different shapes and different 10:36:29

1 morphology of different particles there? 10:36:31

2 A. Yes. And if you -- there is a caption 10:36:34

3 under -- okay. Photomicrographs of talcum -- bup, bup, 10:36:37

4 bup, bup... 10:36:45

5 Q. Specimen? 10:36:45

6 A. Yes. Now, you see, there are some that 10:36:46

7 are irregular. 10:36:50

8 Q. Uh-huh. 10:36:51

9 A. Some that are elongated. Some that are 10:36:52

10 sticking out of other particles. So the question is -- 10:36:55

11 you see the particles. You see an outline (indicating). 10:37:01

12 You see an outline of particles. But in order to 10:37:07

13 identify what it is you're looking at you have to 10:37:10

14 perform diffraction. What's the structure? And 10:37:15

15 chemistry acquisition. What is the chemistry? 10:37:22

16 Q. Is -- is diffraction the same thing I've 10:37:24

17 heard as selected area electron diffraction -- 10:37:28

18 A. Yes. 10:37:28

19 Q. -- SAED? 10:37:30

20 A. Yes. 10:37:30

21 Q. And is -- are you trying to fig -- figure 10:37:30

22 out the crystalline structure? 10:37:32

23 A. Yes. 10:37:33

24 Q. Okay. And when you and Dr. Rohl and other 10:37:34

25 folks did this, did you report the -- whether it was 10:37:38

1 a -- for example, a talc or whether it was an -- 10:37:41

2 A. Yes. 10:37:41

3 Q. -- amphibole? 10:37:47

4 A. Yes. 10:37:48

5 Q. Okay. 10:37:49

6 A. Yes. 10:37:49

7 Q. And so was -- in your view, was 10:37:49

8 Dr. Cralley's paper, was it an important, good paper? 10:37:50

9 A. Well, it was -- it was a good caution 10:37:53

10 light. In other words, we used to say this. We used to 10:37:56

11 lecture to the first-year medical students. You have an 10:38:05

12 observation. And you say, gee, that's an interesting 10:38:15

13 observation; it's worth a case report. Someone works in 10:38:18

14 an asbestos factory and develops shortness of breath. 10:38:24

15 Well, that's -- that's an interesting observation. 10:38:32

16 That's a caution light. You don't know 10:38:37

17 whether it's an odd case or whether it is systematic and 10:38:40

18 indicative of a significant issue. So you study it. It 10:38:46

19 goes caution light, case report, then you do a study. 10:38:53

20 And you say, Well, we've done a case control study, 10:39:00

21 we've looked at a population of people exposed to this 10:39:03

22 agent, to this substance, this dust, and we've got a 10:39:07

23 bunch of people of the same age, the same sex/gender, 10:39:11

24 the same -- and the characteristics match the exposed 10:39:16

25 group of people. And you say, what is the outcome? 10:39:22

1 These people, the exposed people, have 10:39:28
2 pulmonary function decrements. The people who are not 10:39:31
3 exposed, they don't. So there's a red light. And you 10:39:36
4 say, Wait a minute. We've got to do this in detail. 10:39:41
5 We've got to measure the dust in the workplace. We have 10:39:44
6 to see who smokes cigarettes and who doesn't. We have 10:39:48
7 to do an A, B, C, D. 10:39:52
8 So you go through. And you've got that -- 10:39:55
9 that caution light, the red light, the -- the detailed 10:39:57
10 studies. 10:39:59
11 In terms of this paper, he's saying, Oh, 10:40:01
12 yeah, there are these interesting particles in here. We 10:40:05
13 ought to -- we ought to study this. 10:40:08
14 He did a more detailed study in the U -- 10:40:12
15 the Johannesburg meeting in 1969 where he showed really 10:40:17
16 obvious photomicrographs of fiber. 10:40:24
17 Q. Involving talcum powder? 10:40:29
18 A. In -- in talcum powder, not in -- 10:40:30
19 Q. And we'll get to your papers in a little 10:40:32
20 bit, but -- but -- well, I'll wait until we get to your 10:40:35
21 papers. But there's -- there's certainly published 10:40:38
22 literature back in the '40s and '50s from folks looking 10:40:41
23 at talcum powder issues, correct? 10:40:44
24 A. Well, you're saying talcum. The original 10:40:46
25 talc papers were talc studies of industrial talcs, 10:40:49

1	industrial talcs.	10:40:56
2	Q. Uh-huh.	10:40:59
3	A. You were absolutely correct when one of	10:41:00
4	the first questions you asked about talc you asked about	10:41:04
5	the assemblage of talc. Absolutely correct.	10:41:09
6	Now, there were talcs that were used in	10:41:15
7	industry as fillers in paint, as materials melted to	10:41:19
8	make a ceramic body. And it goes on and on. The	10:41:25
9	industrial grade talc could be a lot of different	10:41:29
10	things --	10:41:33
11	Q. Uh-huh.	10:41:34
12	A. -- a lot of interesting mixtures in which	10:41:35
13	the mineral talc is a very minor component as compared	10:41:38
14	to everything else that's present.	10:41:46
15	Q. So there is more accessory minerals in	10:41:47
16	industrial talc than in the cosmetics?	10:41:50
17	A. It could be. When you say accessory,	10:41:53
18	we're talking talcs that may be 40, 50, 60 percent	10:41:56
19	tremolite, which is an interesting mineral, and the talc	10:42:03
20	component is only 20 percent. So that industrial-grade	10:42:07
21	talc is actually a mixture of other things as well.	10:42:14
22	So when you talk about an assemblage of	10:42:21
23	particles, consumer talcum as we reported it -- consumer	10:42:27
24	talcum conveys an impression that it's talc the mineral.	10:42:33
25	Industrial-grade talc could be anything. It could be	10:42:37

1 crushed rock. It's used to dust the steel mandrels in a 10:42:41
2 rubber factory. It could be the -- the talc that is 10:42:49
3 used in -- the talc that is used in tire manufacturing. 10:42:52
4 So there are -- 10:43:03
5 Q. Well, let me switch gears for a second and 10:43:04
6 ask you about -- because we'll come back to that when we 10:43:05
7 get to your paper -- Tenovus. What is the Tenovus 10:43:08
8 Institute or the Tenovus Group? 10:43:12
9 A. The Tenovus Group, as it sounds, the 10 of 10:43:14
10 us -- the Tenovus Group was a group of bookmakers in 10:43:19
11 Great Britain, actually in Wales, I think, was the 10:43:28
12 center. The Tenovus Institute, composed of 10 10:43:32
13 bookmakers who lost a friend, a bookmaker, through 10:43:38
14 cancer, and they got together to form this foundation 10:43:43
15 called the Tenovus, T-E-N-U-V-U-S (sic). Tenovus, 10:43:50
16 U-V-U-S (sic). 10:43:50
17 (Exhibit 10 was marked and 10:43:50
18 attached to the transcript.) 10:43:50
19 BY MR. SATTERLEY: 10:43:50
20 Q. And I'm going to hand you Exhibit 10. And 10:44:02
21 this is a -- a paper by Henderson. And were -- did you 10:44:06
22 know Henderson? 10:44:12
23 A. Yes. Bill Henderson. 10:44:13
24 Q. And was he an electron microscopist like 10:44:15
25 you? 10:44:20

1 A. Yeah. Bill Henderson worked, I think, out 10:44:20
2 of Pooley's laboratory. And then he -- he was supported 10:44:24
3 by the Tenovus Institue and Foundation. And he explored 10:44:34
4 these various -- these various issues concerning mineral 10:44:36
5 particles from talc and ovarian and cervical carcinoma. 10:44:42
6 Q. This is published March of 1971, and it's 10:44:48
7 got photomicrographs in it, correct? 10:44:53
8 A. Yes. 10:44:56
9 Q. And are you familiar with this? 10:44:56
10 A. With -- with the paper, yes, of course. 10:44:58
11 Q. You saw it back at the time, back in 1971? 10:45:00
12 A. Yes, I did. 10:45:02
13 Q. And does it have photomicrographs showing 10:45:03
14 the presence of talc? 10:45:08
15 A. Yes. 10:45:09
16 Q. And does it describe the presence of talc 10:45:09
17 in relationship to cancer? 10:45:14
18 A. He describes that -- part of that, yes. 10:45:16
19 Q. And did -- did J&J in 1971 ask you to 10:45:19
20 specifically look at some of the Tenovus samples? 10:45:30
21 (Exhibit 11 was marked and 10:45:30
22 attached to the transcript.) 10:45:30
23 BY MR. SATTERLEY: 10:45:30
24 Q. Let me show you Exhibit 11 here. 10:45:37
25 A. Yeah. I think that we're -- we're dealing 10:45:39

1 with -- I was probably approached by Gavin Smith. 10:45:42

2 Q. That's Exhibit 11? 10:45:47

3 A. Gavin Smith. Yeah. 10:45:48

4 Q. It indicates there was a meeting with you, 10:45:50

5 Dr. Langer, July the 9th, 1971. And if you can just 10:45:52

6 take a look at that. 10:45:59

7 A. Yeah. 10:46:08

8 Q. And is this the meeting that you had with 10:46:08

9 Dr. Gavin Hildick-Smith where you identified chrysotile 10:46:10

10 asbestos both in Johnson's Baby Powder and in samp -- 10:46:13

11 and in the tissue samples? 10:46:18

12 A. Yeah. These are -- 10:46:20

13 MR. ASHBY: Assumes facts. Assumes facts. 10:46:20

14 Lacks foundation. 10:46:21

15 BY MR. SATTERLEY: 10:46:22

16 Q. Do you recall that, Dr. Langer? You met 10:46:22

17 with Dr. Hildick-Smith in 1971, correct? 10:46:24

18 A. Yes. 10:46:27

19 Q. And J&J produced this document from their 10:46:27

20 business records? 10:46:30

21 MR. ASHBY: Lacks foundation. 10:46:32

22 BY MR. SATTERLEY: 10:46:33

23 Q. And they've admitted it in request for 10:46:33

24 admissions. 10:46:36

25 A. That's an interesting report. I mean, 10:46:49

1 there are details in here that, frankly, I'd forgotten, 10:46:51
2 but... 10:46:54

3 Q. Now that you've had a chance to -- to read 10:46:54
4 the portions of the report, does it refresh your 10:46:56
5 recollection regarding identification of chrysotile and 10:46:59
6 telling Dr. Smith about that, Dr. Hildick-Smith? 10:47:02

7 A. I'll tell you what is interesting to me. 10:47:06
8 I described to him the thermal behavior of the fiber of 10:47:10
9 chrysotile which -- the thermal behavior, the heat 10:47:17
10 generated by -- at the sample by the electron beam. And 10:47:26
11 I said, this mineral is not stable. This is chrysotile 10:47:30
12 asbestos. It's not stable, but the heat generated by 10:47:35
13 the electron beam produces effects that help you 10:47:39
14 identify what you're looking at because chrysotile is 10:47:48
15 not as stable as people think of asbestos, but, rather, 10:47:51
16 it degrades in the beam. 10:47:56

17 An electron beam passing through a 10:48:02
18 substance generates a number of events. It may pass 10:48:03
19 through without any contact with an atom. It may bang 10:48:08
20 on an atom and cause it to generate a -- a chemical 10:48:14
21 signal. It may gen -- it may fall on an array of atoms 10:48:18
22 in the substance and generate a pattern of reflection 10:48:26
23 called a selected area electron diffraction pattern. It 10:48:34
24 may also, because of the heat, undergo deformation. So 10:48:37
25 I -- I attempted to explain all of this. 10:48:44

1 MR. SATTERLEY: Let me mark as Exhibit 12, 10:48:49
2 then, in 1971 a letter, November 10th, and ask you to 10:48:51
3 flip to the second page. 10:49:00
4 (Exhibit 12 was marked and 10:49:00
5 attached to the transcript.) 10:49:00
6 BY MR. SATTERLEY: 10:49:00
7 Q. And is that your signature? 10:49:01
8 A. That's me. 10:49:09
9 Q. And are you writing that on Mount Sinai 10:49:09
10 School of Medicine letterhead? 10:49:15
11 A. Yes. 10:49:15
12 Q. And are you advising Johnson & Johnson's 10:49:15
13 director of clinical research, Dr. Gavin Hildick-Smith, 10:49:18
14 of your findings with regards to the tests that they 10:49:23
15 asked you to do? 10:49:28
16 A. Yes. 10:49:29
17 Q. And did you indicate that chrysotile 10:49:29
18 asbestos was in fact found? 10:49:35
19 A. Yes. 10:49:38
20 MR. ASHBY: Just object as vague and 10:49:38
21 ambiguous. As found in what? 10:49:40
22 BY MR. SATTERLEY: 10:49:46
23 Q. Well, you found it both in -- in -- in the 10:49:46
24 product and in tissue, human tissue, correct? 10:49:48
25 A. Yes. 10:49:51

1	MR. SATTERLEY: All right. So let's go to	10:49:54
2	Exhibit 13, four days later.	10:49:55
3	(Exhibit 13 was marked and	10:49:55
4	attached to the transcript.)	10:49:59
5	BY MR. SATTERLEY:	10:49:59
6	Q. And is this a letter written to you in	10:49:59
7	response for a -- and -- by Gavin Hildick-Smith, M.D.,	10:50:03
8	director of clinical research at Johnson & Johnson?	10:50:11
9	A. Yes.	10:50:15
10	Q. And on the second page he writes, this	10:50:22
11	Johnson & Johnson doctor, on the -- the second	10:50:26
12	paragraph, We were interested to learn from your	10:50:27
13	analysis of our talc samples and the fact that you had	10:50:31
14	observed trace amounts of chrysotile asbestos in amounts	10:50:35
15	you estimated to be less than .01 percent.	10:50:38
16	Do you see that?	10:50:43
17	A. Yep.	10:50:44
18	Q. So that -- does that verify that -- what	10:50:44
19	you already told us under oath, that you told them there	10:50:47
20	was chrysotile asbestos in their product?	10:50:50
21	A. Yes, of course.	10:50:52
22	Q. And then you -- he goes on to write, We of	10:50:53
23	course -- we are of course somewhat surprised to learn	10:50:56
24	that you found chrysotile asbestos as other independent	10:50:59
25	workers have not so far reported such findings to us.	10:51:03

1	My question to you is, did Dr. Gavin	10:51:08
2	Hildick-Smith at this time, 1971, did he tell you about	10:51:11
3	the work of a Dr. Hutcheson at the University of	10:51:16
4	Minnesota Space Center?	10:51:22
5	A. No.	10:51:23
6	MR. ASHBY: Ob -- object. Objection.	10:51:24
7	Foundation. And colloquy.	10:51:25
8	BY MR. SATTERLEY:	10:51:27
9	Q. Did he tell you about any of the other	10:51:28
10	folks that likewise found chrysotile asbestos in	10:51:31
11	Johnson's Baby Powder that they knew internally to be	10:51:34
12	case?	10:51:38
13	MR. ASHBY: Objection. Argumentative.	10:51:38
14	Lacks foundation. Assumes facts.	10:51:38
15	THE WITNESS: No.	10:51:44
16	BY MR. SATTERLEY:	10:51:44
17	Q. Did -- did he tell you about any of the	10:51:44
18	amphibole products that they found in Johnson's Baby	10:51:46
19	Powder by the various laboratories in the '50s or the	10:51:51
20	'60s or early '70s?	10:51:55
21	MR. ASHBY: Objection. Lacks foundation.	10:51:56
22	Calls for speculation. Assumes facts.	10:51:57
23	THE WITNESS: No.	10:52:00
24	BY MR. SATTERLEY:	10:52:00
25	Q. Okay. Did you know, for example, that	10:52:00

1	Johnson & Johnson had privately contracted with a lab	10:52:02
2	called Battelle in Ohio? Back in 1970 did you know that	10:52:08
3	they had actually looked at their talcum powder products	10:52:10
4	and determined there were amphibole -- fibrous	10:52:13
5	amphiboles present from the 1950s forward?	10:52:15
6	MR. ASHBY: Objection.	10:52:18
7	BY MR. SATTERLEY:	10:52:18
8	Q. Did you know that?	10:52:18
9	MR. ASHBY: Same objections.	10:52:19
10	THE WITNESS: No.	10:52:21
11	BY MR. SATTERLEY:	10:52:21
12	Q. Now I want to talk about your paper that	10:52:22
13	you published in the symposium on electron microscopy	10:52:31
14	and microfibers.	10:52:35
15	Okay. I forgot what exhibit number we're	10:52:37
16	up to. Did -- was that 13 or 12?	10:52:40
17	THE REPORTER: 13.	10:52:40
18	THE WITNESS: The last one was 13.	10:52:45
19	MR. SATTERLEY: All right. So we're going	10:52:47
20	to go with 14.	10:52:48
21	(Exhibit 14 was marked and	10:52:48
22	attached to the transcript.)	10:52:48
23	MR. ASHBY: The last one was 13?	10:52:57
24	MR. SATTERLEY: I think the last one was	10:52:57
25	13. This is 14.	10:52:59

1	Right?	10:52:59
2	THE REPORTER: Uh-huh.	10:53:02
3	MR. SATTERLEY: Is that right?	10:53:02
4	THE REPORTER: Uh-huh.	10:53:02
5	MR. SATTERLEY: Yep. Okay. Good. We're	10:53:03
6	on the same page on exhibit numbers.	10:53:03
7	BY MR. SATTERLEY:	10:53:06
8	Q. Is this a paper that was published in a	10:53:06
9	monograph based upon a symposium on the microscopy of	10:53:08
10	microfibers?	10:53:15
11	A. Yes.	10:53:15
12	Q. And did you and Dr. Rohl and others	10:53:15
13	present at this symposium?	10:53:21
14	A. Yes.	10:53:23
15	Q. And did you publish the tech -- techniques	10:53:23
16	to identify fibers in talc?	10:53:28
17	A. Yes. That was our status at that time.	10:53:30
18	Correct.	10:53:35
19	Q. And I'm not going to go through the entire	10:53:35
20	paper. But did you consider this to be a good paper?	10:53:39
21	A. Yeah. I thought -- yeah. I thought it	10:53:41
22	was well considered. I mean, it's just not an	10:53:44
23	enumeration of techniques but, rather, why we did	10:53:47
24	certain things and explained in greater detail and so	10:53:51
25	on.	10:53:55

1 Q. And -- and did you explain the various 10:53:56
2 techniques, but did you state that the transmission 10:53:58
3 electron microscopy with the selected area electron 10:54:02
4 diffraction and the chemistry analysis was the best 10:54:08
5 technique? 10:54:10
6 A. Absolutely. 10:54:11
7 Q. And throughout your entire career is that 10:54:13
8 technique the best technique to find asbestos fibers in 10:54:15
9 talc products? 10:54:18
10 MR. ASHBY: Overbroad. 10:54:19
11 THE WITNESS: It's still state of the art. 10:54:21
12 BY MR. SATTERLEY: 10:54:24
13 Q. All right. And this is 1976, right? 10:54:24
14 A. Yes. 10:54:27
15 Q. Okay. I'm going to mark as Exhibit 15 a 10:54:27
16 section of that paper that you -- you write... 10:54:29
17 (Exhibit 15 was marked and 10:54:29
18 attached to the transcript.) 10:54:29
19 BY MR. SATTERLEY: 10:54:29
20 Q. I've highlighted it here. It says, Talc 10:54:35
21 rock as mined may therefore contain platy talc minerals, 10:54:39
22 talc fibers, asbestiform anthophyllite, tremolite, 10:54:44
23 hexagonite -- 10:54:50
24 A. Hexagonite. 10:54:50
25 Q. Heganite (sic)? 10:54:51

1	A.	Hexagonite.	10:54:52
2	Q.	Okay. And what -- how do you pronounce	10:54:54
3		the next one?	10:54:56
4	A.	Tiroadite.	10:54:56
5	Q.	Tiroadite. And the fibrous serpentine	10:54:57
6		mineral chrysotile.	10:55:01
7		Was that something you published at the	10:55:02
8		FDA symposium in 1976?	10:55:05
9	A.	Yes, that was.	10:55:09
10	Q.	And then speaking of mineral assemblages,	10:55:09
11		the next sentence is particularly important. You say,	10:55:12
12		Numerous other minerals such as chlorite minerals -- let	10:55:17
13		me stop there.	10:55:20
14		Chlorite -- is aluminum silicate and	10:55:22
15		chlorite similar?	10:55:25
16	A.	A chlorite mineral -- there's a group of	10:55:25
17		minerals which are platy, like sheets of paper in a	10:55:28
18		book, that are constituents of -- they're -- they're	10:55:33
19		part of a rock-forming assemblage of generally	10:55:40
20		metamorphic rocks, so rocks that undergo heat, pressure,	10:55:46
21		and other events, which become a -- a member, a	10:55:52
22		component member, of a metamorphic rock. Chlorites tend	10:55:59
23		to be -- they're sheet silicates. They're platy	10:56:06
24		silicates, mica-like.	10:56:11
25	Q.	And then you say the carbonite materials,	10:56:12

1	pyrophyllite --	10:56:16
2	A. Pyrophyllite.	10:56:16
3	Q. -- pyrophyllite, feldspar, micas, and	10:56:18
4	quartz also occur naturally with talc?	10:56:22
5	A. Yes.	10:56:23
6	Q. Is that something you published back in	10:56:23
7	1976?	10:56:26
8	A. Yes. I mean, it's frequently mentioned	10:56:27
9	because talc tends to be a complex assemblage of	10:56:32
10	minerals reflecting earth processes basically.	10:56:37
11	Q. Now, you published -- you and Dr. Rohl	10:56:41
12	published in 1974 on talcs, correct?	10:56:49
13	A. Yes.	10:56:52
14	Q. All right. And that was -- was that more	10:56:52
15	on industrial talc in '74?	10:56:54
16	A. '74. Well, it was talc in general.	10:56:56
17	Q. That was a talc in general?	10:57:02
18	A. Yeah.	10:57:04
19	Q. I -- I'll take that. I apologize for	10:57:04
20	misstating.	10:57:08
21	Let me go to Exhibit 16.	10:57:09
22	(Exhibit 16 was marked and	10:57:09
23	attached to the transcript.)	10:57:14
24	BY MR. SATTERLEY:	10:57:14
25	Q. And Exhibit 16, what is this?	10:57:14

1 A. This is a -- I believe it is a -- one of 10:57:24
2 the hallmark papers for that time period on -- again, we 10:57:30
3 were indicating that large portions of the general 10:57:38
4 population not exposed to an industrial mineral called 10:57:42
5 asbestos but, rather, exposure to a commonly available 10:57:49
6 and -- available consumer products which contain mineral 10:58:02
7 fiber. And so we were talking basically about consumer 10:58:05
8 talcum and powders because not all consumer powders were 10:58:09
9 talc. They contained other materials or were 10:58:16
10 substantially made of other materials. 10:58:20
11 Q. And in this paper did you and the 10:58:24
12 co-authors publish photographs, microphot -- 10:58:30
13 photomicrographs of some of the materials you found in 10:58:33
14 consumer talcum powder products? 10:58:37
15 A. Yes. Many photographs, yes. 10:58:39
16 Q. And if you could flip over to page 268. 10:58:40
17 A. Yes. 10:58:45
18 Q. On 268, figure 3, are those 10:58:46
19 photomicrographs of vari -- transmission electron 10:58:49
20 photomicrographs? If you can just -- the paper is in 10:58:54
21 the way -- pull -- pull -- yeah. There we go. 10:58:57
22 A. (Indicating) 10:58:59
23 Q. And these are the -- and do you describe 10:59:00
24 in there what's called fibers and fibrils? 10:59:02
25 A. Yes. 10:59:07

1	Q.	For example, on -- if you would take a	10:59:07
2		look at the -- the description of the photographs, he	10:59:12
3		describes fibrils protruding from a fiber body?	10:59:17
4	A.	Yes.	10:59:21
5	Q.	And that's photograph B. Do you see B at	10:59:23
6		the top?	10:59:26
7	A.	Yes.	10:59:27
8	Q.	And does that, in your view, fairly and	10:59:28
9		accurately represent a fibril protruding from a fiber	10:59:31
10		body?	10:59:35
11	A.	Yes.	10:59:36
12	Q.	And you describe also fibers protruding	10:59:36
13		from the interior of talc plates. And you -- that's	10:59:43
14		photograph F there. Do you see that?	10:59:48
15	A.	Yes.	10:59:50
16	Q.	And so the photograph -- the one at the	10:59:50
17		bottom on the right-hand side, is that the --	10:59:52
18		demonstrating fibers coming out of talc plates?	10:59:56
19	A.	Well, that's what we're reporting. Yes.	11:00:00
20		Yeah.	11:00:03
21	Q.	And then you say, All of these morphologic	11:00:03
22		variations and forms A through E have been described in	11:00:11
23		anthophyllite and tremolite asbestos samples.	11:00:14
24		Did you write that?	11:00:17
25	A.	Yes.	11:00:18

1	Q.	Okay. Flip over to page 270. Are there	11:00:18
2		more photographs -- photomicrographs on page 270?	11:00:28
3	A.	Yes.	11:00:32
4	Q.	And if you could flip it around so the	11:00:32
5		camera could see these photographs.	11:00:38
6		And -- and -- and just so the jury may be	11:00:40
7		interested, are -- next to the photographs of the actual	11:00:41
8		images are there the diffraction patterns that you speak	11:00:44
9		of?	11:00:47
10	A.	Yes.	11:00:48
11	Q.	And do the diffraction patterns help	11:00:48
12		distinguish between talc versus amphibole?	11:00:51
13	A.	Yes.	11:00:55
14	Q.	All right. And -- and the description	11:00:56
15		of -- that you have below, you describe when something	11:01:00
16		is a platy talc versus a talc fiber?	11:01:04
17	A.	Yes.	11:01:08
18	Q.	And, for example, photograph A, that's a	11:01:08
19		talc plate, right?	11:01:11
20	A.	Yes.	11:01:12
21	Q.	All right. And then if we go down to	11:01:13
22		photograph B, is that a talc fiber above a plate?	11:01:16
23		You've got it marked TF. Does that stand for talc	11:01:22
24		fiber?	11:01:25
25	A.	Yes.	11:01:26

1 Q. And then if we go all the way down to D, 11:01:26
2 does D -- it says the amphibole fiber was diffracted 11:01:30
3 only on one of the protruding unit fibrils. 11:01:36
4 A. Yes. 11:01:40
5 Q. If -- if you could just explain that. 11:01:40
6 A. Well, one of the -- one of the limitations 11:01:43
7 of this technique is for thickness of the particle. And 11:01:49
8 if the particle is -- exceeds in thickness a certain 11:01:55
9 value the diffraction pattern is -- cannot be projected 11:02:03
10 on the screen. So not all of the particles will 11:02:08
11 diffract. So it -- it is only one or two that stick out 11:02:16
12 of a fiber that would permit the acquisition of the 11:02:23
13 pattern. 11:02:26
14 Q. And so in this photograph at the bottom on 11:02:28
15 D, the little things that are sticking out are those 11:02:32
16 individual fibrils coming out from the mineral? 11:02:36
17 A. Well, I'm looking at the pattern. And, 11:02:41
18 frankly, that diffraction pattern is awful because it -- 11:02:45
19 Q. Bad photocopy? 11:02:49
20 A. No. Actually, it is the exposure 11:02:50
21 intensity of the -- on the diffraction pattern should 11:02:56
22 have been cut down and should have been taken over a -- 11:03:01
23 a shorter period of time since you accumulate the 11:03:06
24 pattern over a period of several seconds to make an 11:03:10
25 impression on that photographic plate, a record on the 11:03:16

1	photographic plate.	11:03:22
2	The most important reflections are those	11:03:28
3	closest to the center of the beam. And that's been	11:03:31
4	washed out by the overexposure. So the other patterns	11:03:34
5	are pretty good, but --	11:03:41
6	Q. But you described the -- D as individual	11:03:43
7	fibrils coming out from the mineral, correct?	11:03:45
8	A. Yeah. There was only one that showed a --	11:03:47
9	a pattern that was interpretable, so...	11:03:49
10	Q. Okay. Now, did you know -- you can set	11:03:53
11	the paper to the side.	11:04:02
12	Did you know at the time the paper was	11:04:03
13	being prepared -- did you know a fellow named Norm	11:04:05
14	Estrin?	11:04:12
15	A. Yes.	11:04:12
16	Q. And who is Norm Estrin?	11:04:13
17	A. Norman Estrin was the president of the	11:04:17
18	Cosmetic, Toiletry & Fragrance Association.	11:04:18
19	Q. Back in the early '70s when you identified	11:04:21
20	chrysotile asbestos in Johnson Baby Powder, did the CTFA	11:04:24
21	individuals try to suggest that you were identifying a	11:04:30
22	product called sodium sequestrate (sic)?	11:04:34
23	A. Sodium sesquicarbonate.	11:04:37
24	MR. ASHBY: I'll -- I'll -- I'll just	11:04:40
25	object.	11:04:41

1 BY MR. SATTERLEY: 11:04:41

2 Q. Do you -- 11:04:41

3 MR. ASHBY: It misstates -- 11:04:41

4 BY MR. SATTERLEY: 11:04:42

5 Q. Did that occur? 11:04:42

6 A. Yes. 11:04:43

7 Q. Okay. And did -- did you stand by your 11:04:43

8 findings that you found chrysotile asbestos and it 11:04:46

9 wasn't sodium sequestrate (sic)? 11:04:49

10 A. I was not prepared to argue the point at 11:04:53

11 an open meeting. I just sat, and I -- whatever he said, 11:04:59

12 God bless you, and you publish that somewhere and then 11:05:11

13 we can talk about it. 11:05:14

14 Q. Did Norm Estrin ever publish that? 11:05:15

15 A. No, of course not. 11:05:17

16 Q. Okay. Now, did you know -- the '76 paper, 11:05:18

17 did you know that Norm Estrin -- I'm going to show you 11:05:21

18 Exhibit 17. 11:05:24

19 (Exhibit 17 was marked and 11:05:25

20 attached to the transcript.) 11:05:25

21 BY MR. SATTERLEY: 11:05:27

22 Q. -- had confidentially provided a draft of 11:05:27

23 your paper to Johnson & Johnson? 11:05:32

24 MR. ASHBY: Objection. Argumentative. 11:05:33

25 Lacks foundation. 11:05:35

1	THE WITNESS: No.	11:05:36
2	BY MR. SATTERLEY:	11:05:36
3	Q. Back -- back in the '70 time -- '76	11:05:36
4	timeframe --	11:05:39
5	A. No.	11:05:41
6	Q. -- no one shared with you the fact that	11:05:41
7	they -- it had been circulated?	11:05:43
8	And -- and who was the -- do you remember	11:05:47
9	the -- the editor of the journal? Was it Mehlman?	11:05:51
10	A. Yeah. Myron Mehlman.	11:05:56
11	Q. And who is Myron Mehlman?	11:05:58
12	A. Myron Mehlman was the -- Myron came out of	11:06:01
13	one of the oil companies. But he used to visit our	11:06:13
14	laboratory. He was on friendly terms with Irving	11:06:16
15	Selikoff. Myron Mehlman, one of the major oil	11:06:18
16	companies, the toxicology or -- I'm blocking on it.	11:06:23
17	Myron was the editor of the Journal of Environmental	11:06:30
18	Toxicol -- whatever, whatever the journal name was, that	11:06:34
19	he published it.	11:06:37
20	Q. But he -- he was the journal -- journal	11:06:42
21	editor?	11:06:44
22	A. Yes. He was the journal editor, yes.	11:06:44
23	Q. Back -- back in the timeframe 1976,	11:06:47
24	were -- did he or anybody else educate you on what	11:06:50
25	changes were made to your draft paper by either J&J or	11:06:54

1	the Cosmetic, Toiletry & Fragrance Association?	11:07:00
2	MR. ASHBY: Lacks foundation. Assumes	11:07:04
3	facts. Misstates.	11:07:06
4	THE WITNESS: No.	11:07:07
5	(Exhibit 18 was marked and	11:07:07
6	attached to the transcript.)	11:07:07
7	BY MR. SATTERLEY:	11:07:07
8	Q. Now, Exhibit 18 is a March 17, 1976,	11:07:08
9	memorandum from you to --	11:07:24
10	A. Tom Chalmers.	11:07:29
11	Q. -- Dean Thomas C. Chalmers. Is that your	11:07:31
12	signature on the fourth page?	11:07:34
13	A. Yes.	11:07:40
14	Q. And were you made aware of the fact that	11:07:41
15	Johnson & Johnson had -- had complained to the Dean of	11:07:48
16	Mount Sinai about you and Dr. Selikoff?	11:07:53
17	MR. ASHBY: Objection. Calls for	11:07:57
18	speculation. Lacks foundation. Misstates.	11:07:59
19	Argumentative.	11:07:59
20	THE WITNESS: Not at that time, but it	11:08:07
21	became clear over a passage of time that this had	11:08:08
22	happened.	11:08:12
23	BY MR. SATTERLEY:	11:08:12
24	Q. And were you in -- in March of 1976,	11:08:13
25	following a conversation with Dr. Chalmers, reported to	11:08:18

1	Dr. Chalmers your and Dr. Selikoff's involvement with	11:08:23
2	regards to talc issues and talc studies at the	11:08:28
3	environmental science laboratory?	11:08:32
4	A. Yes.	11:08:34
5	Q. And does this sort a give a history, sort	11:08:34
6	of an overview, and you go all the way back to the late	11:08:38
7	'60s describing what you and Dr. Selikoff had been	11:08:41
8	doing?	11:08:48
9	A. Yes.	11:08:48
10	Q. And does this, I guess, accurately reflect	11:08:49
11	your involvement in talc issues from -- from the late	11:08:53
12	'60s to 1976?	11:08:57
13	A. Yeah. It's -- generally. It doesn't have	11:08:59
14	every detail, but there's a general -- a general outline	11:09:05
15	of our involvement and -- our involvement and the	11:09:11
16	conveying of information to various federal agencies,	11:09:20
17	yes.	11:09:24
18	Q. And I -- I see in this -- you talk about	11:09:25
19	cash outlays and -- and financial considerations. How	11:09:30
20	did that impact your -- your and Dr. Selikoff's ability	11:09:34
21	to conduct research with regards to talc issues?	11:09:38
22	A. Well, this is -- this is an interesting	11:09:44
23	subject. The fact of the matter was we were funded on	11:09:48
24	specific projects. In other words, we were not	11:09:56
25	supported by hard funds from the institution. We	11:10:02

1	generated our own funding base and source.	11:10:09
2	The -- the nature of the -- the nature of	11:10:22
3	the field was such that you would apply for a support	11:10:25
4	focusing on a specific issue, but as you explored that	11:10:34
5	issue it took you to other areas. It was like I'm	11:10:40
6	interested in the asbestos body content of 3,000 people	11:10:52
7	who died in New York City. I'm interested in the fibers	11:10:54
8	in their lungs. I'm going to explore -- not just	11:11:01
9	present the data on what I'm finding, but I'm going to	11:11:09
10	explore other areas in terms of the source of fiber. So	11:11:11
11	you go from a funding core, asbestos bodies, and you	11:11:16
12	start to look at talc.	11:11:23
13	Q. Uh-huh.	11:11:24
14	A. So you use time and money and effort. You	11:11:25
15	have to buy photographic plates, disposables, for our	11:11:34
16	studies. You have to send out -- maybe hire a new	11:11:37
17	technician to run the microscope because you cannot scan	11:11:45
18	sitting in an electron microscope console eight hours a	11:11:49
19	day five days a week. It's -- it's -- it's not made for	11:11:53
20	humans to do. You need --	11:11:59
21	Q. If you could turn to page 2, at the very	11:12:01
22	bottom, you write, Still -- I'll wait until you flip the	11:12:03
23	page. The last paragraph. Still without significant	11:12:09
24	research support other than "stealing time" from other	11:12:13
25	projects, we continue our analysis of consumer talc.	11:12:18

1	A.	That's right.	11:12:23
2	Q.	Is -- is -- this was a scientific interest	11:12:24
3		of you and Dr. Selikoff, but you didn't have the	11:12:25
4		resources by a grant to focus on it; is that fair?	11:12:27
5	A.	That is absolutely correct.	11:12:32
6	Q.	Okay. The next part that I want to ask	11:12:33
7		you about is on the third page, on the second full	11:12:35
8		paragraph of my colleagues and I.	11:12:43
9	A.	Yes.	11:12:45
10	Q.	And I just want to ask you about the	11:12:46
11		Edinburgh situation. Tell -- tell the folks on the jury	11:12:51
12		about the Edinburgh paper and what -- what happened in	11:12:54
13		Edinburgh.	11:12:57
14	A.	Edinburgh, as you know, is in Scotland.	11:12:59
15		This was another international meeting. I was invited	11:13:02
16		to some other conference somewhere else. Art Rohl was	11:13:08
17		going to go over and represent our laboratory. We had	11:13:13
18		written a paper in collaboration with Fred Pooley. Fred	11:13:16
19		Pooley was in the Department of Mineral Exploitation,	11:13:21
20		the University College Cardiff in the UK.	11:13:26
21		Pooley did the electron microscopy for	11:13:31
22		Chris Wagner and their asbestos studies in Wales, the	11:13:36
23		UK. Chris Wagner, the -- has been given the credit for	11:13:42
24		the establishment of the association between exposure to	11:13:48
25		crocidolite asbestos and mesothelioma.	11:13:52

1 Well, we wrote a paper with Fred Pooley. 11:13:58
2 We had an analysis of 30-some-odd products. Fred Pooley 11:14:01
3 was the senior author. Fred Pooley decided -- he 11:14:06
4 decided. He withdrew the paper from presentation. 11:14:13
5 However, there are pre-prints -- pre-printed papers were 11:14:19
6 the norm at international meetings so that the attendees 11:14:25
7 could follow the presentation in detail. 11:14:33
8 I have somewhere in my files -- I promise 11:14:38
9 you I'm going to get you a copy of that paper -- the 11:14:41
10 Edinburgh paper. And the Edinburgh paper was withdrawn 11:14:48
11 from presentation by Fred Pooley. I agreed to it. Fred 11:14:56
12 indicated he was under pressure from whatever mineral 11:15:01
13 groups, whatever mineral commodity people, whatever 11:15:05
14 manufacturer or whatever, were -- was pressured to 11:15:11
15 withdraw the paper from the conference. 11:15:16
16 Q. And just so the record is clear, I asked 11:15:20
17 you if you had a copy of it. You said you'll look for 11:15:23
18 it. But you haven't -- 11:15:26
19 A. I will. I will. I will. 11:15:27
20 Q. You -- you haven't been able to find it 11:15:28
21 yet, right? 11:15:29
22 A. I -- I -- I promise you. 11:15:30
23 Q. Okay. All right. But -- but with regards 11:15:31
24 to the -- the -- that event, you described that to 11:15:33
25 Dr. Chalmers in March of 1976 in your memo, correct? 11:15:40

1	A.	Correct.	11:15:46
2	Q.	And does your memo fairly and accurately	11:15:46
3		set forth your involvement with talc in that timeframe?	11:15:49
4	A.	Yes.	11:15:52
5	Q.	Okay. Now, subsequent to that did you	11:15:53
6		become aware that Dr. Chalmers had issued a retraction	11:15:58
7		about the presence of asbestos in -- in talcum powder	11:16:03
8		products?	11:16:06
9	A.	That's my understanding, yes.	11:16:07
10	Q.	Okay. Were you invited to the meeting	11:16:08
11		between the CEO of Johnson & Johnson and the president	11:16:10
12		of Johnson & Johnson and Dr. Chalmers?	11:16:14
13	A.	No.	11:16:17
14	Q.	Okay. At -- at that timeframe, in 1976,	11:16:17
15		had Johnson & Johnson provided a Johnson Baby Powder	11:16:22
16		sample for you to test?	11:16:26
17	A.	Yes. There were several. Yeah.	11:16:27
18	Q.	And did you test those?	11:16:29
19	A.	Yes, I did.	11:16:30
20	Q.	And did you find chrysotile asbestos?	11:16:30
21	A.	I'm thinking a sample 344 as the number,	11:16:34
22		that was a pretty good talc. Did I find a trace amount	11:16:39
23		of chrysotile? I am uncertain, as I sit here now, to	11:16:43
24		make a definitive statement.	11:16:49
25	Q.	Well, let me ask --	11:16:52

1 A. I don't think so. But whatever was 11:16:53
2 present in that talc sample it was pretty good talc. 11:16:57
3 And it -- and it didn't impress me as one that hadn't 11:17:02
4 been milled and beneficiated properly. 11:17:08
5 Q. Let me ask you a question differently. 11:17:12
6 You -- you said in '71 you found chrysotile asbestos in 11:17:15
7 Johnson's Baby Powder. In '75-'76 timeframe did you 11:17:18
8 also find chrysotile asbestos in Johnson's Baby Powder? 11:17:24
9 A. It -- it -- that was a trace amount. I'm 11:17:27
10 saying .01. .01 is one particle in 10,000, which would 11:17:28
11 be a trace -- it's not a trace -- a -- a -- a trace 11:17:34
12 amount. 11:17:40
13 Q. Now, with regards to amphibole, you never 11:17:40
14 found amphibole asbestos in Johnson Baby Powder, 11:17:43
15 correct? 11:17:46
16 A. Correct. 11:17:46
17 Q. All right. And you never utilized what's 11:17:47
18 called the heavy liquid separation method to look for 11:17:49
19 amphiboles, correct? 11:17:52
20 A. I never -- no. 11:17:53
21 Q. Okay. And, by the way, back in 1971 when 11:17:55
22 Dr. Gavin Hildick-Smith -- and you told him about the 11:18:02
23 chrysotile asbestos, did -- did you want to publish 11:18:09
24 those findings in '71? 11:18:13
25 A. '71. I'm thinking of the first 11:18:21

1 publication. I mean, we were talking about it. We were 11:18:23
2 publishing on asbestos bodies or asbestos fibers in 11:18:25
3 ambient air, and we were talking about asbestos fibers 11:18:29
4 in the lungs of people dying in New York City. We had a 11:18:33
5 number of projects ongoing. 1971, no. 11:18:38

6 Q. Did -- did Johnson & Johnson, Dr. Gavin 11:18:51
7 Hildick-Smith, ever offer a sponsorship so that you 11:18:54
8 could publish on your findings? 11:18:58

9 MR. ASHBY: Calls for speculation. Lacks 11:19:00
10 foundation. 11:19:01

11 THE WITNESS: I don't think so. 11:19:03

12 BY MR. SATTERLEY: 11:19:05

13 Q. With regards to 2017, did an individual -- 11:19:11
14 a group of individuals come to see you, attorneys for 11:19:16
15 Johnson & Johnson, here at -- at this same place we are 11:19:20
16 at today, at this lodge? 11:19:23

17 A. Yes. 11:19:24

18 Q. And who -- who came to see you? 11:19:24

19 A. Mr. Bicks. 11:19:28

20 Q. Okay. 11:19:34

21 A. In -- in the company of -- he was in the 11:19:36
22 company -- I think Roland Holland was there. And down 11:19:38
23 the road -- down the road in Norfolk... 11:19:46

24 Q. Bruce Bishop? 11:19:51

25 A. Bruce, yes. 11:19:52

1	Q. Okay. Was there four or five lawyers for	11:19:52
2	J&J that came to visit you?	11:19:54
3	MR. ASHBY: Calls for speculation. Lacks	11:19:56
4	foundation.	11:19:58
5	THE WITNESS: One, two, three, four. One	11:19:59
6	of Bruce Bishop's colleagues also. I'd say four.	11:20:01
7	BY MR. SATTERLEY:	11:20:05
8	Q. And -- and did that meeting last for	11:20:06
9	three-quarters of a day?	11:20:08
10	A. Possibly, yes.	11:20:10
11	Q. And -- and did Mr. Bicks sort of lead that	11:20:13
12	discussion?	11:20:15
13	A. Yes.	11:20:16
14	Q. And was he a pretty smart guy?	11:20:16
15	A. Smart, nice guy.	11:20:19
16	Q. Nice guy?	11:20:20
17	A. Yeah.	11:20:22
18	Q. And let me show you Exhibit 18 and ask	11:20:22
19	you, is that a photo of Mr. Bicks?	11:20:28
20	A. It appears so.	11:20:30
21	Q. And did you tell Mr. Bicks and the other	11:20:36
22	attorneys for J&J at that time in -- in 2017 that you	11:20:37
23	stood by your position that you found asbestos in -- in	11:20:42
24	baby powder?	11:20:43
25	A. Yes.	11:20:44

1	Q.	And did you -- subsequent to that were you	11:20:45
2		interviewed by Reuters and the New York Times on this	11:20:53
3		topic?	11:20:56
4	A.	I don't think so, no.	11:20:57
5	Q.	Did Reut -- in 2018, later, a year or so	11:20:58
6		later?	11:21:04
7	A.	Someone from the New York Times. That --	11:21:04
8		that would have been telephone.	11:21:06
9	Q.	Yeah. Telephonic.	11:21:07
10	A.	Yeah.	11:21:09
11	Q.	And -- and did you stand by your	11:21:10
12		position --	11:21:12
13	A.	Yes.	11:21:12
14	Q.	-- that there was asbestos in baby powder?	11:21:13
15	A.	Yes.	11:21:15
16	Q.	And let me show you a video. And I'll	11:21:16
17		provide a copy on a flash drive. Let me just turn this	11:21:24
18		around and see if you can see that.	11:21:29
19	THE VIDEOGRAPHER:	Is this to be shown	11:21:33
20		right now?	11:21:34
21	MR. SATTERLEY:	No, no, no. This is for	11:21:35
22		him.	11:21:36
23		(The video was played as follows:)	11:21:36
24		"At the end, the FDA and Mount Sinai	11:21:38
25		Hospital, which is where Dr. Langer is from, they all	11:21:40

1 concluded that there was no asbestos in any of the talc. 11:21:44
2 And it was front page news. 100 U.S. newspapers carried 11:21:51
3 a corrected story that looked at all of this and said we 11:21:57
4 were wrong in 1971. We've looked at this, and there's 11:22:03
5 no asbestos in Johnson & Johnson's powder." 11:22:09
6 MR. ASHBY: All right. I'll just object 11:22:12
7 to the use of the video. It lacks foundation. Calls 11:22:13
8 for speculation. And it's not being used to refresh 11:22:17
9 recollection. 11:22:20
10 MR. SATTERLEY: Your object -- objection 11:22:21
11 is noted. 11:22:22
12 BY MR. SATTERLEY: 11:22:23
13 Q. Let me ask you, Dr. Langer, did you -- in 11:22:23
14 2017, did you understand that this individual, 11:22:26
15 Mr. Bicks, was working for Johnson & Johnson? 11:22:32
16 MR. ASHBY: I'll just object. 11:22:34
17 THE WITNESS: Yes. 11:22:35
18 BY MR. SATTERLEY: 11:22:35
19 Q. And you understood he was an attorney for 11:22:35
20 Johnson & Johnson? 11:22:37
21 MR. ASHBY: Object. 11:22:40
22 THE WITNESS: Yes. 11:22:41
23 BY MR. SATTERLEY: 11:22:41
24 Q. Did you ever tell him that we were wrong, 11:22:41
25 there was no asbestos in Johnson Baby Powder? 11:22:43

1	MR. ASHBY: Objection. Lacks foundation.	11:22:46
2	Calls for speculation. Argumentative.	11:22:48
3	THE WITNESS: Let's assume for the	11:22:52
4	moment --	11:22:54
5	BY MR. SATTERLEY:	11:22:54
6	Q. Well, let me ask -- ask you to answer --	11:22:55
7	A. Let me --	11:22:55
8	Q. -- the question first.	11:22:56
9	Did you tell him that there was no	11:22:57
10	asbestos in baby powder?	11:22:58
11	MR. ASHBY: Same objection.	11:23:01
12	MR. CHARCHALIS: Mr. -- Mr. Satterley, if	11:23:04
13	you could please let the witness complete his answer	11:23:05
14	when he starts to give one. You can't cut him off.	11:23:08
15	BY MR. SATTERLEY:	11:23:10
16	Q. Go ahead, Dr. Langer. Did you tell him	11:23:10
17	that you were wrong?	11:23:12
18	A. Yes. I'm -- I'm just being kind to	11:23:12
19	Mr. Bicks.	11:23:14
20	Q. Uh-huh.	11:23:14
21	A. I -- I can be kind.	11:23:14
22	Q. Uh-huh.	11:23:14
23	A. There were many samples that we discussed.	11:23:16
24	And in terms of the original reports concerning the	11:23:22
25	chrysotile fibers identified in the talcs, including	11:23:28

1	J&J, that remained.	11:23:34
2	Q. You stood by that?	11:23:37
3	A. I stood by that.	11:23:38
4	Q. And did you tell Mr. Bicks that?	11:23:39
5	MR. ASHBY: Objection.	11:23:41
6	THE WITNESS: Yes. I'm just saying over	11:23:43
7	three-quarters of a -- a day could he have been confused	11:23:45
8	about some other report, some other no, we were wrong	11:23:48
9	about that, it's possible that we were wrong about	11:23:55
10	something.	11:23:58
11	BY MR. SATTERLEY:	11:23:58
12	Q. Let me show you another --	11:23:58
13	THE VIDEOGRAPHER: I need to change the	11:24:00
14	media real quick.	11:24:01
15	MR. SATTERLEY: Okay.	11:24:01
16	THE VIDEOGRAPHER: All right. The time is	11:24:03
17	11:24. This is the end of media number one, and we are	11:24:04
18	off the record.	11:24:08
19	THE WITNESS: Oh, perfect. Perfect.	11:24:09
20	(A recess was taken.)	11:24:11
21	THE VIDEOGRAPHER: All right. The time is	11:30:53
22	11:31. This is the beginning of media number two, and	11:31:00
23	we are back on the video record.	11:31:04
24	BY MR. SATTERLEY:	11:31:06
25	Q. Dr. Langer, are you ready to continue?	11:31:07

1	A.	Yes, I am.	11:31:08
2	Q.	Just a few more questions and I'll turn	11:31:09
3		you over to the attorneys for J&J and LTL.	11:31:11
4		Did you know a Bill Ashton?	11:31:15
5	A.	Yes.	11:31:18
6	Q.	And who is Bill Ashton?	11:31:18
7	A.	He was a mineralogist. I believe he was	11:31:21
8		employed by Johnson & Johnson.	11:31:23
9	Q.	And did you come to meet him through	11:31:24
10		scientific meetings and -- and --	11:31:29
11	A.	Occasionally. Meetings, yes.	11:31:31
12	Q.	Back to the -- a video that I showed you a	11:31:33
13		minute -- I showed you one of Mr. Bicks. Now I want to	11:31:37
14		show you one of another -- that -- that was 2018 of	11:31:39
15		Mr. Bicks. Now, this one is in 2019.	11:31:43
16	MR. ASHBY:	Object.	11:31:45
17	MR. SATTERLEY:	You can have an objection.	11:31:47
18		(The video was played as follows:)	11:31:47
19		"Dr. Langer and Dr. Rubin, who we talked	11:31:50
20		about with Dr. Egilman, also did testing and found that	11:31:52
21		they're not false positives. Langer actually wrote an	11:31:58
22		article despite the fact that Dr. Egilman said that he	11:31:59
23		found asbestos in Johnson's Baby Powder and said, I may	11:32:02
24		have been mistaken. Long talcum fibers or asbestos	11:32:06
25		fibers, they have similar properties."	11:32:09

1 BY MR. SATTERLEY: 11:32:11

2 Q. Did you ever write an article -- publish 11:32:11

3 an article saying you were wrong about Johnson & Johnson 11:32:14

4 having chrysotile asbestos? 11:32:17

5 A. No. 11:32:18

6 MR. ASHBY: Let me just get my objection 11:32:19

7 to the -- to the use of the video. It's improper. And 11:32:20

8 then object to the question as argumentative. 11:32:23

9 MR. SATTERLEY: You -- yeah. You can have 11:32:26

10 an objection. You already stated the objection. You 11:32:28

11 can have another one. 11:32:30

12 BY MR. SATTERLEY: 11:32:30

13 Q. Let me ask the question again. Did you 11:32:30

14 ever write an article that said you had a false positive 11:32:33

15 and there's no asbestos in Johnson's Baby Powder? 11:32:36

16 A. No. 11:32:39

17 Q. One more video. 11:32:40

18 (The video was played as follows:) 11:32:40

19 "Let me give you another example of what 11:32:53

20 you need to watch out for. You heard about Dr. Langer. 11:32:56

21 And he tested a bunch of different products. I think 11:33:02

22 the plaintiff told you that. His test showed asbestos. 11:33:05

23 At the end of the day you're going to see that 11:33:09

24 Dr. Langer of Mount Sinai Medical Center found Johnson & 11:33:12

25 Johnson products did not have asbestos. That's what 11:33:16

1	you're going to see him acknowledge. No asbestos	11:33:17
2	contamination."	11:33:20
3	MR. ASHBY: Again, objection to the use of	11:33:22
4	the video. It's improper.	11:33:23
5	BY MR. SATTERLEY:	11:33:25
6	Q. In the meeting with those four or five	11:33:25
7	lawyers in 2017, did you tell them that Johnson &	11:33:26
8	Johnson -- that you retracted your findings, that you	11:33:33
9	did not find any asbestos?	11:33:37
10	MR. ASHBY: Objection. Compound.	11:33:38
11	Misstates.	11:33:39
12	THE WITNESS: No.	11:33:40
13	BY MR. SATTERLEY:	11:33:42
14	Q. As a -- a geologist and a mineralogist,	11:33:49
15	does talc and asbestos grow together in the earth?	11:33:52
16	MR. ASHBY: Objection. Overbroad.	11:33:57
17	THE WITNESS: They can.	11:33:58
18	BY MR. SATTERLEY:	11:33:58
19	Q. And have you published upon that?	11:33:58
20	A. Yes.	11:34:00
21	Q. And as a mineralogist, someone who has	11:34:00
22	spent a -- a career looking under the transmission	11:34:06
23	electron mic -- microscope, have you found fibrous	11:34:09
24	amphiboles in talcum powder products repeatedly?	11:34:12
25	A. Occasionally. No. Occasionally.	11:34:16

1 Q. And with regards to -- I know you said you 11:34:18
2 were emeritus now. You have not recently, in the last 11:34:25
3 several years, analyzed talcum powder for the presence 11:34:27
4 of asbestos, correct? 11:34:32
5 A. Correct. 11:34:33
6 Q. Okay. And you're not -- you've not been 11:34:33
7 hired by -- since 2017 when these attorneys came to see 11:34:36
8 you, they didn't hire you to be -- to evaluate any 11:34:40
9 particular case, correct? 11:34:44
10 A. Correct. 11:34:45
11 Q. And they certainly didn't hire you to 11:34:45
12 evaluate this case, correct, Mr. Valadez? 11:34:47
13 A. No. 11:34:51
14 Q. Okay. And -- and none of these attorneys 11:34:52
15 for Johnson & Johnson asked you to evaluate the risks 11:34:53
16 that -- the risks to -- of -- of asbestos in Johnson's 11:34:59
17 Baby Powder -- 11:35:04
18 MR. ASHBY: Assumes facts. 11:35:04
19 BY MR. SATTERLEY: 11:35:06
20 Q. -- at any point in time? 11:35:06
21 THE WITNESS: No. 11:35:10
22 MR. ASHBY: Assumes facts. 11:35:10
23 MR. SATTERLEY: Dr. Langer, I appreciate 11:35:10
24 all your testimony here today. I'm not going to have 11:35:11
25 any further questions right now. After the attorneys 11:35:14

1	ask you questions, I may come back and ask you	11:35:16
2	additional questions.	11:35:18
3	THE WITNESS: Fine.	11:35:19
4	MR. SATTERLEY: Let's go off the record	11:35:19
5	just so we can switch seats. Okay?	11:35:20
6	THE WITNESS: Sure.	11:35:23
7	MR. ASHBY: All right.	11:35:24
8	MR. SATTERLEY: Let me just get my stuff.	11:35:26
9	THE VIDEOGRAPHER: The time is 11:35.	11:35:29
10	We're going off the record.	11:35:31
11	(A recess was taken.)	11:35:33
12	THE VIDEOGRAPHER: It's 11:36 a.m. We're	11:36:46
13	back on the video record.	11:36:49
14	MR. SATTERLEY: Oh, no, no, we're not on	11:36:53
15	the video record.	11:36:54
16	THE VIDEOGRAPHER: Oh. Well, okay. Just	11:36:54
17	back on the record. I got it.	11:36:54
18	MR. SATTERLEY: Yeah.	11:36:54
19	MR. ASHBY: What's the other, 18?	11:36:54
20	MR. SATTERLEY: Let -- let's change the --	11:37:30
21	let's go on the record and -- you're right. You're --	11:37:30
22	you're correct. Let's change the --	11:37:30
23	MR. ASHBY: The 18?	11:37:30
24	MR. SATTERLEY: -- 18 to -- let's just do	11:37:32
25	19, or should we do 18a?	11:37:35

1 MR. ASHBY: Well, I don't even know -- 11:37:39
2 which ones -- which ones are we talking about, the Bicks 11:37:41
3 one -- 11:37:43
4 MR. SATTERLEY: Yeah. 11:37:43
5 MR. ASHBY: And what else? 11:37:43
6 MR. SATTERLEY: Just -- and -- and 18 11:37:44
7 is -- his letter to Chalmers is 18. 11:37:45
8 MR. ASHBY: Oh, I had that marked as 17. 11:37:50
9 MR. SATTERLEY: That's 18. No. 17 is the 11:37:52
10 confidential -- strictly confidential. 11:37:54
11 MR. ASHBY: Oh, that's 17? 11:37:57
12 MR. SATTERLEY: So why don't we call it 11:37:58
13 18a so that -- because I mentioned 18 on the record? 11:38:00
14 MR. ASHBY: Is Bicks' picture? 11:38:03
15 MR. SATTERLEY: Yeah. 11:38:06
16 MR. ASHBY: Okay. What are we on, 19? 11:38:08
17 Those videos are -- 11:38:10
18 MR. SATTERLEY: Yeah. Yeah. 19. Sorry 11:38:12
19 about that. 11:38:13
20 (A discussion took place off the record.) 11:38:15
21 (Exhibit 18a was marked and 11:38:15
22 attached to the transcript.) 11:40:09
23 THE VIDEOGRAPHER: All right. The time is 11:40:09
24 11:40, and we are back on the video record. 11:40:10
25 11:40:10

1	EXAMINATION BY COUNSEL FOR THE DEFENDANTS JOHNSON &	11:40:10
2	JOHNSON AND LTL MANAGEMENT, LLC:	11:40:10
3	BY MR. ASHBY:	11:40:10
4	Q. Good -- I guess we're still in the	11:40:16
5	morning. Good morning -- good afternoon,	11:40:18
6	Dr. Langer. My name's Matt Ashby. Nice to meet you.	11:40:19
7	A. Nice to meet you.	11:40:22
8	Q. We met in the hallway, but you and I had	11:40:23
9	never met previously to -- to today, correct?	11:40:26
10	A. Yes. That is correct.	11:40:28
11	Q. As you understand, I represent Johnson &	11:40:29
12	Johnson and LTL in the case that Mr. Satterley's	11:40:32
13	brought. Do you understand today that your deposition	11:40:35
14	is being taken at the request of Mr. Satterley and his	11:40:38
15	client?	11:40:41
16	A. Yes.	11:40:41
17	Q. Okay. Johnson & Johnson didn't have	11:40:42
18	anything to do with scheduling your deposition today; is	11:40:44
19	that right, as far as you know?	11:40:46
20	A. As far as I know.	11:40:47
21	Q. Johnson & Johnson is not paying you for	11:40:49
22	your testimony today; is that correct?	11:40:52
23	A. As far as I know.	11:40:53
24	Q. Is Mr. -- is Mr. Satterley paying you for	11:40:54
25	your testimony today?	11:40:56

1	A.	Not -- not that I know of, no.	11:40:58
2	Q.	And prior to today you have met with	11:41:00
3		Mr. Satterley a few times to discuss what you would	11:41:05
4		testify about today; is that true?	11:41:08
5	A.	Yes.	11:41:10
6	Q.	Okay. And how many times did you meet	11:41:11
7		with Mr. Satterley?	11:41:12
8	A.	Several times.	11:41:13
9	Q.	Okay. How many -- how much time do you	11:41:14
10		think you and Mr. Satterley spent together in preparing	11:41:16
11		for the testimony you would give today?	11:41:20
12	A.	I -- the bulk of the time, of course, was	11:41:25
13		spent at the -- at the meetings. However, Mr. Satterley	11:41:30
14		sent me a package of documents raising issues concerning	11:41:38
15		our analytical results and the analysis techniques and	11:41:49
16		the characterization of talc and particles within talc,	11:41:55
17		and he asked me to read these documents and to answer	11:42:00
18		the critiques raised by the defendant experts.	11:42:05
19		And I read the documents. I was very	11:42:16
20		interested in their criticisms of our techniques. And	11:42:20
21		a great deal -- a great deal of time. I have time, as	11:42:28
22		you can imagine. It may have consumed maybe eight	11:42:33
23		hours, maybe nine hours.	11:42:40
24	Q.	And -- and did you submit an invoice or a	11:42:42
25		bill to Mr. Satterley for payment for the time that you	11:42:47

1	spent doing this?	11:42:50
2	A. No.	11:42:50
3	Q. Do you expect to be paid by Mr. Satterley	11:42:51
4	or -- or his firm for the time you spent reviewing those	11:42:53
5	materials?	11:42:56
6	A. Well, as a percipient witness, no, I can't	11:42:56
7	submit a statement, so...	11:43:00
8	Q. Okay. And Mr. Satterley's not offered to	11:43:02
9	pay you for your time spent doing that; is that true?	11:43:06
10	A. I haven't heard anything from him.	11:43:09
11	Q. Okay. So do you still have in your	11:43:12
12	possession the materials that Mr. Satterley sent you?	11:43:18
13	A. Yes. I probably have them on my desk at	11:43:22
14	home.	11:43:25
15	Q. Okay.	11:43:25
16	A. Yes.	11:43:26
17	Q. Are we talking like a Redweld-size worth	11:43:26
18	of -- of papers or -- or something smaller than a	11:43:34
19	banker's box?	11:43:36
20	A. Well, smaller, yeah. Maybe	11:43:36
21	(indicating) -- I'm separating my fingers -- about one	11:43:39
22	inch.	11:43:45
23	Q. Got it.	11:43:45
24	A. So about an inch depth. Yeah. It -- it's	11:43:46
25	documents that -- reports, techniques.	11:43:50

1	Q.	Uh-huh.	11:43:54
2	A.	Yeah.	11:43:55
3	Q.	Okay. All right. Let's just dive into	11:43:55
4		it.	11:44:00
5		So I -- I'm going to have a couple of	11:44:01
6		questions for you today. Certainly I'm going to ask you	11:44:03
7		about Johnson & Johnson and baby powder. I'm going to	11:44:05
8		ask you some things about some statements you've made	11:44:08
9		publicly and some statements you've made in your	11:44:10
10		research or maybe even at symposiums and things like	11:44:12
11		that.	11:44:17
12	Q.	Great.	11:44:17
13		So we'll cover as much as we can. I don't	11:44:17
14		intend to spend a lot of time with you, but what I'm	11:44:20
15		hoping you'll do is just give me your best testimony and	11:44:23
16		how -- how you best remember things. Can you do that	11:44:26
17		for me?	11:44:29
18	A.	And be pithy.	11:44:30
19	Q.	Especially pithy. That's all anybody	11:44:31
20		wants.	11:44:33
21	A.	Okay.	11:44:33
22	Q.	All right. Do you recall -- just as a	11:44:35
23		starting point, you recall that you were deposed in 2021	11:44:38
24		in relation to Johnson & Johnson and many of the things	11:44:42
25		that you testified about here today, right?	11:44:46

1	A.	Essentially.	11:44:47
2	Q.	Okay. All right, Dr. Langer. You had	11:44:48
3		great respect for the researchers at J&J; is that true?	11:44:53
4	A.	Yes. Yeah.	11:44:56
5	Q.	You believe the researchers at J&J were	11:44:58
6		rigorous and acted in good faith?	11:45:00
7	A.	I'm assuming so.	11:45:03
8	Q.	You have no -- what you told us in 2021	11:45:05
9		was that you had no reason to disagree with that, that	11:45:11
10		the researchers at J&J were rigorous and acted in good	11:45:14
11		faith?	11:45:17
12	A.	I have no reason to disagree with that,	11:45:17
13		no.	11:45:19
14	Q.	Do you agree that you believe that J&J's	11:45:19
15		talc was never the problem and that they were the good	11:45:24
16		guys in the talc story and other talcs might have been	11:45:26
17		the problem, right?	11:45:30
18	A.	That's, I think, a reasonable summary,	11:45:32
19		yes.	11:45:37
20	Q.	Okay. All right. So let's talk a bit	11:45:37
21		about 1971 and what was going on at that time. So I	11:45:50
22		want to kind of set the scene. I think you're a pretty	11:45:54
23		good storyteller, so I thought we could start with that.	11:45:57
24	A.	Okay.	11:46:00
25	Q.	In September of 1971 your team at Mount	11:46:00

1 Sinai began the study of asbestos content of consumer 11:46:05
2 talcs; is that right? 11:46:08
3 A. No. Actually, it's not. I believe that 11:46:10
4 we started the study of consumer talcs well before 1971. 11:46:16
5 I believe that we published our -- we published our 11:46:25
6 asbestos body studies in 1969. That's at the 11:46:30
7 Johannesburg meeting. That would be Selikoff's first 11:46:42
8 paper in that area. My first publication would be about 11:46:44
9 1970. 11:46:49
10 But, of course, the issue is there's a 11:46:50
11 publication of the document, which is the publication of 11:46:57
12 the data, but in order to publish -- it's built on a 11:47:04
13 body of information that preceded a year or two years 11:47:08
14 before that. And so a year or two years before 1971 -- 11:47:14
15 what, three years -- we were speaking with federal 11:47:22
16 agencies like Food & Drug concerning fibers and fiber 11:47:26
17 exposure. We were invited to the group at Cincinnati, 11:47:34
18 we were invited to Food & Drug down in Washington, D.C., 11:47:43
19 and we spoke about these issues. 11:47:53
20 Food & Drug at that time -- this is in the 11:47:58
21 nine -- late nineteen seven -- '60s. Food & Drug 11:48:02
22 regarded talc as a -- an additive in a -- in a 11:48:06
23 pharmaceutical, in food products, regarded talc as safe, 11:48:14
24 generally regarded as safe. The document was called the 11:48:21
25 Green Document. And there were a number of materials 11:48:25

1 and compounds generally regarded as safe, and talc was 11:48:31
2 one of them. And so we talked about our data. And we 11:48:36
3 said, you know, we're interested in these particles. We 11:48:41
4 find asbestos bodies. Does this mean that the -- the 11:48:45
5 lung is reacting to these particles? Does it mean 11:48:48
6 there's some biological potential here? Is it an agent 11:48:51
7 of scarring? 11:48:55

8 So these were all issues. I mean, 11:48:58
9 they're -- they're interesting now, but you're looking 11:49:00
10 at it 2023. Go back 55 years. What did we know about 11:49:06
11 fiber type, about concentration, about exposure, about 11:49:14
12 risk, about scarring, about malignancies? These were 11:49:21
13 all unknowns. And so we raised concerns. 11:49:28

14 And so your last statement that you read, 11:49:32
15 which you said, you know, Langer said that I'd make a 11:49:36
16 better witness -- bup, bup, bup, bup. Yeah. I'm -- I'm 11:49:43
17 looking at 2023. And I think a lot of people look at 11:49:45
18 the past -- the past feel, the past knowledge base, 11:49:50
19 through the lens of 2023. And we think of -- of what 11:50:00
20 the potential exposure risk is, what we call health, 11:50:07
21 what we call low risk, high risk, and so forth and so 11:50:13
22 on. 11:50:16

23 Q. Okay. Okay. So I -- I think there were 11:50:17
24 some things that were nonresponsive in what I asked, so 11:50:18
25 I'll just move to strike some of that. But really what 11:50:22

1 I was getting at -- I was just trying to set the stage. 11:50:24
2 I know you -- you covered a lot of topics right there, 11:50:27
3 and we'll get into those as -- as we go along, but 11:50:28
4 really -- here. I'll just do this. I'll mark this as 11:50:31
5 Exhibit 19. I'll give this to you. And maybe this will 11:50:35
6 help us. 11:50:38
7 (Exhibit 19 was marked and 11:38:15
8 attached to the transcript.) 11:38:15
9 BY MR. ASHBY: 11:50:41
10 Q. Do -- do you recognize this document? 11:50:41
11 A. Expert report, yes. 11:50:46
12 Q. Okay. 11:50:48
13 A. Asbestos -- bup, bup, bup, bup. Talc. 11:50:50
14 Q. And is this a report that you drafted in 11:50:56
15 2015 as an expert in some kind of litigation? 11:50:59
16 A. Yes. 11:51:07
17 Q. Okay. So if you turn to page 3, really 11:51:07
18 what I was looking at, and I probably misstated, but 11:51:09
19 at -- in paragraph 3 there it says, In September 1971 my 11:51:13
20 team at -- 11:51:17
21 A. Yeah. 11:51:17
22 Q. -- Environmental Sciences Lab -- 11:51:17
23 Laboratory, ESL -- and you told us today it was the EML 11:51:21
24 before that -- at Mount Sinai -- 11:51:24
25 A. Oh. Before that we were called -- we were 11:51:26

1	called Environmental Health in the Department of	11:51:30
2	Medicine. There was no School of Medicine when I first	11:51:36
3	started there in 1965. It was only Mount Sinai	11:51:39
4	Hospital, which was a teaching hospital. And the -- let	11:51:44
5	me -- let me be pithy. Let me just say -- okay. All	11:51:49
6	right.	11:51:53
7	Q. Sure. Okay. So it -- it goes on, In	11:51:53
8	September '71 my team at ES -- ESL at Mount Sinai School	11:51:56
9	of Medicine began in a more formal manner the study of	11:52:01
10	the asbestos content of consumer talcs.	11:52:04
11	A. Yes.	11:52:06
12	Q. Is that accurate?	11:52:06
13	A. Yes.	11:52:07
14	Q. Okay. That's all I was getting at.	11:52:08
15	A. Yes.	11:52:10
16	Q. And in this time period of 1971 or the	11:52:10
17	early 1970s there's a lot going on in the world of	11:52:18
18	asbestos beyond just consumer talcs, true?	11:52:22
19	A. No question.	11:52:27
20	Q. Okay. And -- and it says, if we go down a	11:52:28
21	little further on page -- page 3, the last paragraph	11:52:30
22	says, During the early 1970s my laboratory at Mount	11:52:31
23	Sinai School of Medicine was in near constant receipt of	11:52:36
24	household and commercial products for asbestos content	11:52:38
25	analysis. Is that accurate?	11:52:41

1	A.	Yes.	11:52:43
2	Q.	Okay. Because around this time, in the	11:52:43
3		early 1970s, there's a lot of knowledge being developed	11:52:47
4		regarding asbestos, particularly asbestos in the	11:52:51
5		workplace and even at the -- even at the households,	11:52:53
6		right?	11:52:56
7	A.	Asbestos made the 5:00 news.	11:52:56
8	Q.	And -- and when -- when I see here that it	11:52:59
9		says you were in near constant receipt of household and	11:53:06
10		commercial products for asbestos content analysis, and	11:53:10
11		then you go on to say these included textile products --	11:53:15
12	A.	Yes.	11:53:19
13	Q.	-- personal care products --	11:53:19
14	A.	Yes.	11:53:20
15	Q.	-- building materials, and all manner of	11:53:20
16		other consumer goods, right?	11:53:23
17	A.	Yes.	11:53:25
18	Q.	Can -- can you tell me the types of --	11:53:27
19		well, actually, I'll strike that.	11:53:31
20		How -- how many products would you say at	11:53:33
21		the time contained asbestos as an intended ingredient in	11:53:34
22		the United States?	11:53:37
23	MR. SATTERLEY:	Objection --	11:53:43
24	THE WITNESS:	At least --	11:53:43
25	MR. SATTERLEY:	-- to foundation.	11:53:43

1	THE WITNESS: At least half the products	11:53:44
2	sent to us contained fiber, asbestos fiber.	11:53:45
3	I mean, my favorite story is we were	11:53:55
4	contacted by a woman in Connecticut who said she had	11:53:57
5	purchased a coat for her daughter and on the coat label	11:54:07
6	it indicated it contained 8 percent chrysotile asbestos.	11:54:16
7	Irving Selikoff received the letter. He contacted the	11:54:26
8	woman. He said, This is not possible. He said -- and	11:54:30
9	she said, I have the coat. He said, We're going to buy	11:54:33
10	the coat from you and we're going to examine it. Thank	11:54:35
11	you very much. Send me the bill. And we bought the	11:54:39
12	coat from her.	11:54:42
13	And the coat was manufactured in New York	11:54:47
14	City with fabric in -- fabric that was imported from	11:54:49
15	Milan, Italy. It was imported under a tariff which	11:54:56
16	permitted tariff fees to be changed if the product, the	11:55:04
17	fabric, contained a fiber which imparted special	11:55:13
18	properties to the material. And the fiber that was	11:55:19
19	mentioned was chrysotile asbestos. It was woven into	11:55:24
20	the fabric in Italy. It was brought into New York City	11:55:28
21	where it was cut and fashioned; the International	11:55:33
22	Ladies' Garment Workers Union. And they were in	11:55:37
23	touch -- Irving Selikoff -- I did the assays. We	11:55:43
24	included it in our report, our annual report. Maybe it	11:55:51
25	was the annual report of 1974.	11:55:52

1 The -- Irving contacted -- I think 11:55:57

2 Mendelson was the president of the International Ladies' 11:56:06

3 Garment Workers Union in New York, and alerted to the 11:56:08

4 fact that his people were cutting this fabric and the 11:56:13

5 dust generated was dust that contained asbestos fiber. 11:56:19

6 BY MR. ASHBY: 11:56:19

7 Q. So -- 11:56:25

8 A. And that was -- that was common. I mean, 11:56:25

9 there were all kinds of interesting materials. 11:56:27

10 Q. I was just going to ask, so that's just 11:56:30

11 one example -- 11:56:32

12 A. Exactly. 11:56:32

13 Q. -- of probably, what, thousands of 11:56:33

14 different types of products you've looked at that 11:56:35

15 have -- have contained asbestos? 11:56:35

16 MR. SATTERLEY: Objection. Foundation. 11:56:38

17 Speculation. 11:56:39

18 THE WITNESS: And mercifully -- 11:56:40

19 mercifully, we didn't do a thousand -- 11:56:42

20 BY MR. ASHBY: 11:56:42

21 Q. Okay. 11:56:42

22 A. But we did a great number, a great number. 11:56:44

23 Would it have been 100? Yeah. It would have been 100. 11:56:47

24 Could it have been 150? Yeah. Everyone was sending us 11:56:51

25 something. They were sending us the kitty litter. They 11:56:54

1 were sending us putties from different job sites. They 11:56:58
2 were sending us new -- pipe covering for pipes in the 11:57:04
3 basement of homes, a -- a -- a cellulous chrysotile 11:57:09
4 combination of cellu whatever. 11:57:15
5 Then there were paper maches, paper maches 11:57:20
6 from the Boy Scouts of America or whatever. The 11:57:24
7 recommendation in the Boy Scout Handbook was that 11:57:30
8 asbestos cement, the good varieties from Johns-Manville, 11:57:33
9 may be used as a -- as a modeling material. I mean, 11:57:37
10 you -- it was the original report out of JM -- and I'm 11:57:43
11 talking Sinclair's monograph on asbestos. He said there 11:57:50
12 were 3,000 consumer uses. 11:57:54
13 Mercifully, we didn't -- we didn't look at 11:57:59
14 3,000. We didn't look at 1,000. But there were plenty 11:58:01
15 of people -- asbestos made the 5:00 news. And people 11:58:05
16 became concerned not so much about what was known but 11:58:10
17 what was unknown. And so there was uncertainty. And 11:58:15
18 the uncertainty drove analysis. Now, we used to say why 11:58:20
19 don't you send this to the Consumer Product Safety 11:58:30
20 Commission. That's -- that 's their job. 11:58:33
21 Q. All right. And -- and then around this 11:58:36
22 time, in this early 1970s period or maybe even before 11:58:37
23 1971, it -- what I see from this report is that you 11:58:40
24 began to purchase consumer talcum powder products from 11:58:43
25 retail outlets near Mount Sinai in New York City? 11:58:46

1	A.	Yes. That's correct.	11:58:49
2	Q.	Okay. And you also analyzed talcums that	11:58:50
3		members of the lab staff may have had in their medicine	11:58:55
4		cabinets at their homes?	11:58:58
5	A.	Yes.	11:58:59
6	Q.	And so you've discussed with Mr. Satterley	11:59:00
7		quite a bit about the 1971 testing that you did of	11:59:03
8		the -- the Johnson's Baby Powder product. And I think	11:59:07
9		what I understood you to say was that the analysis that	11:59:12
10		was performed on the 1971 product, or at least the	11:59:16
11		product about that time, that analysis was never	11:59:21
12		published in any peer-reviewed journal? That's true?	11:59:23
13	A.	I -- I think that's true, yeah.	11:59:26
14	Q.	And -- and do you recall originally when	11:59:28
15		the analysis was done of that product, was it done by	11:59:34
16		PLM or electron microscopy or both?	11:59:39
17	A.	We would have employed both polarized	11:59:44
18		light microscopy. We would have employed x-ray	11:59:51
19		diffraction. We would have employed electron	11:59:56
20		microscopy, which included selected area diffraction and	12:00:01
21		the generation of chemical information. But, of course,	12:00:07
22		that was not by energy dispersive at that time. That	12:00:11
23		was with crystal spectrometry. That was an electron	12:00:14
24		microprobe analyzer, which had a different system and	12:00:21
25		method for analyzing x-rays generated from an irradiated	12:00:24

1	particle.	12:00:30
2	Q. And -- and at that time I -- my	12:00:30
3	understanding is that, in -- in addition to the	12:00:34
4	Johnson's Baby Powder you had looked at a Lander's Baby	12:00:36
5	Powder too in that 1971 period?	12:00:43
6	A. Could be.	12:00:44
7	Q. And -- and the findings with respect to	12:00:45
8	those analyses at the very preliminary stages had been	12:00:46
9	sent or given to someone at the New York City	12:00:51
10	Environmental Protection department? Does that sound	12:00:53
11	right?	12:00:55
12	A. Yes, that sounds right.	12:00:55
13	Q. Okay. And -- and because of that what	12:00:56
14	happened was your preliminary findings that hadn't been	12:00:58
15	published yet are disclosed, were disclosed by somebody	12:01:02
16	at the New York City's office to the media, right?	12:01:04
17	A. Correct.	12:01:07
18	Q. And it -- it -- it -- it drew some	12:01:08
19	attention, didn't it?	12:01:11
20	A. Yes, it did.	12:01:12
21	Q. And you were interviewed several times in	12:01:13
22	1971 and 1972 about your baby powder findings, right?	12:01:18
23	A. Yes.	12:01:23
24	Q. Now, at -- at some point did you take a	12:01:24
25	closer look at the materials to get a better	12:01:28

1	understanding of the analyses or a -- a better	12:01:36
2	understanding of your findings in --	12:01:39
3	A. Yes.	12:01:39
4	Q. -- that 1971 to '72 period?	12:01:41
5	A. Occasionally.	12:01:45
6	Q. Okay. And -- and we saw a video earlier.	12:01:47
7	There was one of these gentlemen that were talking. In	12:01:50
8	any event, there -- there was a reference to an article.	12:01:52
9	I know Mr. Satterley asked you if you ever published any	12:01:55
10	articles on this issue. What I'm asking, though, is a	12:01:59
11	newspaper article, because I think that was the	12:02:02
12	reference in the video. There was a newspaper article	12:02:04
13	in 1972 that had quoted you. And so do you remember	12:02:08
14	being quoted in 1972 in newspaper articles regarding	12:02:14
15	your findings in relation to consumer talcs?	12:02:18
16	A. Not specifically.	12:02:21
17	Q. Okay. So let's just -- let's see if I can	12:02:22
18	find that, and we can take a look at --	12:02:26
19	A. Is it -- oh, I'm thinking -- is this the	12:02:27
20	Wall Street Journal? Not Wall Street. It would be	12:02:30
21	Washington Post?	12:02:35
22	Q. It might be. It might be the Washington	12:02:35
23	Post article because there were -- there were quite a	12:02:37
24	few at the time, I believe.	12:02:38
25	A. Yeah. I mean, I know where that confusion	12:02:41

1 may have been, but okay. 12:02:43

2 MR. ASHBY: So this is going -- so this is 12:02:45

3 going to be a challenge, but I'll -- I'll do this. I'll 12:02:47

4 mark this Exhibit 20, but the -- the writing is very 12:02:50

5 small, Dr. Langer, and I apologize. I don't have 12:02:53

6 anything better than this. 12:02:55

7 (Exhibit 20 was marked and 12:02:57

8 attached to the transcript.) 12:02:58

9 BY MR. ASHBY: 12:03:00

10 Q. Okay. So this -- Exhibit 20 is an article 12:03:23

11 entitled Asbestos in J&J Baby Powder question mark. And 12:03:29

12 then the bigger heading is Doctor Admits He May Have 12:03:33

13 Been Mistaken. Do you see that? 12:03:36

14 A. Yes. 12:03:38

15 Q. Okay. Do you remember this article 12:03:38

16 from -- this is from 1972. 12:03:40

17 MR. SATTERLEY: Where was it published at? 12:03:44

18 MR. ASHBY: This is in New Brunswick, New 12:03:47

19 Jersey. 12:03:50

20 MR. SATTERLEY: Okay. 12:03:51

21 THE WITNESS: Yeah. Well, I wish I had a 12:03:52

22 better copy of this because it -- because there's an 12:03:57

23 explanation of what -- what was either confused or what 12:04:05

24 was reported and what was withdrawn. 12:04:11

25 BY MR. ASHBY: 12:04:15

1	Q.	Yeah. Well, let's see if we can get	12:04:15
2		through it a little bit. I'll read what I --	12:04:18
3	A.	Please.	12:04:20
4	Q.	-- what I see here. And I -- I understand	12:04:21
5		it's -- it's a small copy.	12:04:23
6		It says Langer. It doesn't say	12:04:24
7		Dr. Langer, but it just says Dr. Langer --	12:04:26
8	MR. SATTERLEY:	I can't read it.	12:04:28
9		Dr. Langer, can -- can you read that?	12:04:30
10	THE WITNESS:	No.	12:04:31
11	MR. SATTERLEY:	Do you have a better,	12:04:33
12		bigger, copy at all?	12:04:35
13	MR. ASHBY:	I do not have a bigger --	12:04:36
14		well, I -- I can probably zoom in on my computer if you	12:04:38
15		want. I mean --	12:04:41
16	THE WITNESS:	Someone can read it to me.	12:04:41
17		It's all right.	12:04:43
18	BY MR. ASHBY:		12:04:43
19	Q.	Well, let's see. I'll read it to you, and	12:04:43
20		Mr. Satterley can tell me if I'm reading it wrong.	12:04:45
21	MR. SATTERLEY:	I'll trust you, but I	12:04:48
22		can't read it very well, but I -- I need to get a	12:04:50
23		magnifying glass.	12:04:50
24	THE WITNESS:	I can't.	12:04:53
25	BY MR. ASHBY:		12:04:54

1	Q.	It says, Dr. Langer tested one container	12:04:54
2		of Lander's Baby --	12:04:57
3	MR. SATTERLEY:	What paragraph are you on?	12:04:59
4	MR. ASHBY:	I am on paragraph one, two --	12:05:01
5		paragraph five.	12:05:03
6	MR. SATTERLEY:	Paragraph five.	12:05:04
7	MR. ASHBY:	Just below the word admit.	12:05:06
8		The first full paragraph below admit.	12:05:08
9	MR. SATTERLEY:	All right.	12:05:11
10	BY MR. ASHBY:		12:05:11
11	Q.	Dr. Langer tested one container of	12:05:11
12		Lander's Baby Powder and one of Johnson & Johnson's.	12:05:13
13		And then it quotes you. It says, Foolishly I sent them	12:05:16
14		a written report after looking at only two samples, he	12:05:20
15		said, meaning you.	12:05:23
16	A.	Is that right?	12:05:25
17	Q.	Does that sound like something you would	12:05:26
18		have said?	12:05:28
19	A.	That I've been foolish?	12:05:28
20	Q.	No, no, no, no.	12:05:30
21	A.	Okay. Keep reading, please.	12:05:31
22	Q.	Okay. And then it's still quoting you.	12:05:36
23		It says, The data was very preliminary in nature and	12:05:40
24		what is more. I may have mistaken long talcum fibers	12:05:43
25		for asbestos fibers. They have similar properties, the	12:05:45

1	doctor said.	12:05:49
2	A. That's me, yeah.	12:05:50
3	Q. Okay. So we agree you said that in 1972	12:05:51
4	to this --	12:05:54
5	A. It sounds reasonable. Okay.	12:05:55
6	Q. Okay. And then this definitely sounds	12:05:56
7	like you. It says, He continued, meaning you continued,	12:06:00
8	in quotes, "It annoys the hell out of me."	12:06:03
9	A. Yes. That's -- that's a Langer-ism.	12:06:06
10	Q. Yeah. There are a lot more important	12:06:09
11	things than looking for asbestos in talcum powder. For	12:06:11
12	example, they should be worrying about asbestos in spray	12:06:15
13	paint and paper mache.	12:06:18
14	A. Yeah.	12:06:20
15	Q. And you told me about paper mache earlier,	12:06:20
16	right --	12:06:23
17	A. Yeah.	12:06:23
18	Q. -- being a problem?	12:06:23
19	A. Yeah.	12:06:24
20	Q. Okay. So does it -- does that sound like	12:06:24
21	something you would have said at the time too?	12:06:26
22	A. Sure.	12:06:28
23	Q. And then it says -- it goes on. Now I'm	12:06:28
24	moving over to the next -- the third column. It says,	12:06:34
25	But Dr. Langer said the amount of asbestos he saw in the	12:06:39

1	baby powder was, in quotes now, "only a bare trace	12:06:42
2	level." At the current state of medical knowledge he	12:06:47
3	said there is no way of knowing if such a small quantity	12:06:53
4	could be harmful. You said that?	12:06:57
5	A. You know, I'm a smart guy.	12:06:59
6	Q. So you -- you agree with --	12:07:01
7	A. Absolutely. Remember, you're -- you're	12:07:03
8	looking back there. I mean, you're looking back then,	12:07:05
9	in -- 2023 you could conclude differently possibly.	12:07:09
10	Q. Okay.	12:07:17
11	A. Okay. You've read it correctly. Thank	12:07:20
12	you.	12:07:22
13	Q. I read it correctly. And that -- to be	12:07:22
14	fair to you as well, does that sound or at least sound	12:07:25
15	like something you would have said if you don't	12:07:29
16	necessarily remember saying it?	12:07:30
17	A. Yes.	12:07:31
18	Q. Okay. All right. Well, you know what?	12:07:32
19	Maybe I'm not done with that.	12:07:49
20	In the very last sentence of this article	12:08:01
21	it says here, which you may have said, "Dr. Langer says	12:08:05
22	some talcum contains lots of asbestos, some very little.	12:08:11
23	The Johnson & Johnson sample happens to be very pure	12:08:15
24	talc."	12:08:18
25	A. Yeah.	12:08:19

1	Q.	Do you agree with that?	12:08:19
2	A.	Yeah. Those would be the samples -- I	12:08:20
3		think that we got them through Gavin, Gavin	12:08:27
4		Hildick-Smith, but I don't want to mislead you.	12:08:31
5	Q.	Yeah.	12:08:34
6	A.	That's my impression.	12:08:34
7	Q.	No. And that's -- and that's fair.	12:08:35
8		Mr. Satterley used with you a document.	12:08:38
9		It was Exhibit No. 12. And this is around the same	12:08:42
10		time, so this is in -- November 10 of 1971. It's	12:08:49
11		Exhibit 12, if you want to find the one that	12:08:54
12		Mr. Satterley showed you. And this is your letter to	12:08:56
13		Mr. Hildick -- or Dr. Hildick-Smith.	12:09:00
14	A.	Yes.	12:09:04
15	Q.	I -- I'll wait for you to find it.	12:09:04
16	A.	We're on 12?	12:09:15
17	Q.	Yeah. It's Exhibit 12. It looks kind of	12:09:37
18		like this (indicating).	12:09:40
19	A.	I can't find it in this stack, so...	12:09:40
20	Q.	Well, you know what? I'm sure I -- well,	12:09:42
21		let's see if I have an extra copy.	12:09:43
22		Oh, yeah. I brought one myself.	12:09:50
23		Preparation's half the battle.	12:09:57
24	MR. SATTERLEY:	Which one are you doing?	12:10:01
25	MR. ASHBY:	This is your Exhibit 12. It's	12:10:03

1	November 10, 1971.	12:10:05
2	MR. SATTERLEY: December the 10th you	12:10:07
3	mean?	12:10:08
4	MR. ASHBY: No. I have November 10th.	12:10:09
5	MR. SATTERLEY: Oh, November 10th. I'm	12:10:12
6	sorry.	12:10:13
7	MR. ASHBY: Okay.	12:10:13
8	MR. SATTERLEY: You're right. November	12:10:14
9	10th.	12:10:15
10	MR. ASHBY: Okay.	12:10:16
11	BY MR. ASHBY:	12:10:20
12	Q. All right. Okay. And, I'm sorry, that	12:10:21
13	one's printed double-sided, Dr. Langer. It's --	12:10:22
14	A. That's all right.	12:10:22
15	Q. -- actually a two-page document.	12:10:25
16	You all right?	12:10:31
17	A. Yeah.	12:10:32
18	Q. So in -- in -- all right. So we were	12:10:32
19	talking -- I was -- why I brought this out -- I'll be	12:10:35
20	clear -- is on this issue of the purity of the Johnson &	12:10:37
21	Johnson talc, because you make a statement in this	12:10:41
22	document that Mr. Satterley and you didn't discuss.	12:10:44
23	If we go on page 2 of the document in	12:10:47
24	the -- the paragraph that trails over onto the second	12:10:53
25	page, it's the last sentence, I believe, do you see	12:10:58

1	where it starts the amounts of chrysotile? Are you with	12:11:02
2	me.	12:11:11
3	A. Yeah.	12:11:11
4	Q. Okay.	12:11:11
5	A. I've got it.	12:11:12
6	Q. Okay. And -- and it looks like what you	12:11:12
7	wrote to Dr. Smith -- Hildick-Smith was, The amounts of	12:11:14
8	chrysotile are relatively small, occurring in amounts we	12:11:18
9	estimate at less than 0.01 percent. The J&J baby talc	12:11:21
10	is of quite high quality and as a matter of fact, in	12:11:29
11	relation to the number of samples we have examined thus	12:11:33
12	far, it is the purest. Do you see that?	12:11:35
13	A. Yeah. Yes.	12:11:38
14	Q. And that's what you told Dr.	12:11:39
15	Hildick-Smith, correct?	12:11:41
16	A. Yes.	12:11:41
17	Q. It sounds like that's the same thing you	12:11:42
18	were telling the reporters at the time too, right?	12:11:46
19	A. Yeah, but I can't vouch for the -- for the	12:11:49
20	reporters and the accuracy of their interpretation of	12:11:54
21	what I was talking about.	12:11:58
22	Q. All right. Did -- were you aware that	12:12:01
23	Johnson & Johnson determined the lot from which the baby	12:12:10
24	talc that you tested came from?	12:12:16
25	A. I believe so.	12:12:17

1 Q. Okay. And -- and so you -- you remember 12:12:18
2 that Johnson & Johnson had sent samples from that same 12:12:21
3 lot to the lab at McCrone, correct? 12:12:25
4 A. I believe. 12:12:28
5 Q. And the lab Dr. -- or Professor Pooley's 12:12:29
6 lab as well, correct? 12:12:32
7 A. I believe. 12:12:33
8 Q. And -- well, you respect Fred Pooley as a 12:12:39
9 microscopist, correct? 12:12:43
10 A. Certainly. 12:12:44
11 Q. You respect the folks at McCrone; for 12:12:45
12 example, Ian Stewart, as a -- 12:12:48
13 A. Yes. 12:12:49
14 Q. -- competent microscopist? 12:12:50
15 A. Yes, indeed. 12:12:51
16 Q. I don't -- Walter McCrone was not an 12:12:52
17 electron microscopist; is that... 12:12:54
18 A. No. He was more optical property 12:12:57
19 oriented, yes. 12:13:00
20 Q. So if -- if -- if Johnson & Johnson at the 12:13:01
21 time wants to get a second opinion from someone, is it 12:13:06
22 perfectly acceptable for them to go to somebody like Ian 12:13:09
23 Stewart or Professor Pooley to ask them to look at those 12:13:12
24 samples as well? 12:13:15
25 A. Yes. 12:13:17

1	Q.	They'd do a good job, and they'd give an	12:13:17
2		honest -- honest answer, wouldn't they?	12:13:21
3		MR. SATTERLEY: Objection. Calls for	12:13:23
4		speculation; honesty.	12:13:24
5		BY MR. ASHBY:	12:13:26
6	Q.	Well, do you know Professor Pooley to be	12:13:26
7		dishonest?	12:13:28
8	A.	No.	12:13:29
9	Q.	Do you know Ian Stewart to be dishonest?	12:13:29
10	A.	No.	12:13:32
11		MR. SATTERLEY: Objection. Foundation.	12:13:32
12		Speculation.	12:13:35
13		BY MR. ASHBY:	12:13:35
14	Q.	Would you agree that they are objective	12:13:36
15		scientists of high integrity?	12:13:37
16		MR. SATTERLEY: Objection. Objection.	12:13:40
17		Calls for speculation. Improper opinion testimony.	12:13:43
18		THE WITNESS: Yes.	12:13:44
19		BY MR. ASHBY:	12:13:44
20	Q.	All right. Okay. So putting aside for	12:13:44
21		the difference in protocols that your lab might have had	12:13:47
22		as compared to Ian Stewart's lab or -- or Professor	12:13:52
23		Pooley's lab, you were aware that Professor Pooley and	12:13:55
24		Ian Stewart at McCrone were unable to find chrysotile	12:14:00
25		in the -- in the samples from the same lot you looked	12:14:04

1 at, correct? 12:14:07

2 MR. SATTERLEY: Objection. Speculation. 12:14:08

3 THE WITNESS: I was not aware of that, 12:14:09

4 meaning that those assays were the property of Johnson & 12:14:10

5 Johnson. Whether they were shared with me at that time, 12:14:16

6 I cannot recall. I'm not certain that they shared their 12:14:19

7 results with me. 12:14:22

8 BY MR. ASHBY: 12:14:23

9 Q. Okay. Did you become aware at some point 12:14:23

10 that Professor Pooley and Ian Stewart had looked at 12:14:28

11 samples of Johnson & Johnson Baby Powder at that time 12:14:34

12 and found there to be no chrysotile asbestos in them? 12:14:37

13 A. Eventually. 12:14:39

14 Q. Okay. Fair enough. 12:14:40

15 Okay. So now let's do something 12:14:44

16 interesting. Let's talk -- or at least I think it's 12:14:46

17 interesting. Can we -- I want to talk to you about the 12:14:49

18 evolution of technology for -- in general but 12:14:51

19 specifically for your lab as well. 12:14:55

20 Clearly the technology available to an 12:15:00

21 electron microscopist in 1971 is not the same as it is 12:15:04

22 today; is that fair? 12:15:08

23 A. That's -- yes. That's fair. 12:15:10

24 Q. Okay. It's a silly statement, but -- and 12:15:11

25 you have this really good quote that I saw in one of 12:15:14

1 your other times that you talked to some lawyers, and 12:15:17
2 you said something like, comparing modern technology and 12:15:21
3 techniques to what we had in 1971 is like comparing a -- 12:15:25
4 an SR-71, a supersonic jet fighter, to the first plane 12:15:31
5 the Wright Brothers flew at Kitty Hawk. 12:15:36
6 A. Pretty much. 12:15:40
7 Q. Yeah. But if I understand right, in -- in 12:15:42
8 nine -- in the early -- or in the late '60s and the 12:15:46
9 early 1970s you had an electron microscope called -- or 12:15:49
10 made by RCA? 12:15:55
11 A. Yes. 12:15:57
12 Q. And it was a 3G model? 12:15:57
13 A. Yes. Correct. 12:15:59
14 Q. Okay. Somewhere in the mid '70s -- 1970s 12:16:00
15 you got a newer one, and it's probably... 12:16:06
16 A. The 100CX JEOL. 12:16:08
17 Q. Yeah. Okay. 12:16:14
18 A. Well, we also got at the same time a -- a 12:16:14
19 Hitachi H.U.11 E125. 12:16:17
20 Q. Okay. 12:16:20
21 A. That was used by Dr. Suzuki for pathology 12:16:20
22 materials. 12:16:27
23 Q. So would you agree with me that your 12:16:27
24 technology and the techniques that you developed with 12:16:29
25 this new technology became more advanced throughout the 12:16:32

1	1970s?	12:16:35
2	A. Absolutely.	12:16:36
3	Q. So did we decide -- do you know when you	12:16:37
4	got the -- so I'm looking at Exhibit 4 now. Do -- do	12:16:42
5	you remember when you got the JE -- J-O-E-L (sic)?	12:16:46
6	A. Well, we got that at the same time under a	12:16:50
7	grant from the National Institute of Environmental	12:16:53
8	Health Sciences called a center grant, an overall	12:16:55
9	umbrella grant, seven-figure grant per year. That would	12:17:02
10	be an equipment -- the JEOL, that 100CX, I guess	12:17:12
11	with -- with an academic discount would have been	12:17:19
12	several hundred thousand -- several hundred -- 400 or --	12:17:22
13	\$400,000 in purchase price. The RCA -- the RCA 3G,	12:17:27
14	which was improved as an RCA 4, was marketed at about	12:17:39
15	45,000.	12:17:45
16	Q. Uh-huh.	12:17:46
17	A. So there's a lot going on in the field of	12:17:48
18	microscopy. And, yeah, the -- the improvements were	12:17:52
19	enormous, the abilities of the instruments quite	12:18:02
20	different, and the improvements in analyses and analysis	12:18:07
21	was remarkable.	12:18:12
22	Q. All right. You -- so what we see in	12:18:13
23	Exhibit 4 is the JOEL (sic) model 100?	12:18:18
24	A. Yes.	12:18:22
25	Q. You didn't have that electron microscope	12:18:22

1 in 1971; is that right? 12:18:25

2 A. No. 12:18:27

3 Q. Okay. 12:18:28

4 A. Did not have it. 12:18:29

5 Q. You had the RCA 3G at the time? 12:18:30

6 A. Yeah. 12:18:35

7 Q. All right. And -- and the RC -- 12:18:35

8 A. (Speaking simultaneously) 12:18:35

9 Q. Oh, I'm sorry. Go ahead. I don't want to 12:18:37

10 cut you off. 12:18:37

11 A. No, no, no. Please. I'm just going to 12:18:38

12 tell you details. It's just... 12:18:40

13 Q. May -- you never know. Maybe I want to 12:18:42

14 know. 12:18:45

15 All right. Okay. So the -- the RCA 3G 12:18:46

16 electron microscope that you had in 1971 had limitations 12:18:52

17 that this JOEL (sic) did not, correct? 12:18:58

18 A. Absolutely. 12:19:03

19 Q. Okay. So, for example, you talked about 12:19:03

20 with Mr. Satterley when using the JOEL (sic) -- 12:19:05

21 A. J-E-O-L. 12:19:11

22 Q. J-O -- 12:19:13

23 A. J-E-O-L. 12:19:13

24 Q. Yeah. J-O-E-L (sic) -- 12:19:15

25 A. Right. 12:19:15

1	Q. -- microscope you could focus on	12:19:19
2	diffracted electrons in order to determine -- to	12:19:22
3	determine crystal structure?	12:19:25
4	A. Yes.	12:19:26
5	Q. Okay. Could -- could you do that with the	12:19:27
6	RCA 3G that you had in 1971?	12:19:31
7	A. You could, but it was very primitive and	12:19:34
8	the diffraction patterns were virtually uninterpretable.	12:19:37
9	Q. Uh-huh.	12:19:41
10	A. I mean, the system was crude.	12:19:47
11	Magnification only went up to 31,000 times direct on the	12:19:50
12	stage. The JEOL electron microscope you could go up to	12:19:55
13	480,000 times magnification -- I mean, in order of	12:20:00
14	magnitude difference. And you could focus on the	12:20:05
15	scattered diffracted electrons in the back focal plane	12:20:09
16	of the objective lens. That's one of the major	12:20:14
17	contributions.	12:20:19
18	And you had a -- you had apertures that	12:20:21
19	could limit the field to get scattered electrons at --	12:20:24
20	you could remove them from the recording. The -- the	12:20:29
21	differences were extraordinary.	12:20:36
22	Q. Uh-huh.	12:20:39
23	Another limitation that the 1971 RCA	12:20:42
24	microscope had that the JOEL microscope did not was that	12:20:47
25	with the RCA in 1971 you couldn't beam or extend the	12:20:53

1	electron beam on a particle to get the chemistry; is	12:21:00
2	that right?	12:21:03
3	A. 19 -- you mean in the RCA?	12:21:05
4	Q. Yeah, in the RCA. Let -- why -- why don't	12:21:10
5	I ask it again? I'll ask it in a much simpler way.	12:21:12
6	A. No, no, no. We -- we -- we could not	12:21:15
7	determine chemistry with the RCA, period.	12:21:16
8	Q. Period.	12:21:18
9	Yeah. Right. Unlike the JOEL (sic)	12:21:19
10	later, you could determine chemistry with the JOEL	12:21:22
11	(sic)?	12:21:25
12	A. Yes.	12:21:25
13	Q. Okay. So in 1971 you had a microscope	12:21:26
14	that -- or an electron microscope that you couldn't	12:21:29
15	determine -- you couldn't use to determine chemistry	12:21:33
16	with, right?	12:21:35
17	A. Correct.	12:21:36
18	Q. And you also -- although you could try to	12:21:36
19	determine crystal structure with it, it was very	12:21:40
20	difficult and limited in your ability to be precise?	12:21:42
21	A. Yes.	12:21:46
22	Q. Okay. All right. And when doing the	12:21:46
23	analyses -- so let's move forward in 1976 now and the	12:21:59
24	paper that you and Mr. Satterley talked about, which	12:22:03
25	is...	12:22:06

1	A. Yeah. The one published in Myron	12:22:10
2	Mehlman's journal, yes.	12:22:13
3	Q. Where is it?	12:22:16
4	MR. SATTERLEY: I think you left it down	12:22:19
5	here, maybe.	12:22:20
6	MR. ASHBY: Oh. Is that why I don't have	12:22:21
7	it? Okay.	12:22:22
8	Thank you, Joe.	12:22:24
9	MR. SATTERLEY: Uh-huh.	12:22:24
10	THE WITNESS: I'm going to interrupt you	12:22:26
11	for just a second.	12:22:29
12	MR. ASHBY: Do you want to take a break?	12:22:30
13	THE WITNESS: I'm going to take a break.	12:22:31
14	MR. ASHBY: Yeah. Okay. That's perfectly	12:22:32
15	acceptable.	12:22:34
16	THE VIDEOGRAPHER: The time is 12:22. And	12:22:35
17	we are off the video record. This is the end of media	12:22:37
18	number two.	12:22:41
19	(A recess was taken.)	12:22:41
20	THE VIDEOGRAPHER: All right. The time is	12:30:16
21	12:30. This is the beginning of media number three, and	12:30:00
22	we are back on the video record.	12:30:03
23	BY MR. ASHBY:	12:30:05
24	Q. Okay. Dr. Langer, where we left off, we	12:30:05
25	were going to make the jump to 1976. And just -- just	12:30:08

1	to set the table, we've marked as Exhibit 16 a	12:30:11
2	publication that you had with Drs. Rohl and Selikoff and	12:30:14
3	others entitled Consumer Talcums and Powders: Mineral	12:30:20
4	and Chemical Characterization.	12:30:25
5	Do you recall what time of year in 1976	12:30:29
6	that article was published? Well, I'll -- I'll tell	12:30:34
7	you --	12:30:36
8	A. Maybe the spring.	12:30:36
9	Q. I -- well, I thought it was in November.	12:30:44
10	Does that sound right?	12:30:45
11	A. Maybe it is November, yeah.	12:30:47
12	Q. All right. At the time this, and maybe	12:30:48
13	still is, this is a seminal study of the time regarding	12:30:51
14	the analysis of talc for absence or presence of asbestos	12:30:55
15	minerals; is that fair?	12:31:01
16	A. I would say that is the standard, the	12:31:03
17	exemplar at that time.	12:31:07
18	Q. And you stand by this paper?	12:31:13
19	A. You bet.	12:31:14
20	Q. And I've seen you say that in nine -- in	12:31:15
21	the 1976 paper you used standards and techniques that --	12:31:18
22	that had never been used up until that point for talc	12:31:22
23	analysis; is that true?	12:31:25
24	A. Yes, I believe that to be true.	12:31:26
25	Q. And you've said this paper was the best	12:31:28

1	paper written to that point concerning the analysis of	12:31:31
2	consumer talcums; is that fair?	12:31:34
3	A. Yes. I still believe that. Yes.	12:31:36
4	Q. And does this 1976 study that we've marked	12:31:39
5	as Exhibit 16 accurately and fully set out all of the	12:31:42
6	results of your analyses concerning consumer talc	12:31:47
7	through pub -- the publication date which was around	12:31:51
8	November 1976?	12:31:55
9	A. I'm not certain of that. We may have had	12:31:57
10	assays that -- other analyses that were not published in	12:32:01
11	that paper where, I mean, we had looked at -- we had	12:32:07
12	looked at industrial-grade talcs at that time. We had a	12:32:16
13	lot of data on that. But I think for consumer talcs	12:32:20
14	that's a fair representation, yes.	12:32:23
15	Q. Okay. Let me see if I can parse that out.	12:32:25
16	So for consumer talcs this paper in 1976	12:32:30
17	accurately and fully set out the results of your testing	12:32:39
18	through the date of its publication; is that true?	12:32:42
19	A. Generally -- generally so --	12:32:46
20	Q. Okay.	12:32:46
21	A. -- yes.	12:32:47
22	Q. Yeah. In -- do you recall being deposed	12:32:47
23	in -- in 2021? I asked you about that before. You were	12:32:50
24	asked that same question in 2021.	12:32:53
25	A. Could have. Could have been, yes.	12:32:55

1 Q. And when you were asked that question, you 12:32:57
2 were asked -- and I'll -- 12:32:59
3 MR. ASHBY: Do you want this transcript, 12:33:01
4 Joe? 12:33:02
5 MR. SATTERLEY: You -- you can use it with 12:33:02
6 him. I don't... 12:33:04
7 BY MR. ASHBY: 12:33:05
8 Q. All right. Well, just let me start over. 12:33:08
9 Let me see if I can find the -- I'm going to highlight 12:33:09
10 it for you. Okay? 12:33:12
11 Okay. Can you read that or is that too 12:33:27
12 small for you? 12:33:29
13 A. That's better. 12:33:30
14 You have highlighted the following: I 12:33:34
15 actually meant to only and -- only -- to only ask does 12:33:37
16 the paper accurately and fully set out the results of 12:33:45
17 the testing up to the date of its publication? 12:33:51
18 Mr. Hensler said he objects to the form. 12:33:57
19 The witness: I believe so, yes. 12:34:01
20 Okay. 12:34:04
21 Q. Okay. And then that was your testimony 12:34:05
22 that day under oath, correct? 12:34:06
23 A. Yeah. 12:34:07
24 Q. Okay. The -- the findings in this paper 12:34:08
25 were conservative in that if there was something, 12:34:18

1 anything, that resembled asbestos that you had found, 12:34:20
2 you would have reported it, true? 12:34:25
3 A. True. 12:34:27
4 Q. And this was an analysis of 21 consumer 12:34:27
5 talcum samples; is that correct? 12:34:34
6 A. 21 consumer talcum products, yes -- 12:34:36
7 Q. Okay. 12:34:36
8 A. -- marketed as consumer talcum products. 12:34:39
9 Q. Four of the samples -- I'm on table 6 now, 12:34:43
10 just to make it easier if you want -- do you still have 12:34:50
11 the copy of it? 12:34:52
12 A. I'll find it. 12:34:53
13 Q. Okay. 12:34:53
14 A. Okay. What's up? 12:35:26
15 Q. You've got it? Okay. 12:35:28
16 There were four samples of -- of the 21 12:35:41
17 that were the Johnson & Johnson talcs, correct? 12:35:45
18 A. We never published the names of the talc. 12:35:49
19 It wasn't done at that time. The Public Health Service 12:35:52
20 didn't permit it. We wouldn't have gained, for example, 12:36:00
21 access to facilities had we mentioned it, the specific 12:36:04
22 name of the facility, but they were designated as 12:36:12
23 facility factory A, factory B, or in bulk plant D or 12:36:15
24 whatever. 12:36:21
25 So we published numbers of -- of the 12:36:22

1 talcs. And it was later on that the -- the key to the 12:36:28
2 numbers was eventually released. So when you say 12:36:33
3 Johnson & Johnson, it's not indicated in here. They're 12:36:38
4 mere -- merely numbers of talc consumer products. 12:36:45
5 Q. Understood. I -- and my question probably 12:36:49
6 wasn't as precise as it should be. 12:36:51
7 You know from having done the research 12:36:53
8 that four of the -- of the 21 samples were Johnson & 12:36:55
9 Johnson talc -- 12:36:59
10 A. Eventually, yes. 12:37:00
11 Q. -- products? 12:37:01
12 And you -- well, I'll -- I'll give -- I'll 12:37:02
13 give this to you. This is Exhibit 21. 12:37:04
14 (Exhibit 21 was marked and 12:37:06
15 attached to the transcript.) 12:37:08
16 BY MR. ASHBY: 12:37:08
17 Q. Do you recognize that document? 12:37:08
18 A. There it is, and you have the key. You -- 12:37:10
19 you know all now. In the fullness of time all is 12:37:20
20 revealed. 12:37:23
21 Q. I have a key. So this key -- well, as I 12:37:23
22 understand it, this is a document that you prepared; is 12:37:27
23 that right, Dr. Langer? 12:37:29
24 A. Yeah. Ev -- yes. 12:37:30
25 Q. Okay. 12:37:30

1	A. Eventually, yeah.	12:37:32
2	Q. Eventually, sure.	12:37:32
3	And this document, I think what it shows	12:37:35
4	is the sample -- the product names that associate with	12:37:37
5	the sampled numbers in which anthophyllite and tremolite	12:37:42
6	or any amphibole was found; is that correct?	12:37:45
7	A. Yes.	12:37:48
8	Q. Okay. The two samples that contained the	12:37:49
9	chrysotile in the study were not any of the four Johnson	12:38:05
10	& Johnson samples that you analyzed, correct?	12:38:10
11	MR. SATTERLEY: I'm -- I'm --	12:38:13
12	THE WITNESS: Yeah. What --	12:38:13
13	MR. SATTERLEY: -- confused here, counsel.	12:38:13
14	This doesn't -- this document doesn't say anything about	12:38:15
15	chrysotile on this document. Are you referring to a	12:38:17
16	different document?	12:38:19
17	MR. ASHBY: No. No. This one.	12:38:20
18	THE WITNESS: You are correct. This	12:38:22
19	document refers only to amphiboles, whether it's	12:38:25
20	anthophyllite or tremolite. There is no chrysotile	12:38:35
21	indicated nor are there any Johnson & Johnson Baby	12:38:37
22	Powders on this list.	12:38:46
23	BY MR. ASHBY:	12:38:46
24	Q. Correct. And -- and that's because there	12:38:47
25	wasn't any --	12:38:49

1	A.	Amphibole.	12:38:49
2	Q.	-- amphibole?	12:38:50
3	A.	Correct.	12:38:50
4	Q.	And there was no chrysotile found as well	12:38:52
5		in any of the Johnson & Johnson samples, correct?	12:38:53
6	A.	No. No, that's not correct.	12:38:56
7	Q.	Well, let's take a look. The -- if we --	12:38:57
8		can -- can you turn to table 4?	12:39:01
9	A.	This is yours.	12:39:03
10		Table 4, Summary of Mineralogical	12:39:45
11		Composition of 21 Consumer Talcum and Powders. Yes.	12:39:49
12	Q.	Okay. And the sample in which chrysotile	12:39:53
13		was found, one of them was sample 12, correct?	12:39:55
14	A.	Chrysotile. Across the bottom. Number	12:39:58
15		12, less than 0.5. Number 15, less than 0.5. Correct.	12:40:03
16	Q.	Do any other samples indicate a finding of	12:40:12
17		chrysotile at major present --	12:40:15
18	A.	No.	12:40:18
19	Q.	-- or trace levels or any level for that	12:40:18
20		matter?	12:40:22
21	A.	No.	12:40:22
22	Q.	Okay. And we know that sample 12 from the	12:40:23
23		key that you prepared is Faberge Brut Talc, correct?	12:40:28
24	A.	May I have the --	12:40:34
25	Q.	Oh, yeah. You can have it back. You gave	12:40:36

1	it back.	12:40:39
2	A. Thank you.	12:40:39
3	Q. I'll give it to you again.	12:40:39
4	A. Number 12. Number 12. Faberge Brut Talc.	12:40:41
5	Anthophyllite. Okay.	12:40:48
6	Q. All right. So one of the samples that --	12:40:54
7	in which chrysotile was found was the Faberge Brut Talc,	12:40:56
8	correct?	12:40:59
9	A. This is with this key. Is it so? I'm	12:40:59
10	going to do something now. This -- this may interest	12:41:03
11	you.	12:41:06
12	Q. Okay.	12:41:07
13	A. The Johnson & Johnson talcs came from an	12:41:13
14	ultramafic body. Ultramafic -- an ultramafic body is a	12:41:16
15	magnesium-rich body. And it means that the talc is	12:41:25
16	associated with serpentine of various kinds.	12:41:29
17	So I'm going to go from the materials that	12:41:32
18	we're talking about to the chemistry tables. That's	12:41:34
19	going to identify which of the talcs are Johnson &	12:41:39
20	Johnson.	12:41:48
21	So here we are. Table number 5. I'm	12:41:48
22	looking at -- I want to look at the trace metals to see	12:41:51
23	the nickel, chromium, iron. Let's see -- major oxides.	12:41:56
24	No. Let's skip the major oxides. Let's go into the	12:42:06
25	trace metals. Trace elements, 21 consumer talcs. Let's	12:42:09

1	look at these.	12:42:15
2	Look at that. Look at the chromium	12:42:16
3	levels. Talc number 1. Talc number 4. Let's go	12:42:20
4	across. Talc number 9. Let's go across. Talc number	12:42:30
5	16.	12:42:35
6	Now, let me look at this list that you	12:42:36
7	gave me.	12:42:44
8	Q. Well, that's a list you prepared, right?	12:42:44
9	A. No. No. Someone else did. Someone else	12:42:46
10	did because these are all -- it says total fiber. No.	12:42:49
11	You just pointed out there were two chrysotile samples	12:42:56
12	that are noted in here. And they're not noted on	12:43:00
13	this -- this particular table, tabulated data. And the	12:43:03
14	question is -- the question is why isn't it noted with	12:43:09
15	chrysotile and the other -- the other -- among the other	12:43:18
16	talcs? Let's take a look at this. Why is that? Isn't	12:43:25
17	that strange?	12:43:29
18	No. Wait. Wait. One. One. Cashmere	12:43:35
19	Bouquet. Bup, bup, bup, bup. There's -- there's two.	12:43:42
20	That's good.	12:43:48
21	How about three? Is three indicated on	12:43:49
22	here? Two. Two. Why is there two samples two noted?	12:43:51
23	Two number fives noted. Two number 11s noted. Well,	12:44:02
24	it's because they're matched across. No.	12:44:12
25	Q. Okay.	12:44:17

1	Q.	I'll try to do that.	12:44:59
2	A.	Okay. Now I'm looking at these -- the	12:45:01
3		bulk chemistry. No.	12:45:08
4		How about the trace metals? Trace metals	12:45:09
5		are more informative.	12:45:11
6	Q.	All right.	12:45:11
7	A.	And I'm looking at an index trace metal	12:45:13
8		for an ultramafic. It's number -- oh. I'm going to do	12:45:17
9		this.	12:45:23
10	Q.	Okay.	12:45:24
11	A.	Hold the...	12:45:24
12	Q.	Dr. Langer, I don't know if I have a	12:45:25
13		question pending, so I -- and I kind of want to cut --	12:45:29
14	A.	Okay.	12:45:29
15	Q.	-- cut to the chase --	12:45:32
16	A.	All right. Go ahead.	12:45:32
17	Q.	-- a little bit.	12:45:33
18	A.	Yes. Go ahead.	12:45:34
19	Q.	For -- let's just -- do you -- if -- if I	12:45:35
20		represent to you that the Johnson & Johnson talc samples	12:45:43
21		are 4, 9 --	12:45:46
22	A.	Makes sense.	12:45:50
23	Q.	-- 18, and 20...	12:45:51
24	A.	4, 9, 18 -- all right. Okay. Let's look	12:46:00
25		at chromium.	12:46:04

1 Q. Well -- well, hold on. I -- I didn't 12:46:05
2 even -- I didn't ask you a question yet. 12:46:06
3 A. Well, I'm -- I'm just mulling this over. 12:46:09
4 Q. Okay. 12:46:09
5 A. I have to answer -- 12:46:11
6 Q. Yes. 12:46:11
7 A. -- your questions properly -- 12:46:12
8 MR. SATTERLEY: And let me -- 12:46:12
9 THE WITNESS: -- correctly. 12:46:13
10 MR. SATTERLEY: Let me object to the 12:46:13
11 representation. Mr. Ashby is not under oath. He's not 12:46:15
12 a witness. 12:46:19
13 BY MR. ASHBY: 12:46:20
14 Q. All right. So you were asked about this 12:46:21
15 at your deposition in 2021. 12:46:22
16 A. Yeah. 12:46:23
17 Q. And I could -- we could go over the 12:46:24
18 testimony if you like. And what you were asked is: 12:46:25
19 Understanding that you don't have the key in front of 12:46:30
20 you -- 12:46:32
21 A. Yes. 12:46:32
22 Q. -- but if the key were to say that talc 12:46:33
23 samples 4, 9, 18 -- 12:46:36
24 A. 4, 9, 18, and 20. 12:46:38
25 MR. ASHBY: Yeah. 12:46:41

1	MR. SATTERLEY: Well, let me place an	12:46:41
2	objection because the key that you gave him as Exhibit	12:46:42
3	21 doesn't say that, so I -- I -- I object to the	12:46:45
4	confusion, misrepresentation --	12:46:48
5	MR. ASHBY: Okay.	12:46:51
6	MR. SATTERLEY: -- and foundation.	12:46:51
7	BY MR. ASHBY:	12:46:53
8	Q. Okay. So let me just start over.	12:46:54
9	If I represent to you that the Johnson &	12:46:56
10	Johnson talc samples are 4, 9, 18, and 20 --	12:46:58
11	MR. SATTERLEY: Same objection.	12:47:05
12	BY MR. ASHBY:	12:47:07
13	Q. -- we can agree those talc samples don't	12:47:08
14	have an indication of a chrysotile finding?	12:47:10
15	MR. SATTERLEY: Same objections.	12:47:17
16	BY MR. ASHBY:	12:47:17
17	Q. Is that fair?	12:47:15
18	A. In terms of the list at -- at .5	12:47:26
19	percent -- less than .5, whatever, .05 -- okay.	12:47:29
20	Q. Okay. And -- and -- and really if you had	12:47:34
21	found chrysotile in samples 4, 9, 18, or 20, even though	12:47:36
22	they're trace level, that would have been recorded in	12:47:45
23	table 4, correct?	12:47:47
24	MR. SATTERLEY: Same objections.	12:47:57
25	THE WITNESS: Okay. Yes. I would have	12:47:57

1	reported it, yes.	12:47:59
2	BY MR. ASHBY:	12:48:10
3	Q. So -- and --	12:48:11
4	A. Oh, wait a minute.	12:48:11
5	Q. Okay.	12:48:13
6	A. You know, you're right.	12:48:15
7	Q. Okay. You really had me going --	12:48:17
8	A. I have --	12:48:17
9	Q. -- for a minute there.	12:48:18
10	A. Yes.	12:48:18
11	The analyses reflect different analytical	12:48:23
12	methods. If I put a mineralogical makeup of these 21	12:48:29
13	talcs and I indicate that two contain chrysotile to a	12:48:37
14	certain level, .5, whatever, that assay was obtained by	12:48:44
15	x-ray diffraction and our standard method of	12:48:50
16	quantitatively determining fiber content by x-ray	12:48:53
17	diffraction. The finding of chrysotile fibrils at the	12:48:58
18	trace amounts, at those lower amounts, was by	12:49:03
19	transmission electron microscopy. And we indicated that	12:49:07
20	the levels were less than .01 percent, one part in	12:49:11
21	10,000.	12:49:18
22	So there -- there are different tables	12:49:20
23	representing very different analytical techniques. The	12:49:22
24	trace metal and bulk chemistry methods were determined	12:49:27
25	in a first-class geochemistry laboratory in Glasgow.	12:49:31

1	That was Don Bowes' laboratory. And Skinner did the	12:49:37
2	analyses, the spectroscopy, and so on. So we're dealing	12:49:43
3	with apples and oranges.	12:49:47
4	And if I would have found it, I -- it's	12:49:49
5	not your failing. It -- I -- I should have written it	12:49:53
6	more clearly. I apologize for that. But there were	12:49:59
7	different techniques in the tabulated listings, and	12:50:02
8	therefore they do not -- they do not -- what's the right	12:50:08
9	word? They do not present clearly the analytical	12:50:15
10	differences.	12:50:28
11	That sounded a little garbled.	12:50:35
12	Q. So let -- let me see if I can -- if -- if	12:50:37
13	I can figure this out.	12:50:38
14	A. Okay.	12:50:39
15	Q. In -- in table 4 there is an area or a	12:50:40
16	mineral row that says chrysotile, correct?	12:50:43
17	A. Well, let me get to table 4.	12:50:47
18	Q. Okay.	12:50:49
19	A. All right. Table 5. Let me get to table	12:51:10
20	4.	12:51:13
21	Q. Do you have table 4? I can get -- I can	12:52:18
22	get you there. I -- I can just hand you mine.	12:52:20
23	A. Please.	12:52:23
24	Q. Okay.	12:52:23
25	A. Okay.	12:52:23

1 Q. So you have there table -- 12:52:24

2 A. Table 4. Summary of Mineralogical 12:52:29

3 Composition of 21 -- (reading to self) -- bup, bup, bup, 12:52:33

4 bup -- major and minor. So we're talking about x-ray 12:52:36

5 diffraction. We're not talking about transmission 12:52:39

6 electron microscopy. 12:52:41

7 So we determine trace amounts of chloride 12:52:43

8 and phlogopite, which is a magnesium mica, calcium 12:52:46

9 dolomite. Those are carbonates. Calci -- kaolin. In 12:52:55

10 other words, there were some clays that were in these 12:52:56

11 formulations. 12:53:01

12 Chrysotile, 2 -- zero -- less than 0.5 12:53:07

13 percent. That's obviously by x-ray diffraction. 12:53:11

14 Q. Uh-huh. So in the column for chrysotile 12:53:16

15 in -- 12:53:18

16 A. Yes. 12:53:18

17 Q. -- table 4 there is -- or can we agree 12:53:19

18 that there's no finding of trace or major chrysotile 12:53:21

19 present in samples 4, 9, 18, or 20? Table 4. 12:53:25

20 A. Yes. It would be only by TEM. You're 12:53:33

21 right. 12:53:37

22 Q. Okay. And there -- there are no findings 12:53:38

23 in that report by TEM of chrysotile in samples 4, 9, 18, 12:53:39

24 or 20? 12:53:48

25 A. Are you talking about the entire report? 12:53:48

1	Q.	Yes, the entire report.	12:53:50
2	A.	I can't make that statement.	12:53:51
3	Q.	All right.	12:53:51
4	A.	I mean, there -- it -- it -- there may be	12:53:56
5		a statement in here, but identifying a -- a product was	12:53:56
6		clearly not done in this paper.	12:54:00
7	Q.	Okay.	12:54:02
8	A.	Clearly not done.	12:54:05
9	Q.	All right. And -- and are you saying	12:54:07
10		today you can't -- do you recall that -- well, let --	12:54:10
11		let me ask you this: Do you recall that there were four	12:54:12
12		samples of Johnson & Johnson talc?	12:54:15
13	A.	Yes, I do. Yes.	12:54:16
14	Q.	Okay. In that report? Okay.	12:54:17
15		And if -- if I represent that the samples	12:54:19
16		were 4, 9, 18, and 20, do you have any reason to dispute	12:54:23
17		that right now?	12:54:27
18		MR. SATTERLEY: Object to the form.	12:54:28
19		THE WITNESS: To dispute which?	12:54:30
20		(Speaking simultaneously)	12:54:31
21		BY MR. ASHBY:	12:54:31
22	Q.	Oh. All right. Do you have any -- if --	12:54:32
23		if I suggest to you that the samples were 4, 9, 18 and	12:54:32
24		20 --	12:54:36
25	A.	I'll accept that. Samples number 4 and 9	12:54:36

1	are obviously from an ultramafic. And let's say the	12:54:40
2	Johnson talc mine early on was up in Vermont and it was	12:54:44
3	associated with a serpentine body, which includes the	12:54:50
4	serpentine minerals in chrysotile. The likelihood of a	12:54:54
5	cross-contaminant would -- with chrysotile and talc	12:54:57
6	during the beneficiation --	12:55:01
7	MR. ASHBY: I'll just -- I'll move to	12:55:04
8	strike as not responsive.	12:55:06
9	MR. SATTERLEY: Please don't interrupt	12:55:07
10	him.	12:55:09
11	BY MR. ASHBY:	12:55:10
12	Q. I -- the -- the -- the -- the question	12:55:11
13	really -- well, actually, I'll do this.	12:55:11
14	MR. SATTERLEY: No. Your question was you	12:55:13
15	wanted him to accept your numbering system.	12:55:14
16	MR. ASHBY: Yeah, of course.	12:55:14
17	MR. SATTERLEY: He's answering the	12:55:16
18	question why he would accept the numbering system, and	12:55:17
19	he explained geologically. So please let him answer the	12:55:20
20	question.	12:55:23
21	BY MR. ASHBY:	12:55:23
22	Q. So with -- without the key today --	12:55:23
23	MR. SATTERLEY: Please let him answer the	12:55:24
24	question.	12:55:26
25	MR. ASHBY: I'm -- I'm -- I'm -- I'm	12:55:26

1 asking my question. 12:55:27

2 MR. SATTERLEY: No. You -- Dr. Langer, 12:55:27

3 did you finish answering your question? 12:55:28

4 THE WITNESS: Yes. 12:55:30

5 MR. SATTERLEY: Okay. 12:55:31

6 BY MR. ASHBY: 12:55:31

7 Q. Okay. I have -- okay. And -- and for the 12:55:32

8 samples that are 4, 9, 18, and 20 there are no findings 12:55:37

9 of tremolite or antho -- anthophyllite in those samples, 12:55:42

10 correct? 12:55:45

11 A. No amphiboles. You're right. 12:55:45

12 Q. Okay. I think we're probably -- I'm 12:55:47

13 sorry. 12:55:47

14 A. Okay. Thank you. 12:55:47

15 Q. I think we're probably done with that. 12:55:58

16 Okay. When you talked to Mr. Satterley 12:56:00

17 earlier, you talked about the finding of the chrysotile 12:56:03

18 at the trace levels in the talc, correct? 12:56:05

19 A. Yes. 12:56:10

20 Q. Okay. And -- and then I thought he asked 12:56:10

21 you if there were any other samples that you had tested 12:56:16

22 in which you found chrysotile, and you said you were 12:56:18

23 uncertain of that to Mr. Satterley; is that correct? 12:56:22

24 A. You know, we looked at -- yes. I mean, 12:56:25

25 the answer to your question is -- did I say that? Yes. 12:56:28

1 And as a way of an explanation, we looked at so many 12:56:33
2 samples. Is it possible we looked at these other 12:56:37
3 samples? Yes, it's all -- it's all possible. Can I 12:56:40
4 make a -- a blanket statement that it never or wasn't or 12:56:43
5 never analyzed or never did I -- no, I can't make that 12:56:51
6 blanket statement. But it's -- my recollection is 12:56:54
7 whatever the -- whatever the outcome was, it was a 12:57:00
8 limited number. It was those that were reported. 12:57:05
9 Q. Uh-huh. Right. 12:57:08
10 I -- I guess my question to you is if -- 12:57:11
11 if -- if there were other chrysotile findings that you 12:57:12
12 had in relation to any of these talcs, would you have 12:57:14
13 reported it in the 1976 study? 12:57:18
14 A. I think so. 12:57:20
15 Q. Okay. That's -- that's -- and so as we 12:57:21
16 sit here today the -- the only -- the only sample you're 12:57:37
17 certain of finding or can remember finding chrysotile 12:57:41
18 in -- in relation to Johnson's Baby Powder is that 12:57:44
19 sample in 1971? 12:57:46
20 MR. SATTERLEY: Objection. 12:57:48
21 Mischaracterization. Mischaracterization of prior sworn 12:57:49
22 testimony. 12:57:57
23 BY MR. ASHBY: 12:57:58
24 Q. Okay. 12:58:01
25 A. No, I -- I can't -- I can't make a 12:58:01

1	statement like that.	12:58:04
2	Q. Okay.	12:58:05
3	A. Finding it only in the 1971 assays, the	12:58:06
4	initial assays that we explored and so on, is -- are	12:58:11
5	those the only ones?	12:58:15
6	Q. Well --	12:58:15
7	A. As I sit here -- I know this is painful,	12:58:18
8	but as I -- as I sit here, the 1976 paper represented an	12:58:23
9	ongoing study. Did I ever find any after the 1971	12:58:36
10	assays? I can't represent that.	12:58:40
11	Q. Okay. Fair enough.	12:58:43
12	All right. Let's -- let's move on.	12:58:45
13	A. Okay. I'll keep it pithy.	12:58:51
14	Q. After the -- or, actually, was there a	12:58:55
15	pre-publication of the 1976 paper or that -- that was --	12:58:59
16	A. Yes.	12:59:04
17	Q. That created some media reporting?	12:59:04
18	A. There was always media reporting.	12:59:06
19	Everyone was interested in asbestos and consumer	12:59:10
20	products.	12:59:14
21	The -- well, without going into the whole	12:59:24
22	litany --	12:59:25
23	Q. Yeah. No. That's fine.	12:59:25
24	You know, what I wanted to show you was --	12:59:27
25	I -- I don't have it printed out here. It's just one of	12:59:28

1 the few I didn't bring. Is -- this is a -- so if we go 12:59:31
2 back -- 12:59:35
3 MR. SATTERLEY: I can't -- how do I review 12:59:37
4 what you haven't printed out? 12:59:38
5 MR. ASHBY: I'll let -- you can -- you can 12:59:40
6 take a look at it. 12:59:40
7 MR. SATTERLEY: And how do I cross-examine 12:59:42
8 on it? 12:59:44
9 MR. ASHBY: I can -- 12:59:45
10 THE WITNESS: What is this? 12:59:45
11 MR. ASHBY: I can email you that. It's a 12:59:46
12 transcript. It's a deposition transcript. I'm just 12:59:47
13 wanting to lay a foundation for that -- the exhibit that 12:59:49
14 we looked at, for Exhibit 21. 12:59:51
15 MR. SATTERLEY: Well, object to not having 12:59:53
16 a copy of it and putting it into context. I don't know 12:59:55
17 what it is. 12:59:58
18 BY MR. ASHBY: 12:59:59
19 Q. So, Dr. Langer, I just -- really quickly, 12:59:59
20 I -- on -- on Exhibit 21, which was that key, if you see 13:00:01
21 here this was from a deposition on June 14th of 2013. 13:00:06
22 A. Yes. 13:00:13
23 Q. And it's in relation to Exhibit 9. 13:00:14
24 A. Okay. 13:00:14
25 Q. And I'm looking at testimony that day 13:00:17

1 where you were asked: Okay. I forgot to ask this. The 13:00:20
2 other document that you identified a moment ago as 13:00:23
3 Exhibit 9, were you the author of this, do you recall? 13:00:25
4 And your answer was -- 13:00:28
5 MR. SATTERLEY: Let -- let me place an 13:00:29
6 objection. 13:00:31
7 BY MR. ASHBY: 13:00:31
8 Q. And your answer was yes. 13:00:31
9 (Speaking simultaneously) 13:00:31
10 MR. SATTERLEY: Please -- please, counsel. 13:00:33
11 Let me place an objection. Number one, a copy of this 13:00:34
12 transcript has not been provided. It's not been printed 13:00:37
13 out. Don't know the name of the case. Don't know the 13:00:37
14 parties present. Don't know the context of what the 13:00:37
15 situation is. So I object to the use of something not 13:00:37
16 being shared with the -- with me or -- or the witness. 13:00:51
17 BY MR. ASHBY: 13:00:51
18 Q. Okay. So would you like to take a -- I -- 13:00:51
19 I don't have a copy for you, but I'm happy to show you 13:00:53
20 on my computer, if you'd like to take a copy -- look 13:00:55
21 at -- look at the transcript. 13:00:59
22 A. Yeah. I'd like to know what I was talking 13:00:59
23 about. Yeah. 13:01:01
24 Q. So this was a -- a deposition in Baltimore 13:01:02
25 City Court for a case there in 2013. And you were an 13:01:09

1	expert witness in the case.	13:01:19
2	A. Uh-huh.	13:01:23
3	Q. And I believe that you were working with	13:01:23
4	Quinn Emanuel at the time? Does that sound familiar?	13:01:25
5	A. Quinn Emanuel, yeah.	13:01:29
6	MR. SATTERLEY: What's the name of the	13:01:31
7	case? Can you tell me the name?	13:01:32
8	MR. ASHBY: The name of the case is	13:01:34
9	Goldsmith. Harold Goldsmith versus ACandS.	13:01:35
10	THE WITNESS: Yeah. Wait. Sure.	13:01:52
11	BY MR. ASHBY:	13:01:52
12	Q. I don't --	13:01:52
13	A. I should have known that. Okay.	13:01:53
14	Q. So if you want to take a look at the --	13:01:56
15	what I've -- the testimony of -- let me see if I can	13:01:58
16	highlight it for you. That'll make it much easier.	13:02:01
17	The part I was talking about was right	13:02:07
18	here.	13:02:09
19	MR. SATTERLEY: Did you have a page	13:02:19
20	number?	13:02:20
21	THE WITNESS: This is page number 189.	13:02:21
22	My God, you talk up a storm.	13:02:31
23	Okay. And I forgot to ask, the other	13:02:34
24	document that you identified a moment ago, Exhibit 9,	13:02:37
25	were you the author of this, do you recall?	13:02:43

1	Yes.	13:02:48
2	BY MR. ASHBY:	13:02:48
3	Q. Okay. So --	13:02:48
4	A. Yes, I recalled it.	13:02:48
5	Q. So does that --	13:02:50
6	A. And this --	13:02:51
7	Q. Does that at -- does that at all refresh	13:02:52
8	your recollection that that was the document?	13:02:53
9	A. No, it doesn't, but I --	13:02:54
10	Q. Okay.	13:02:54
11	A. -- will assume it's correct. And if I	13:02:56
12	said no, I misspoke. And I don't want to confuse	13:02:59
13	anyone. Thank you.	13:03:03
14	Q. Thank you.	13:03:04
15	Okay. It -- it -- so -- and do you recall	13:03:15
16	that the media reports about your 1976 testing or your	13:03:20
17	1976 paper consistently stated that the Johnson &	13:03:25
18	Johnson talcum powder products were not contaminated	13:03:32
19	with asbestos?	13:03:35
20	MR. SATTERLEY: Objection. Calls for	13:03:40
21	speculation. Overly broad. Vague.	13:03:41
22	BY MR. ASHBY:	13:03:47
23	Q. Well, here. That -- because of that	13:03:48
24	objection, here is what I'll do. In -- when you were	13:03:48
25	deposed in 2021 you were asked that question, whether or	13:03:52

1	not the media reports about your 1976 testing	13:03:57
2	consistently stated that you found Johnson & Johnson	13:04:01
3	talcum powder products not to be contaminated with	13:04:03
4	asbestos. And your answer was: I think I might have	13:04:07
5	said that then, yes.	13:04:10
6	A. If that's what I said, I said. In terms	13:04:12
7	of what I was talking about, in terms of whether	13:04:15
8	their -- the question presented was whether amphibole	13:04:19
9	asbestos particles were there, chrysotile particles,	13:04:23
10	what were the concentrations and so on and so forth, the	13:04:30
11	answers are whatever is there in the testimony. I	13:04:35
12	wasn't evading anything. It was just a response to a	13:04:39
13	specific series of inquiries, if you like. And I	13:04:46
14	answered to the best --	13:04:51
15	Q. Yeah.	13:04:51
16	A. -- of my recollection.	13:04:52
17	Q. Yeah. No. And -- and really all I'm	13:04:53
18	asking is -- is -- is at the time, in 1976, the	13:04:59
19	reporting was there were 10 powders that contained	13:05:01
20	asbestos based on your 1976 article --	13:05:05
21	A. Okay.	13:05:07
22	Q. -- right?	13:05:08
23	Do you -- do you recall that?	13:05:09
24	A. There were 10 that contained chrysotile --	13:05:10
25	that contained asbestos, chrysotile and asbestiform	13:05:12

1	amphiboles, which is -- was used as a non-specific term	13:05:17
2	in our paper.	13:05:22
3	Q. Uh-huh. Right. Okay. So --	13:05:29
4	A. Which means -- yes.	13:05:30
5	Q. And -- and as part of that reporting it	13:05:31
6	was reported -- and there was a New York Times article,	13:05:34
7	for example. I -- why don't I -- why don't I just show	13:05:36
8	you that, from 1976?	13:05:38
9	A. What year New York Times?	13:05:40
10	Q. March 10.	13:05:46
11	A. Is this the report from the city agency,	13:05:52
12	the --	13:05:55
13	Q. No. That's -- that's in 1970. That's --	13:05:55
14	those are the earlier ones.	13:05:57
15	MR. SATTERLEY: Objection.	13:05:59
16	MR. ASHBY: So I'll mark this as Exhibit	13:06:03
17	20 -- 22.	13:06:05
18	(Exhibit 22 was marked and	12:37:06
19	attached to the transcript.)	12:37:06
20	BY MR. ASHBY:	12:37:06
21	Q. Okay. So this is an article in the New	13:06:10
22	York Times on March 10th, 1976. It's entitled Asbestos	13:06:14
23	Found in Ten Powders.	13:06:18
24	A. Okay.	13:06:19
25	Q. Do you recall the -- the media reporting	13:06:19

1 on this? 13:06:22

2 A. No, I don't recall it. 13:06:22

3 Q. Okay. 13:06:24

4 A. But it seems that Arthur Rohl was the -- 13:06:26

5 con -- confirmed the test with Dr. Langer. Said of the 13:06:33

6 findings, this is no firm evidence on low-level or 13:06:39

7 intermediate exposures such as from using talcum powder. 13:06:44

8 We don't know for sure what the danger level is. 13:06:47

9 That sounds circumspect, something I would 13:06:52

10 have said. 13:06:56

11 Q. I think that's being attributed to 13:06:56

12 Dr. Rohl, that statement, actually. 13:06:58

13 A. What if I were to tell you I think it was 13:06:59

14 me? 13:07:02

15 Q. All right. Fair enough. 13:07:02

16 If -- if you go down to the third 13:07:04

17 paragraph from the bottom that starts with the products 13:07:08

18 that the researchers -- 13:07:11

19 A. Yes. 13:07:12

20 Q. Okay. Do you see that? 13:07:12

21 It says, The products that the researchers 13:07:13

22 found un -- uncontaminated with asbestos fibers were 13:07:15

23 various ones. 13:07:19

24 A. Yeah. 13:07:20

25 Q. But importantly for us is Johnson's -- two 13:07:20

1 Johnson's Baby Powder and a Johnson's Medicated Powder. 13:07:25

2 Do you see that? 13:07:29

3 A. Yes, I do. 13:07:30

4 Q. Okay. Did -- and -- and that -- that was 13:07:30

5 never an article that you corrected in any way or 13:07:41

6 changed or -- or wrote a letter to the editor saying 13:07:43

7 that that was wrong? 13:07:45

8 A. I -- I never corrected anything that 13:07:46

9 appeared in the newspaper. 13:07:47

10 MR. SATTERLEY: And objection. 13:07:49

11 Foundation. Mischaracterization. No Foundation he ever 13:07:51

12 saw the article. 13:07:52

13 BY MR. ASHBY: 13:07:53

14 Q. Well, you -- do you understand at the time 13:07:54

15 that -- the 10 asbestos -- or the 10 powders that were 13:07:55

16 being reported as possibly containing asbestos were 13:07:59

17 powders other than Johnson & Johnson powders? 13:08:05

18 A. I'm uncertain of that. 13:08:12

19 Q. Okay. All right. And then you continued 13:08:13

20 to look at talcum powders after the 1976 publication; is 13:08:17

21 that true? 13:08:21

22 A. That's right. Yes. 13:08:22

23 Q. And -- but the results of that subsequent 13:08:23

24 analysis were never published; is that true? 13:08:25

25 A. That was part of the Edinburgh paper. 13:08:28

1	Q.	Well, the -- the --	13:08:32
2	A.	There were 30 or some odd powders that	13:08:36
3		were analyzed that were part of that paper.	13:08:40
4	Q.	Right. That was -- well, the Edinburgh	13:08:47
5		was in what, in 20 -- I mean -- sorry. The Edinburgh	13:08:48
6		was in 1975, right?	13:08:50
7	A.	Edinburgh was in -- I -- it may be '75.	13:08:52
8		It may be '76.	13:09:03
9	Q.	Okay. Why don't we do this: I'm going to	13:09:04
10		give you -- if we go back to Exhibit 19, this might help	13:09:06
11		us orient. Do you have a copy of your Exhibit 19 there?	13:09:20
12		Probably not.	13:09:24
13	A.	19 is the -- the Penn State Symposium?	13:09:30
14	Q.	No. Exhibit 19 is your report in 2015.	13:09:32
15		Do you think you have it there? You might, right?	13:09:43
16	A.	This looks like the papers on my desk at	13:09:47
17		home.	13:09:50
18		No, I don't have -- I -- I just can't	13:10:11
19		locate it in this pile, so...	13:10:13
20	Q.	Okay. That's fine. I'll -- I'll give you	13:10:15
21		my copy.	13:10:19
22	A.	Thank you.	13:10:19
23	Q.	And there's a paragraph here that I've	13:10:20
24		highlighted with my blue pen that starts with, in -- in	13:10:25
25		1979. So could you just read that for me? Since I	13:10:30

1 don't have my copy, can you read that for us? 13:10:35

2 A. In 1979, Dr. Rohl -- 13:10:37

3 MR. SATTERLEY: Let me just place a 13:10:39

4 general objection that this isn't cross -- this isn't 13:10:41

5 proper cross-examination. But go ahead. 13:10:44

6 THE WITNESS: In 1979 Dr. Rohl and I 13:10:45

7 published a paper noting that a fol -- noting that a 13:10:48

8 follow-up analysis, quote, of cosmetic talcums purchased 13:10:51

9 during the period 1975-1978 was in progress. Okay. 13:10:58

10 Preliminary results suggest that fewer products contain 13:11:06

11 fibrous minerals. 13:11:11

12 I think that's correct. That's a correct 13:11:13

13 characterization. 13:11:15

14 Rohl and Langer -- fibrous mineral content 13:11:16

15 of consumer talc-containing products -- bup, bup, bup, 13:11:16

16 bup -- in Dust and Disease, 1979. The results of this 13:11:25

17 subsequent analysis were never published. However, the 13:11:27

18 results did not show that any of the cosmetic talcum 13:11:37

19 products contained asbestos particles. 13:11:41

20 The Dust and Disease -- 13:11:44

21 BY MR. ASHBY: 13:11:47

22 Q. All right. Wait. I'm sorry. You're -- 13:11:47

23 A. That was published, of course, in the 13:11:48

24 monograph Dust and Disease. 13:11:50

25 The results did not show that any of the 13:11:56

1	cosmetic talcum products -- I'm saying analyzed --	13:11:59
2	contained asbestos particles.	13:12:06
3	So the follow-up study -- well, obviously	13:12:10
4	it improved in quality.	13:12:12
5	Q. Can I borrow that back from you?	13:12:16
6	A. Sure. Please.	13:12:18
7	Q. Okay. So this is your document that you	13:12:19
8	drafted in -- in 2015. So we're talking eight years	13:12:22
9	ago, right?	13:12:25
10	A. Yeah.	13:12:26
11	Q. And it looks like what you're saying at	13:12:26
12	the time is -- is you continue to do analysis after the	13:12:29
13	1970s?	13:12:32
14	A. Follow-ups. Yeah.	13:12:33
15	Q. Follow-ups through 1979. But the results	13:12:34
16	of the subsequent analyses that were done were never	13:12:42
17	published; that's true?	13:12:45
18	A. 1979 -- if it's 1979 Dust and Disease, our	13:12:46
19	papers were published in the monograph.	13:12:52
20	Q. Yeah. But the -- the 1979 paper, though,	13:12:54
21	referenced that you had been looking at more consumer	13:12:57
22	talcum powders, but the 1979 paper did not publish any	13:12:59
23	results, correct?	13:13:03
24	A. I'm not following.	13:13:05
25	Q. Oh. Well, the -- the 1979 paper wasn't	13:13:07

1 necessarily about asbestos analys -- or talcum powder 13:13:11
2 analysis for asbestos content; it was a broader paper 13:13:18
3 than that, right? 13:13:21
4 A. Yes. I think that is correct. 13:13:25
5 Q. Yeah. 13:13:27
6 A. We looked at other materials, yes. 13:13:27
7 Q. And at the time in that paper what you 13:13:29
8 said was we're -- we're still looking at consumer talcs, 13:13:35
9 but we have yet to publish our findings? Is that -- is 13:13:41
10 that your recollection? 13:13:45
11 A. That is not my clear -- 13:13:46
12 Q. Okay. 13:13:46
13 A. -- recollection, but it sounds like 13:13:52
14 something that we -- 13:13:55
15 Q. All right. 13:13:55
16 A. -- would continue to analyze, we would 13:13:55
17 accumulate data, but not be ready to publish. 13:13:59
18 Q. Yeah. We'll -- 13:14:03
19 A. Yeah, it sounds like things that happened 13:14:04
20 to us. 13:14:05
21 Q. Well, you wrote it here in this report 13:14:06
22 which you have for -- as Exhibit 19. Is -- what you say 13:14:07
23 is, in 1979 Dr. Rohl and I published a paper -- so this 13:14:10
24 is the paper in Dust and Disease, right? 13:14:14
25 A. Yeah. 13:14:17

1	Q.	Noting that a follow-up analysis -- and	13:14:17
2		this is in quotes -- of cosmetic talcums purchased	13:14:20
3		during the period 1975 to 1978 --	13:14:24
4	A.	'78.	13:14:28
5	Q.	-- was in progress.	13:14:29
6	A.	Yeah.	13:14:31
7	Q.	Okay?	13:14:31
8	A.	Yeah.	13:14:31
9	Q.	And what you go on to say in this	13:14:32
10		report -- I think what you're explaining here is that	13:14:35
11		although I -- we wrote that in 1979, we actually never	13:14:37
12		ended up publishing any of that, those results, correct?	13:14:41
13	A.	Correct.	13:14:44
14	Q.	Okay. But what you do say, to clear up	13:14:45
15		any confusion that someone might have about what those	13:14:48
16		findings were from your analyses for that 1975 to 1978	13:14:51
17		period is this: However, the results did not show that	13:14:57
18		any of the cosmetic talcum products analyzed contained	13:15:00
19		asbestos particles. Is that -- did I read that right?	13:15:04
20	A.	Well, that's -- that -- whatever statement	13:15:07
21		we made, whatever statements were made at that time or	13:15:09
22		follow-up depositions I'll accept. Okay.	13:15:14
23	Q.	Yeah. Well, I -- I -- honestly,	13:15:21
24		Dr. Langer, I'm reading what you wrote down as your	13:15:25
25		report. And let me ask you this: Did -- at the time	13:15:28

1 you drafted your report you would have included all of 13:15:34
2 your -- well, let me -- let me strike that. 13:15:41
3 To the extent you -- you drafted an expert 13:15:44
4 report in the litigation -- 13:15:47
5 A. Yeah. 13:15:48
6 Q. -- you -- you include all the information 13:15:48
7 you have, and you -- 13:15:51
8 A. At that time, yeah. 13:15:51
9 Q. At that time. And -- 13:15:52
10 A. Right. 13:15:52
11 Q. And you're honest when you write it at 13:15:55
12 that time? 13:15:57
13 A. Of course. 13:15:57
14 Q. Okay. 13:15:58
15 A. That's what I found. That's what I found 13:16:00
16 or didn't find, as the case may be. 13:16:02
17 Q. Yeah. Correct. 13:16:04
18 A. Right. 13:16:06
19 Q. Okay. So let's talk about now -- well, 13:16:06
20 let -- let me ask you this: I'll do it this way. All 13:16:34
21 right. When -- when -- you've talked a -- a little bit 13:16:42
22 about it's 2023, things were different in -- in 1971 or 13:16:44
23 even 1976. When you look back on those early chrysotile 13:16:51
24 findings in the Johnson's Baby Powder at the trace 13:17:01
25 levels, is -- is your view today that there is no safety 13:17:06

1	risk to those findings that you found in 1971?	13:17:12
2	MR. SATTERLEY: Objection. Calls for	13:17:21
3	expert opinion. Beyond the scope. Foundation.	13:17:26
4	BY MR. ASHBY:	13:17:26
5	Q. Well, let's just put -- you were asked	13:17:27
6	this question in -- in 2021. Okay?	13:17:28
7	A. Yeah.	13:17:28
8	Q. You were asked: If you look back on -- on	13:17:30
9	that time with the benefit of -- of the years that have	13:17:32
10	passed, and when you look at those trace findings of	13:17:37
11	chrysotile in the product, do you believe that that	13:17:44
12	leads to any safety risk?	13:17:48
13	MR. SATTERLEY: Same -- same objection.	13:17:51
14	Also, there was an objection at the 2021 deposition.	13:17:52
15	He's not a retained expert witness. Beyond the scope of	13:17:55
16	the direct examination. Foundation.	13:17:59
17	BY MR. ASHBY:	13:18:08
18	Q. Okay. How about this? Would you agree	13:18:08
19	that there's no identifiable cancer risk in relation	13:18:10
20	specifically to the -- these bare trace levels of	13:18:13
21	chrysotile that you found in the 1971 samples of	13:18:17
22	Johnson's Baby Powder?	13:18:21
23	MR. SATTERLEY: Same -- same objection.	13:18:22
24	Foundation. Beyond the scope of direct foundation. Not	13:18:23
25	disclosed as an expert witness. Foundation.	13:18:26

1	THE WITNESS: If you're talking about	13:18:34
2	risk, you're talking about safety -- well, it all	13:18:36
3	depends what your perception is.	13:18:42
4	If you were to use the government	13:18:46
5	agencies' model in terms of risk, their mathematical	13:18:50
6	model indicates there is no safe level. And they	13:19:02
7	indicate that there is risk of disease, whatever the	13:19:08
8	disease is -- well, malignancy -- a risk of malignancy	13:19:14
9	has no safe level, there's no threshold, but proceeds to	13:19:21
10	be zero level of exposure, which means every increment	13:19:26
11	of exposure greater than zero is associated with an	13:19:31
12	increment of risk. So you've got that model to deal	13:19:36
13	with.	13:19:42
14	The question is, given the fact that	13:19:44
15	there's no safe level, it means there is some risk --	13:19:48
16	even if infinitesimally small, there is some risk	13:19:57
17	associated with exposure. And so there are models that	13:20:01
18	are based on linear dose response which gives you a	13:20:12
19	number and gives you a risk following exposure to	13:20:16
20	chrysotile asbestos. And that risk some would regard as	13:20:24
21	unacceptable and others would regard as a phantom risk.	13:20:30
22	BY MR. ASHBY:	13:20:30
23	Q. Okay.	13:20:30
24	A. And so you're dealing with -- you're	13:20:39
25	dealing with perception, people's perception, and	13:20:44

1	whether or not there are people who accept risk and	13:20:47
2	those who don't. But it's a model. It is a model	13:20:51
3	that's embraced by the government agencies. And there	13:21:00
4	you're -- you're stuck with it.	13:21:05
5	Q. Okay. And -- and when you were asked a	13:21:08
6	very similar question in 2021 at your deposition,	13:21:11
7	what -- your answer was -- is this risk that you can	13:21:14
8	look back on and associate with the -- your findings in	13:21:19
9	1971 --	13:21:23
10	A. Yeah.	13:21:24
11	Q. -- is a phantom risk?	13:21:24
12	MR. SATTERLEY: Object.	13:21:26
13	THE WITNESS: Yeah.	13:21:26
14	MR. SATTERLEY: Object to the form of the	13:21:27
15	question. Mischaracterization of prior testimony. And	13:21:28
16	mischaracterization of -- of his answer.	13:21:31
17	THE WITNESS: Yeah. I would have said	13:21:35
18	that.	13:21:37
19	BY MR. ASHBY:	13:21:37
20	Q. Now -- and -- and...	13:21:38
21	A. But that, of course, is the benefit of 50	13:21:38
22	years of research. And it's -- it is what it is.	13:21:47
23	Q. Yeah. I mean, I think I understand what	13:21:57
24	you're saying. I -- I think maybe what you're saying,	13:21:58
25	in -- in 1971 it's hard to determine what the risk is,	13:22:01

1	if any, but --	13:22:08
2	A. If it was impossible?	13:22:09
3	Q. Right. But looking back on it now where	13:22:10
4	you're at after all these years of being at Mount Sinai,	13:22:13
5	all the epidemiology, the toxicology that's been done,	13:22:17
6	you're comfortable now saying that to the extent you	13:22:21
7	found chrysotile at these trace levels in the joint --	13:22:24
8	in -- in the -- in the Johnson's Baby Powder, the risk	13:22:28
9	associated with that is a phantom risk?	13:22:32
10	MR. SATTERLEY: Objection. Beyond the	13:22:34
11	scope. Foundation.	13:22:36
12	THE WITNESS: Yes.	13:22:43
13	MR. SATTERLEY: Mr. Ashby just gave you	13:22:44
14	two thumbs up.	13:22:46
15	MR. ASHBY: No, I didn't.	13:22:47
16	MR. SATTERLEY: Yeah, he did.	13:22:48
17	MR. ASHBY: Object to the colloquy.	13:22:51
18	MR. SATTERLEY: Well, you're -- you're not	13:22:56
19	going to admit that you just gave two thumbs up to	13:22:57
20	Dr. Langer, are you?	13:23:00
21	MR. ASHBY: No.	13:23:00
22	MR. SATTERLEY: Okay. We should have a	13:23:02
23	camera on you.	13:23:04
24	BY MR. ASHBY:	13:23:06
25	Q. Okay. And -- and -- and if we're talking	13:23:16

1	about chrysotile -- well, I'll strike that.	13:23:21
2	And if we're talking about chrysotile	13:23:27
3	only -- so just to orient you, this question is just	13:23:28
4	going to be about chrysotile. If -- and if we're	13:23:32
5	talking about chrysotile only, that -- that phantom risk	13:23:34
6	is only going to be associated with pleural mesothelioma	13:23:40
7	and not peritoneal mesothelioma; is that true?	13:23:44
8	MR. SATTERLEY: Objection. Beyond --	13:23:47
9	objection. Beyond the scope of direct examination. Not	13:23:48
10	an expert witness in this case. Foundation.	13:23:52
11	THE WITNESS: That would be the case.	13:23:57
12	BY MR. ASHBY:	13:23:59
13	Q. Okay. And -- and I know you talked about	13:23:59
14	this idea, this model of what the regulatory agencies do	13:24:08
15	with risk and their assessments. You would not exclude,	13:24:12
16	though, that there could be a safe level to chrysotile;	13:24:18
17	is that true?	13:24:22
18	A. I would not --	13:24:22
19	MR. SATTERLEY: Objection. Let me place	13:24:23
20	an object. Beyond the scope of direct examination.	13:24:25
21	Also, not listed as an expert witness.	13:24:27
22	THE WITNESS: I would not exclude that,	13:24:30
23	no.	13:24:32
24	BY MR. ASHBY:	13:24:33
25	Q. And -- and when it comes to chrysotile --	13:24:39

1	I alluded to this in the last question, so I'll start	13:24:46
2	over.	13:24:49
3	When it comes to chrysotile, the risk at	13:24:50
4	any level, whether it's tiny or phantom or	13:24:52
5	infinitesimal or otherwise, wouldn't apply to	13:24:58
6	peritoneal mesothelioma because chrysotile does not	13:25:00
7	cause peritoneal mesothelioma?	13:25:02
8	MR. SATTERLEY: Same -- same objection.	13:25:03
9	Beyond the scope of direct examination, and foundation.	13:25:06
10	THE WITNESS: It is not expected to be or	13:25:09
11	found to be an agent in peritoneal mesothelioma	13:25:16
12	causation. This is true.	13:25:21
13	BY MR. ASHBY:	13:25:24
14	Q. If I ask you the same question in relation	13:25:25
15	to pericardial mesothelioma, would your answer be the	13:25:27
16	same?	13:25:30
17	MR. SATTERLEY: Let me place an objection.	13:25:32
18	Beyond the scope. Foundation.	13:25:33
19	BY MR. ASHBY:	13:25:37
20	Q. If you know.	13:25:38
21	A. No. No. As a matter of fact, if it's up	13:25:39
22	in the chest, above the diaphragm, you would think	13:25:41
23	that -- there -- there have been reports of metastatic	13:25:48
24	disease from the pleura to the pericardium and	13:25:53
25	vice-versa. So that's another issue, another story.	13:25:57

1	Q.	Okay. Okay. Well, do you recall -- when	13:26:08
2		you and Dr. Rohl -- well, actually, do you recall	13:26:23
3		meeting with Dr. Rohl and you in March of 1976 to	13:26:25
4		discuss your findings in relation to your studies of	13:26:29
5		consumer talcs?	13:26:34
6	A.	I'm not sure I understand the question.	13:26:36
7	Q.	Okay. In -- in 1976, in March, do you	13:26:38
8		recall meeting with representatives from the FDA with	13:26:43
9		Dr. Rohl to discuss your findings related to consumer	13:26:46
10		talcs?	13:26:51
11	A.	I'm not sure.	13:26:51
12	Q.	Okay. Now, let me see if I can -- well,	13:26:53
13		let me see if I can refresh your recollection then.	13:27:09
14	A.	Okay.	13:27:13
15	MR. ASHBY:	Okay. I'll mark this as	13:27:25
16		Exhibit 22.	13:27:27
17	MR. SATTERLEY:	I thought there already	13:27:29
18		was an Exhibit --	13:27:31
19	MR. ASHBY:	Oh, sorry. Is that -- did I	13:27:31
20		already hit that one?	13:27:32
21	MR. SATTERLEY:	Yeah. The newspaper	13:27:32
22		article was 22, wasn't it?	13:27:33
23	MR. ASHBY:	I don't know. I can't -- I	13:27:33
24		handed them over, so I've lost --	13:27:34
25	THE WITNESS:	You find your paper. I'll	13:27:36

1	be sure to call Mrs. Langer and make sure the house is	13:27:38
2	not burning down.	13:27:42
3	MR. ASHBY: Okay. Sorry about that.	13:27:42
4	THE WITNESS: I left the coffee pot on,	13:27:43
5	and...	13:27:44
6	MR. SATTERLEY: Let's go off the video.	13:27:45
7	THE VIDEOGRAPHER: Yeah. Yeah.	13:27:47
8	THE WITNESS: Yeah.	13:27:48
9	THE VIDEOGRAPHER: The time is 1:28.	13:27:48
10	MR. SATTERLEY: All right.	13:27:48
11	THE VIDEOGRAPHER: This is the end of	13:27:51
12	media unit three.	13:27:51
13	MR. SATTERLEY: I'll try getting to --	13:27:51
14	THE VIDEOGRAPHER: We're off the video	13:27:53
15	record.	13:27:55
16	(A recess was taken.)	13:27:56
17	(Exhibit 23 was marked and	13:28:50
18	attached to the transcript.)	13:31:30
19	THE VIDEOGRAPHER: Let's see. The time is	13:31:30
20	1:32. This is the beginning of media number four, and	13:32:10
21	we are back on the video record.	13:32:14
22	BY MR. ASHBY:	13:32:16
23	Q. So I'm going to hand you, Dr. Langer,	13:32:17
24	this -- it's a memorandum from March 22, 1976. It says	13:32:20
25	the attendees were Arthur M. Langer and Arthur Rohl with	13:32:26

1	the Division of Cosmetics Technology, FDA, Mr. Wilson,	13:32:31
2	and Mr. Yates.	13:32:37
3	A. Okay.	13:32:39
4	Q. Okay?	13:32:39
5	Do you -- before I give you this, do you	13:32:39
6	recall meeting with those gentlemen in -- in March of	13:32:42
7	1976?	13:32:45
8	A. No.	13:32:45
9	Q. Okay. Let's see if I can give you this	13:32:46
10	and it can refresh your rec -- recollection. So why	13:32:48
11	don't you take a look at it? Then I'm going to ask you	13:32:50
12	specifically about some things on page 3.	13:32:53
13	All right. I know you -- I know you	13:33:17
14	haven't gotten through the whole document yet, but --	13:33:18
15	MR. SATTERLEY: Are you going to let him	13:33:19
16	read the document? I mean, you -- if you're trying to	13:33:21
17	refresh his recollection with it, I think you should let	13:33:22
18	him read it.	13:33:25
19	THE WITNESS: Okay.	13:35:29
20	BY MR. ASHBY:	13:35:30
21	Q. Okay. What -- what I wanted to ask you	13:35:31
22	was, does that help refresh your recollection as to	13:35:32
23	whether or not you discussed with the gentlemen from the	13:35:36
24	FDA your findings about chrysotile in two of the	13:35:38
25	consumer talc products in 1976?	13:35:44

1 A. No, it doesn't refresh my memory, but 13:35:47
2 it is -- if the quotes are correct, and they sound 13:35:52
3 correct, my concerns regarding the finding of 13:35:55
4 chrysotile, it was tempered by the fact that the 13:36:01
5 contamination -- the electron microscopy assay requires 13:36:10
6 multiple areas to be scanned and that a number of grid 13:36:16
7 openings is required to distinguish findings from 13:36:23
8 background. And that considering that these findings 13:36:27
9 may be so low, whether or not they were hazardous is 13:36:34
10 open to question. 13:36:38
11 In general, I did not think that 13:36:40
12 chrysotile was a -- a real problem as far as cosmetic 13:36:42
13 talcs were concerned. I mean, that -- that makes sense. 13:36:48
14 The written up analytical section by Yates 13:36:52
15 is a little confused, but my statements are the ones 13:36:55
16 that are part of that. 13:36:59
17 Q. You -- no. You can -- you can keep that 13:37:02
18 document. 13:37:03
19 A. Okay. 13:37:03
20 Q. You don't have to hand it back to me. 13:37:04
21 A. Thank you. 13:37:07
22 Q. Do you see there -- you were just reading 13:37:07
23 from the part on chrysotile. And it's -- what was 13:37:09
24 written was, In two of the 19 commercial cosmetic talcs 13:37:12
25 examined fiber counts of approximately 24 fibrils per 13:37:17

1	grid square were obtained. Do you see that?	13:37:21
2	MR. SATTERLEY: Let me object to the	13:37:23
3	improper cross-examination.	13:37:25
4	THE WITNESS: Which -- which page is that	13:37:27
5	on?	13:37:32
6	BY MR. ASHBY:	13:37:33
7	Q. So I'm on page 3.	13:37:34
8	A. Yes.	13:37:37
9	Q. In the section on chrysotile.	13:37:37
10	A. Yes.	13:37:38
11	Q. And it says in between the parts that may	13:37:39
12	be highlighted there --	13:37:41
13	A. Yes.	13:37:42
14	Q. -- in -- in two of the 19. Do you see	13:37:42
15	that?	13:37:45
16	A. Yes. Yes.	13:37:45
17	Q. And it says, In two of the 19 commercial	13:37:46
18	cosmetic talcs examined fiber counts of approximately 24	13:37:49
19	fibrils per grid square were obtained. Do you see that?	13:37:53
20	A. Yes. Yes.	13:37:55
21	MR. SATTERLEY: Same objection.	13:37:58
22	BY MR. ASHBY:	13:37:59
23	Q. Okay. So does that refresh your	13:37:59
24	recollection that you used TEM to identify chrysotile in	13:38:01
25	your 1976 study?	13:38:03

1	A.	Yes.	13:38:04
2	Q.	In the two -- okay.	13:38:05
3		So in the 1976 study you did -- to the	13:38:09
4		extent you identified chrysotile in those two samples,	13:38:12
5		it was using TEM, correct?	13:38:16
6	A.	Yes.	13:38:18
7	Q.	Okay.	13:38:18
8	A.	Yes. The other table that you were	13:38:22
9		quoting from when you said that there's no chrysotile	13:38:23
10		indicated, there were two samples that were not	13:38:26
11		identified as J&J with the .5 percent chrysotile,	13:38:30
12		that -- that table was marked concentration or quantity	13:38:36
13		by weight, which is obviously by x-ray diffraction. So	13:38:45
14		here it's -- it's more quantitative to distinguish a	13:38:49
15		background from an actual amount.	13:38:54
16	Q.	Okay. And -- and does this refresh your	13:39:03
17		recollection that you told the FDA representatives that	13:39:05
18		you considered those chrysotile findings in those two	13:39:09
19		non-J&J talc products to be quite low and probably not	13:39:14
20		hazardous?	13:39:18
21	A.	Yes.	13:39:19
22		MR. SATTERLEY: Objection. Beyond the	13:39:20
23		scope.	13:39:21
24		BY MR. ASHBY:	13:39:21
25	Q.	And --	13:39:21

1	MR. SATTERLEY: Wait a second. Let me	13:39:22
2	place my objection. Beyond the scope. Foundation. And	13:39:23
3	not expert witness.	13:39:26
4	BY MR. ASHBY:	13:39:27
5	Q. And -- and you agree that you told them in	13:39:28
6	general you did not think chrysotile was the real	13:39:30
7	problem as far as cosmetic talcs were concerned?	13:39:32
8	MR. SATTERLEY: Objection. Beyond the	13:39:35
9	scope. Foundation. Not a retained expert witness.	13:39:36
10	THE WITNESS: I believed that, yes.	13:39:41
11	BY MR. ASHBY:	13:39:43
12	Q. And I'm surmising from reading that, what	13:39:44
13	was believed to be the real problem at the time was	13:39:49
14	probably the amphiboles that you were finding; is that	13:39:51
15	true?	13:39:53
16	A. I think so.	13:39:53
17	Q. Okay. And we've already established you	13:39:54
18	didn't find any amphiboles in the J&J talc, correct?	13:39:56
19	A. Correct.	13:40:03
20	Q. Okay. Then Mr. Satterley asked you about	13:40:03
21	Dr. Chalmers and the press release. At -- at the time	13:40:13
22	Dr. Chalmers was the president of Mount Sinai Medical	13:40:19
23	Center?	13:40:24
24	A. President and Dean of the School of	13:40:24
25	Medicine.	13:40:26

1 Q. You took my next question from me. I was 13:40:26
2 going to ask you if he was the Dean. 13:40:28
3 And this happened in 1976, this press 13:40:31
4 release. And it was in response to some media reporting 13:40:37
5 that had been done in 1976, correct? 13:40:42
6 A. I think so. 13:40:44
7 Q. And what Dr. Chalmers said in his press 13:40:45
8 release was that the most commonly used baby talc has 13:40:58
9 been consistently free of asbestos? Do you recall him 13:41:02
10 saying that? 13:41:05
11 A. Well, that was his opinion, I guess. 13:41:06
12 Q. Yeah. Right. And we know that he's 13:41:09
13 talking about Johnson & Johnson Baby Powder at that 13:41:13
14 point, right? 13:41:16
15 A. I'm not sure. One of the issues that I 13:41:16
16 always pursued was market share, and nobody would tell 13:41:19
17 me anything, although I assumed that the J&J talc was a 13:41:22
18 major component of market share. 13:41:28
19 Q. Uh-huh. 13:41:32
20 And he -- Dr. Chalmers said it was his 13:41:33
21 opinion -- it was the opinion of the Mount Sinai 13:41:36
22 Department of Pediatrics -- 13:41:39
23 A. Yes. 13:41:41
24 Q. -- that baby talc is a useful and safe 13:41:41
25 product, correct? 13:41:44

1	A.	Yes.	13:41:45
2	Q.	And before Dr. Chalmers wrote that, he	13:41:45
3		obviously knew about your 1976 findings, correct?	13:41:50
4	A.	Oh, yes.	13:41:52
5	Q.	All right. And he obviously knew about	13:41:53
6		your 1971 findings related to Lander's and -- and --	13:41:55
7	A.	No.	13:41:55
8	Q.	-- Johnson Baby Powder?	13:41:59
9	A.	No.	13:42:03
10	Q.	Okay. In -- in -- in your deposition in	13:42:04
11		2021 you were asked -- well, why don't I show you? Do	13:42:10
12		you still have it there or do -- do I need to get it for	13:42:26
13		you?	13:42:29
14	A.	What do you need?	13:42:29
15	Q.	Here. I'll just use this one. That's	13:42:30
16		fine.	13:42:32
17		So a similar question was asked of you in	13:42:35
18		2021. Let me see if I can highlight it for you.	13:42:38
19		Okay. So what you were asked in 2021 was	13:42:50
20		this question: You would have spoken with Dr. Selikoff	13:42:56
21		and Dr. Chalmers about your 1971 finding of a trace	13:42:58
22		amount of chrysotile in J&J powder as well as your 1976	13:43:02
23		finding and reported public paper not finding any trace	13:43:07
24		chrysotile in J&J powder? You would have talked about	13:43:12
25		both studies, both findings with them, correct?	13:43:16

1	And your answer was: Yes, of course.	13:43:18
2	A. Well, that's not a correct answer. Irving	13:43:23
3	Selikoff, yes. Chalmers was not Dean of the School of	13:43:26
4	Medicine. He came in the early '70s, maybe '75, so he	13:43:31
5	would not have been interested in talcum powder in the	13:43:39
6	institution. So that answer pertains specifically to	13:43:43
7	Irv Selikoff.	13:43:48
8	Q. Okay.	13:43:49
9	A. Of course he would know. Yes, of course.	13:43:51
10	Q. Okay. So Irv Selikoff would have known,	13:43:53
11	but you're changing your testimony from 2021 to say now	13:43:55
12	that Mr. Chalmer -- or Dr. Chalmers would not have	13:43:59
13	known?	13:44:02
14	MR. SATTERLEY: Objection. Argumentative.	13:44:03
15	THE WITNESS: He would not have known, no.	13:44:04
16	He didn't arrive in the institution.	13:44:05
17	BY MR. ASHBY:	13:44:08
18	Q. Okay. And -- and when you gave your	13:44:09
19	deposition testimony in 2021 you were truthful and	13:44:10
20	honest during that testimony, correct?	13:44:12
21	A. I would hope so.	13:44:16
22	Q. And you were under oath at --	13:44:16
23	A. I was sworn. Yes.	13:44:18
24	Q. That's what I was going to ask you. You	13:44:18
25	were under oath at the time to tell the truth, correct?	13:44:21

1	A. I believe so, yes.	13:44:22
2	Q. So are you -- at -- were you aware that	13:44:23
3	Dr. Selikoff wrote to one of the reporters in relation	13:44:28
4	to that statement from -- from Dr. Chalmers?	13:44:35
5	A. No. And I think that Irv countered that	13:44:38
6	comment. He thought it was inappropriate for him to	13:44:44
7	comment because that wasn't his field, that was not the	13:44:49
8	asbestos field, and he had limited knowledge of the	13:44:53
9	effects of low-level exposures or whatever for	13:44:59
10	chrysotile specifically.	13:45:05
11	MR. ASHBY: Okay. So I'll just move to	13:45:07
12	strike as speculation.	13:45:10
13	Why don't I show you what Dr. Selikoff	13:45:12
14	wrote, and you can tell me --	13:45:13
15	THE WITNESS: Yes, please.	13:45:16
16	MR. ASHBY: Yeah. I -- instead of doing	13:45:17
17	it like that. I'll mark this as Exhibit 24.	13:45:18
18	(Exhibit 24 was marked and	12:37:42
19	attached to the transcript.)	13:46:00
20	BY MR. ASHBY:	13:46:00
21	Q. This is a letter from Dr. Irving Selikoff	13:45:40
22	to Marian Burros at the Washington Post?	13:45:48
23	A. The Washington Post. Marian Burros. Yes.	13:45:49
24	Do you know what Marian Burros' expertise	13:45:53
25	was?	13:45:56

1	Q.	I think food.	13:45:56
2	A.	Yes.	13:45:57
3	Q.	Okay. So Marian Burros had written an	13:46:01
4		article about your --	13:46:02
5	A.	Yeah.	13:46:02
6	Q.	-- about your article?	13:46:04
7	A.	Yeah.	13:46:05
8	Q.	And in response to that she -- or I'll	13:46:06
9		strike that.	13:46:11
10		She had interviewed Dr. Selikoff in	13:46:12
11		writing her article, correct?	13:46:14
12	A.	I think so.	13:46:16
13	Q.	And Dr. Selikoff felt like he had been --	13:46:17
14	A.	Misquoted.	13:46:23
15	Q.	-- misquoted. Yeah. Right. That	13:46:24
16		statements he -- that he did not make were being	13:46:27
17		misattributed to him, correct?	13:46:29
18	A.	Okay. Yeah.	13:46:30
19	Q.	So he wrote a letter to Ms. Burros	13:46:31
20		explaining that to her, correct?	13:46:33
21	A.	I believe so.	13:46:35
22	Q.	All right. So let's look at Exhibit 24.	13:46:36
23	A.	Okay.	13:46:36
24	Q.	Do you recognize this as a letter from	13:46:49
25		Dr. Selikoff on the Mount Sinai letterhead to Ms. Marian	13:46:52

1	Burros?	13:46:56
2	A. Yes, with a copy to Tom Chalmers and David	13:46:57
3	Pomrinse. He was president of the -- of Mount Sinai	13:47:00
4	Hospital.	13:47:05
5	Q. Oh, okay. So do you see in the first	13:47:05
6	paragraph there --	13:47:15
7	A. He's astonished.	13:47:16
8	Q. Yeah, he's -- he's astonished.	13:47:18
9	I was astonished by your article in the	13:47:19
10	Washington Post on March 26th, 1976, astonished because	13:47:21
11	of the inaccurate stance of the story, and the sly	13:47:25
12	selections used in its preparation.	13:47:28
13	A. Wooh.	13:47:30
14	Q. Does that sound like something	13:47:30
15	Dr. Selikoff would say?	13:47:32
16	A. Actually not.	13:47:34
17	Q. No?	13:47:34
18	A. No, he wouldn't.	13:47:36
19	Q. These gave the impression that there was a	13:47:38
20	disagreement on my part and on the part of our	13:47:43
21	laboratory with the position of Dr. C. Chalmers. Do you	13:47:45
22	see that?	13:47:49
23	A. Yes.	13:47:49
24	Q. Okay. And what Dr. Selikoff says is that	13:47:52
25	this can only be characterized as a deliberate	13:47:55

1	distortion --	13:47:58
2	A. Wow.	13:47:59
3	Q. -- which he says is not a very difficult	13:48:00
4	task, I presume, on the part of a skilled writer able to	13:48:02
5	make use of omissions. Do you see that?	13:48:05
6	A. Yes.	13:48:08
7	MR. SATTERLEY: Let me object to hearsay	13:48:09
8	on all of this.	13:48:11
9	THE WITNESS: Wow.	13:48:12
10	BY MR. ASHBY:	13:48:15
11	Q. And he goes on to say that, I specifically	13:48:15
12	stated that I was in agreement with Dr. Chalmers and I	13:48:17
13	thought his statement was carefully and accurately	13:48:21
14	written.	13:48:24
15	Do you see that?	13:48:24
16	A. Yes.	13:48:25
17	MR. SATTERLEY: Same objection.	13:48:26
18	BY MR. ASHBY:	13:48:27
19	Q. So this is -- this is Dr. Selikoff setting	13:48:29
20	the re -- the record straight with Ms. Burros that he	13:48:32
21	agrees with Dr. Chalmers' statement, correct?	13:48:34
22	A. Yeah.	13:48:38
23	MR. SATTERLEY: Same objection.	13:48:44
24	BY MR. ASHBY:	13:48:45
25	Q. And what he goes to say in that next	13:48:45

1	paragraph, if you look down at the second sentence, is,	13:48:48
2	I stated that the cosmetic industry was to be	13:48:51
3	congratulated on having improved its product and the	13:48:53
4	credit should be given where due. So this, too, didn't	13:48:56
5	fit your perspective.	13:49:00
6	Do you see that?	13:49:04
7	A. Yes.	13:49:04
8	Q. All right.	13:49:04
9	A. Boy, was he angry. Phew. Wow.	13:49:05
10	Unbelievable.	13:49:14
11	Q. Okay. Okay.	13:49:15
12	A. Wow.	13:49:16
13	Q. You can keep that one.	13:49:16
14	A. Well, there's grist for the mill on both	13:49:29
15	sides.	13:49:32
16	Q. So it wasn't -- and Dr. Selikoff wasn't	13:49:33
17	the type of person that would usually be this animated	13:49:35
18	over an issue; is that correct?	13:49:38
19	A. Very much so, correct.	13:49:39
20	Q. So you'd have to have a lot of conviction	13:49:41
21	to write such strongly worded -- or such a strongly	13:49:43
22	worded letter to somebody like Ms. Burros?	13:49:47
23	MR. SATTERLEY: Objection. Foundation.	13:49:50
24	Speculation.	13:49:52
25	THE WITNESS: I have never seen a letter	13:49:53

1	like that from Irv Selikoff. Wow.	13:49:55
2	BY MR. ASHBY:	13:50:06
3	Q. Were you -- are you aware -- are you	13:50:06
4	familiar with the -- I'm switching subjects now.	13:50:09
5	Are you -- are you familiar with the	13:50:12
6	citizen's petition in 1986 by Mr. Douillet in which the	13:50:13
7	FDA makes comments about consumer talcs?	13:50:19
8	MR. SATTERLEY: Objection. Beyond the	13:50:23
9	scope. Foundation.	13:50:24
10	THE WITNESS: No.	13:50:25
11	BY MR. ASHBY:	13:50:26
12	Q. Okay. Are -- are you aware -- let me ask	13:50:27
13	it a bit more broadly then. Are you aware that in 1986	13:50:29
14	the FDA stated that, We find there is no basis at this	13:50:32
15	time, meaning 1986, for the agency to conclude that	13:50:36
16	there is a health hazard attributable to asbestos in	13:50:40
17	cosmetic talc?	13:50:43
18	MR. SATTERLEY: Objection.	13:50:45
19	BY MR. ASHBY:	13:50:46
20	Q. Were you aware of that statement?	13:50:46
21	A. Yes.	13:50:47
22	MR. SATTERLEY: Objection. Beyond the	13:50:48
23	scope.	13:50:51
24	MR. ASHBY: Okay.	13:50:51
25	MR. SATTERLEY: Foundation.	13:50:52

1	BY MR. ASHBY:	13:50:54
2	Q. Mr. Satterley asked you a bit about	13:50:55
3	Dr. Estrin?	13:50:59
4	A. Norman Estrin.	13:51:02
5	Q. Yeah.	13:51:04
6	MR. SATTERLEY: Is he a doctor?	13:51:04
7	MR. ASHBY: I don't --	13:51:05
8	THE WITNESS: No.	13:51:05
9	MR. ASHBY: Oh. Mr. Estrin. Sorry.	13:51:07
10	THE WITNESS: Yes.	13:51:07
11	MR. ASHBY: All right. So I'll strike	13:51:07
12	that.	13:51:08
13	MR. SATTERLEY: He's a lobbyist.	13:51:08
14	MR. ASHBY: I'll -- I'll -- what's that?	13:51:10
15	MR. SATTERLEY: He's a lobbyist, not a	13:51:12
16	doctor.	13:51:12
17	MR. ASHBY: So I'll start over. I'll	13:51:15
18	strike all that.	13:51:15
19	BY MR. ASHBY:	13:51:15
20	Q. Mr. Satterley asked you a little bit about	13:51:16
21	Mr. Estrin, correct?	13:51:18
22	A. Yes.	13:51:19
23	Q. Now -- and in 2021 at your deposition you	13:51:20
24	were asked similar questions about that manuscript. And	13:51:25
25	what you told us was that it's occasionally done when	13:51:33

1 you're drafting a manuscript to have conversations with 13:51:37
2 industry about the manuscript. Is that a fair 13:51:40
3 statement? 13:51:43
4 A. Yeah. I think that's so. 13:51:43
5 Q. And what you said was it's pro -- it's 13:51:45
6 probable that a paper which has a pronounced effect on 13:51:48
7 an industry will be sent by the editor of the journal to 13:51:51
8 a scientist in that industry. 13:51:55
9 A. I think, yes. 13:51:57
10 Q. Do you agree with that? 13:51:58
11 A. Oh, absolutely. Yes. 13:52:00
12 Q. And how many -- we -- nobody -- 13:52:01
13 Mr. Satterley didn't ask you this, so let me ask you: 13:52:04
14 How many articles do you have that have been published 13:52:08
15 in the peer-reviewed literature? 13:52:10
16 A. Out of about 300 and change reports or 13:52:12
17 papers or whatever -- bup, bup, bup -- I'd say about 13:52:21
18 100. 13:52:24
19 Q. And you're not aware that you've ever 13:52:24
20 received comments on any of your manuscripts from 13:52:31
21 Johnson & Johnson, true? 13:52:34
22 A. It depends on the journal. There are some 13:52:35
23 journals who will tell you who the reviewers were. And 13:52:40
24 most journals will provide critiques from experts 13:52:44
25 without recognition of who they are. They are 13:52:53

1 anonymous. In fact, many reviewers would not review or 13:52:57
2 critique if their identity was made known, no. 13:53:07

3 Q. Right. All right. And so my question was 13:53:11
4 just, I think, more simple than that. You -- you don't 13:53:14
5 have knowledge that Johnson & Johnson has ever commented 13:53:18
6 or -- I'll strike that. 13:53:23

7 You don't know that you've ever received 13:53:25
8 comments that came directly from Johnson & Johnson about 13:53:27
9 any of your manuscripts; is that fair? 13:53:29

10 A. No. As -- recently I have been provided 13:53:34
11 documents by Mr. Satterley, and those documents included 13:53:37
12 critiques of individuals that read that paper, and they 13:53:45
13 were scientists or representatives of Johnson & Johnson. 13:53:55
14 So that was only very recently, in the last six months 13:53:59
15 or so. 13:54:05

16 Q. Okay. So at the time of your deposition 13:54:05
17 in 2021 you were asked the same question, if you've ever 13:54:08
18 received comments on any of your draft papers from 13:54:13
19 Johnson & Johnson. And your answer at that time was: 13:54:15
20 No, not that I know of. 13:54:18

21 A. That's right. Not that I knew then. Yes. 13:54:20
22 Correct. 13:54:24

23 Q. Okay. And -- and to the extent Johnson & 13:54:25
24 Johnson had a -- or had seen a pre-print of a 13:54:42
25 manuscript, that -- that doesn't necessarily mean that 13:54:46

1 Johnson & Johnson gave comments to someone that were in 13:54:51
2 turn given to you, correct? 13:54:54

3 A. I don't know that. I have no idea 13:54:57
4 concerning the structure. I have no idea concerning the 13:54:59
5 skein, the procession of events or whether that was pro 13:55:11
6 forma or whether it was a special case. I have no idea. 13:55:15

7 Q. In -- in any event, to -- to the extent -- 13:55:19
8 well, I'll -- I'll strike that. 13:55:22

9 You -- you stand by your 1976 study, 13:55:24
10 correct? 13:55:26

11 A. Yes. 13:55:27

12 Q. Okay. 13:55:27

13 A. That's a damn good study. That's state of 13:55:27
14 the art. 13:55:30

15 Q. And if you get a comment from someone, not 13:55:30
16 knowing who that -- who it's coming from, and you think 13:55:32
17 it's poppycock or it's not scientifically valid, you'll 13:55:36
18 ignore that comment, won't you? 13:55:43

19 A. Not really. Two years ago I submitted a 13:55:45
20 major paper to a journal from a conference. And these 13:55:49
21 papers were peer-reviewed. I don't know who the 13:55:59
22 peer-reviewers were. The paper was on the chemical 13:56:02
23 modification of the surface of an asbestos mineral and 13:56:06
24 its alter -- its altered biological potential. 13:56:10

25 And this reviewer said, Your 13:56:15

1 chrysophosphate was shown to be -- chrysophosphate, 13:56:20
2 that's a phosphorous oxychloride gas reacted with 13:56:23
3 chrysotile asbestos -- and you modified the surface and 13:56:28
4 you rendered the surface unable to interact 13:56:31
5 biologically. 13:56:35
6 Q. Uh-huh. 13:56:35
7 A. However, one of the batches of 13:56:37
8 chrysophosphate were dumped into laboratory animals. 13:56:40
9 And one study, this bioassay, produced malignancies, 13:56:45
10 mesotheliomas, in laboratory animals reacted with this 13:56:51
11 chemical. 13:56:58
12 Q. Uh-huh. 13:56:58
13 A. I had to respond to it. 13:56:59
14 I said, Yes, there are reasons for this. 13:57:01
15 The incomplete reaction of the material, or the batch 13:57:05
16 was an early batch, the -- the -- bup, bup, bup, bup, 13:57:10
17 bup, bup, bup. I addressed the issue. So someone could 13:57:15
18 disagree with your paper. Some would -- it's up to the 13:57:18
19 editor. You either address it or they'll reject your 13:57:24
20 paper because an expert said, No, I don't agree with it. 13:57:29
21 Q. Uh-huh. 13:57:29
22 A. So the bottom line -- the bottom line is, 13:57:34
23 yes, you tend to address the issue. You can say, This 13:57:43
24 is where you're wrong, this is the data, and therefore I 13:57:48
25 stand by my statements in the data set. But there you 13:57:50

1	have it. You address the issue.	13:57:54
2	Q. Yeah. I -- I think if I understand, there	13:57:57
3	are some -- some times when you get comments back where	13:57:59
4	you have to address the issue?	13:58:02
5	A. Yes.	13:58:03
6	Q. But at all times you stand by your	13:58:04
7	opinions and your results?	13:58:07
8	A. Generally so. On rare occasions the point	13:58:08
9	is made, and it's a valid point, in which you have to	13:58:13
10	change your statements.	13:58:17
11	Q. Okay.	13:58:19
12	A. The data -- the data stays the same. The	13:58:20
13	interpretation may change if altered. But that's --	13:58:23
14	that's fair.	13:58:28
15	Q. Okay.	13:58:28
16	A. That's a good review, by the way.	13:58:32
17	Q. What is?	13:58:34
18	A. The fact that you can -- you can read a --	13:58:35
19	a criticism and find it valid and it keeps you from	13:58:39
20	saying something dopey in the open literature that stays	13:58:43
21	there forever.	13:58:48
22	Q. Mr. Satterley asked you a bit about	13:59:02
23	Edinburgh and the meeting there and the -- the -- the	13:59:04
24	manuscript that was ultimately not used during the	13:59:07
25	meeting, correct?	13:59:10

1	A. Yes.	13:59:11
2	Q. Okay. So if -- if I understand it, it	13:59:11
3	sounds like you had a pre-print of the manuscript, and	13:59:14
4	that pre-print of the manuscript would have gone out to	13:59:17
5	the attendees of the conference?	13:59:20
6	A. Yes.	13:59:21
7	Q. Okay. Professor Pooley ultimately decided	13:59:22
8	not to disseminate that manuscript at that --	13:59:26
9	A. Yeah.	13:59:28
10	Q. -- during the conference?	13:59:28
11	A. We gave him the -- the ultimate decision.	13:59:29
12	It was presented in his home country. And he was the	13:59:33
13	senior author, I believe. Well, maybe Art was, Art	13:59:38
14	Rohl. I'm uncertain. But he was the presenting -- one	13:59:44
15	of the presenters. And we gave the decision to Fred,	13:59:53
16	and Arthur also on the -- on the U.S. side of the ocean,	13:59:58
17	made the decision, okay, well, let's withdraw it.	14:00:04
18	Q. And --	14:00:04
19	A. We've said it already.	14:00:07
20	Q. And -- and you used the term in talking to	14:00:09
21	Mr. Satterley that Professor Pooley was being pressured	14:00:16
22	in a way to do that?	14:00:18
23	A. Yes.	14:00:20
24	Q. You -- you've said that that was not	14:00:20
25	Johnson & Johnson doing the pressuring, though, correct?	14:00:24

1	A.	I think it was someone else. That --	14:00:27
2	Q.	Boots? A company --	14:00:28
3	A.	Boots?	14:00:30
4	Q.	A -- Boots -- a company called Boots was	14:00:30
5		doing it, right?	14:00:32
6	A.	Boots, a pharmaceutical -- a pharmacy	14:00:33
7		chain, Boots.	14:00:37
8	Q.	Okay. Ultimately, though, in the end you	14:00:39
9		and Dr. Rohl presented your findings in the published	14:00:43
10		literature in 1976, correct?	14:00:48
11	A.	Yeah, I think so.	14:00:49
12	Q.	And later Professor Pooley also presented	14:00:50
13		his findings, the other half of that manuscript --	14:00:54
14	A.	Of course.	14:00:57
15	Q.	-- I think in -- I don't -- but he did at	14:00:58
16		some point present that in -- in the peer-reviewed	14:01:00
17		literature, right?	14:01:03
18	A.	I believe so.	14:01:04
19	Q.	Okay. In -- in 2000 you and John Addison	14:01:15
20		drafted some comments to a draft report from the	14:01:18
21		National Toxicology Program regarding talc, correct?	14:01:19
22	A.	Yes. Yes.	14:01:24
23	Q.	And in that doc --	14:01:25
24		MR. SATTERLEY: Objection. Beyond the	14:01:25
25		scope.	14:01:26

1	BY MR. ASHBY:	14:01:26
2	Q. And in that document you wrote that talc	14:01:27
3	per se is not carcinogenic to humans, correct?	14:01:30
4	MR. SATTERLEY: Objection. Beyond the	14:01:32
5	scope.	14:01:34
6	THE WITNESS: That is the statement of the	14:01:34
7	International Agency for Research on Cancer. Talc as	14:01:35
8	the mineral is not carcinogenic to humans.	14:01:39
9	BY MR. ASHBY:	14:01:44
10	Q. And you stand by those comments, correct?	14:01:44
11	A. Yes.	14:01:46
12	Q. Why don't -- let's...	14:01:46
13	MR. SATTERLEY: Let me just place an	14:01:53
14	objection, beyond the scope.	14:01:58
15	MR. ASHBY: Yeah. All right. I'll	14:02:00
16	mark -- I'll hand it to you so you have it. So here is	14:02:01
17	Exhibit 24.	14:02:04
18	MR. SATTERLEY: You've already done 24.	14:02:06
19	MR. ASHBY: I'm sorry. Gosh.	14:02:06
20	MR. SATTERLEY: 25?	14:02:08
21	MR. ASHBY: Exhibit 25.	14:02:08
22	(Exhibit 25 was marked and	14:02:12
23	attached to the transcript.)	14:02:14
24	BY MR. ASHBY:	14:02:14
25	Q. Can I have that -- borrow that back from	14:02:15

1	you real quick?	14:02:18
2	A. Sure.	14:02:18
3	Q. All right.	14:02:18
4	MR. ASHBY: Here you go, Mr. Satterley.	14:02:26
5	BY MR. ASHBY:	14:02:26
6	Q. Okay. So what is this, what we've marked	14:02:34
7	as Exhibit 25?	14:02:36
8	MR. SATTERLEY: Objection. Beyond the	14:02:37
9	scope.	14:02:39
10	THE WITNESS: What is -- what's the issue?	14:02:40
11	Are you asking me about the issue?	14:02:43
12	BY MR. ASHBY:	14:02:46
13	Q. Yeah. No. I'm -- just a real simple	14:02:46
14	question. What is it we're looking at that's Exhibit	14:02:47
15	25?	14:02:51
16	A. This is a statement that we submitted to	14:02:51
17	the National Toxicology Program at their hearings on the	14:02:53
18	biological significance of talc as to whether they	14:02:59
19	should ultimately ban it, and so on and so forth.	14:03:03
20	Q. Okay.	14:03:03
21	A. John Addison was a consultant for a number	14:03:08
22	of talc producers in Europe. He asked me to evaluate	14:03:11
23	and read documents with him and prepare a comment	14:03:21
24	regarding our findings concerning talc.	14:03:23
25	Q. Okay. In this document you state that --	14:03:37

1	that studies showed that the mesothelioma potential of	14:03:39
2	the talc fiber is zero.	14:03:41
3	MR. SATTERLEY: Objection. Beyond the	14:03:43
4	scope. And what -- what page are you specifically going	14:03:44
5	to?	14:03:46
6	MR. ASHBY: Page 5.	14:03:47
7	THE WITNESS: Yeah.	14:03:51
8	BY MR. ASHBY:	14:03:52
9	Q. Do you recall that?	14:03:53
10	A. Yes.	14:03:53
11	MR. SATTERLEY: What paragraph on page 5?	14:03:54
12	I'm just trying to find where you're reading from.	14:03:57
13	MR. ASHBY: The fourth paragraph. And --	14:04:02
14	MR. SATTERLEY: I don't see the word	14:04:12
15	mesothelioma in the fourth paragraph.	14:04:13
16	MR. ASHBY: Okay.	14:04:15
17	MR. SATTERLEY: I'm just trying to find	14:04:16
18	what -- what you're saying. Where -- where is	14:04:18
19	mesothelioma mentioned?	14:04:20
20	MR. ASHBY: Page 5, paragraph four.	14:04:22
21	MR. SATTERLEY: One, two, three --	14:04:25
22	MR. ASHBY: The last sentence.	14:04:26
23	MR. SATTERLEY: Oh.	14:04:28
24	BY MR. ASHBY:	14:04:28
25	Q. Do you see here, Dr. Langer, it says,	14:04:28

1	Furthermore the implantation experiments by Stanton, et	14:04:32
2	al. (1981) showed that the mesothelioma potential of	14:04:35
3	talc fiber was zero?	14:04:38
4	A. Yes.	14:04:39
5	MR. SATTERLEY: Objection. Beyond the	14:04:40
6	scope.	14:04:42
7	BY MR. ASHBY:	14:04:42
8	Q. Okay. You stand by that statement,	14:04:43
9	correct?	14:04:44
10	A. Yes.	14:04:44
11	Q. All right. And then around 2011 do you	14:04:44
12	recall preparing a presentation with Dr. Nolan and	14:04:47
13	Dr. Rubin in response to the NIOSH roadmap criteria?	14:04:52
14	A. Yeah. That was a dog also. Yes.	14:05:00
15	Q. And do you stand by the statements in that	14:05:04
16	presentation?	14:05:10
17	I'm sorry. Did I -- did we get an answer?	14:05:27
18	I might -- I might have missed it.	14:05:31
19	A. No. There was no answer because I --	14:05:31
20	Q. Okay.	14:05:31
21	A. I was waiting for a paragraph to read what	14:05:33
22	I said.	14:05:35
23	Q. Oh, fair enough. I'll strike that.	14:05:36
24	So now I'm talking about the NIOSH	14:05:37
25	presentation in 2011. So I'll mark this as Exhibit 26.	14:05:39

1	(Exhibit 26 was marked and	14:05:39
2	attached to the transcript.)	14:05:57
3	BY MR. ASHBY:	14:05:57
4	Q. Here you go.	14:06:02
5	Do you recognize this as comments that	14:06:08
6	were prepared by you and Dr. Nolan and Dr. Rubin?	14:06:10
7	A. Yes.	14:06:15
8	Q. Were these --	14:06:26
9	MR. SATTERLEY: Objection. Beyond the	14:06:27
10	scope.	14:06:28
11	BY MR. ASHBY:	14:06:29
12	Q. Were these comments prepared in response	14:06:30
13	to the NIOSH --	14:06:31
14	A. Roadmap.	14:06:34
15	Q. -- roadmap; is that right?	14:06:35
16	A. Yeah.	14:06:37
17	Q. Okay.	14:06:37
18	A. I'm sorry. I said yes.	14:06:42
19	Q. No. That's fine. It -- it's easy to do.	14:06:44
20	And -- and in this document you wrote	14:06:47
21	that, Morphology and biopersistence are not the keys to	14:06:50
22	explaining carcinogenesis.	14:06:52
23	MR. SATTERLEY: Let me -- wait -- wait a	14:06:53
24	second. There's no page numbers on this. Where are you	14:06:54
25	going? I mean, what page are -- or where -- where --	14:06:57

1	I'm trying to follow along.	14:07:00
2	MR. ASHBY: Okay. All right. So I'm on a	14:07:02
3	page that's called the Unified Fiber Theory. It's, I	14:07:27
4	think, the fifth one from the end or fourth one from the	14:07:31
5	end.	14:07:34
6	MR. SATTERLEY: Same objection. Beyond	14:07:38
7	the scope.	14:07:39
8	BY MR. ASHBY:	14:07:40
9	Q. Do you see at the top -- there you go.	14:07:40
10	A. The Unified Fiber Theory. Yes.	14:07:51
11	Q. Okay. And -- and what is written here is	14:07:52
12	this: From the experimental studies already in the	14:07:54
13	literature indicate that morphology and biopersistence	14:07:58
14	are not the keys to explaining fiber carcino --	14:08:03
15	carcinogenici --	14:08:06
16	A. Carcinogenicity.	14:08:09
17	Q. Cars -- yeah. Let me try that again.	14:08:11
18	What it says here is, From the	14:08:12
19	experimental studies already in the literature indicate	14:08:14
20	that morphology and biopersistence are not the keys to	14:08:17
21	explaining fiber carcinogenicity. Do you see that?	14:08:21
22	A. Yeah.	14:08:24
23	MR. SATTERLEY: Objection. Beyond the	14:08:24
24	scope.	14:08:25
25	BY MR. ASHBY:	14:08:26

1	Q.	And you also say here, Both erionite and	14:08:26
2		fibrous talc are thought to be biopersistent, yet one is	14:08:30
3		a powerful animal and human carcinogen and the other is	14:08:34
4		not.	14:08:38
5	MR. SATTERLEY:	Objection. Beyond the	14:08:38
6		scope.	14:08:41
7	THE WITNESS:	Correct.	14:08:41
8	BY MR. ASHBY:		14:08:41
9	Q.	Is that correct?	14:08:42
10	A.	Yes.	14:08:42
11	Q.	You agree that cleavage fragments are not	14:08:43
12		asbestos and should not be counted, correct?	14:08:59
13	A.	Yes. Of course.	14:09:01
14	Q.	And -- and you've -- you've written	14:09:02
15		that -- actually, I'll strike that.	14:09:05
16	A.	Yes.	14:09:09
17	Q.	But you've published that, correct,	14:09:10
18		that --	14:09:13
19	A.	Yes.	14:09:13
20	Q.	And you've testified under oath that	14:09:13
21		cleavage fragments do not cause mesothelioma in humans?	14:09:18
22	MR. SATTERLEY:	Objection.	14:09:22
23	THE WITNESS:	Yes.	14:09:22
24	MR. SATTERLEY:	Beyond the scope.	14:09:22
25	BY MR. ASHBY:		14:09:23

1	Q.	Correct?	14:09:24
2	A.	Correct.	14:09:24
3	Q.	And you've written even to government	14:09:24
4		agencies that cleavage fragments are not biologically	14:09:27
5		important?	14:09:33
6		MR. SATTERLEY: Objection. Beyond the	14:09:33
7		scope.	14:09:35
8		THE WITNESS: Yes.	14:09:36
9		BY MR. ASHBY:	14:09:37
10	Q.	And the view that --	14:09:37
11	A.	Yes. Yes.	14:09:38
12	Q.	Yeah. And -- and this view that cleavage	14:09:39
13		fragments do not cause mesothelioma is generally	14:09:42
14		accepted in the scientific community --	14:09:44
15		MR. SATTERLEY: Objection.	14:09:46
16		BY MR. ASHBY:	14:09:46
17	Q.	-- correct?	14:09:46
18		MR. SATTERLEY: Beyond the scope.	14:09:47
19		Foundation. Calls for expert opinion.	14:09:47
20		THE WITNESS: It depends. It depends on	14:09:50
21		which side of the fence you're sitting.	14:09:56
22		BY MR. ASHBY:	14:10:00
23	Q.	Now -- and so let me get some	14:10:00
24		clarification on that. It -- when you were asked that	14:10:01
25		question in 2021 you said: There's still some argument	14:10:04

1	as some argue against science and believe that cleavage	14:10:09
2	fragments might also cause mesothelioma. Is that what	14:10:13
3	you're referring to?	14:10:16
4	A. Yes.	14:10:17
5	MR. SATTERLEY: Objection. Improper	14:10:18
6	impeachment, cross-examination.	14:10:19
7	BY MR. ASHBY:	14:10:26
8	Q. All right. And these are all statements	14:10:27
9	that you have made to regulatory agencies and in the	14:10:31
10	public literature -- the published literature?	14:10:36
11	MR. SATTERLEY: Objection. Objection.	14:10:37
12	Overly broad.	14:10:38
13	BY MR. ASHBY:	14:10:38
14	Q. Correct?	14:10:40
15	MR. SATTERLEY: Oh, go ahead. Finish.	14:10:41
16	You finished with your question?	14:10:41
17	MR. ASHBY: All right. Let me -- let me	14:10:43
18	say it again.	14:10:44
19	BY MR. ASHBY:	14:10:45
20	Q. And -- and these -- these are all	14:10:45
21	statements with respect to cleavage fragments that	14:10:47
22	you've given to federal agencies and in the published	14:10:51
23	literature, correct?	14:10:54
24	MR. SATTERLEY: Ob --	14:10:54
25	THE WITNESS: Absolutely.	14:10:55

1	MR. SATTERLEY: Objection. Over -- beyond	14:10:57
2	the scope. Overly broad. Vague. Ambiguous. Compound.	14:10:59
3	BY MR. ASHBY:	14:11:04
4	Q. Okay. It -- I need to find that. I	14:11:24
5	wanted to look back at your report from 2015 that we	14:11:26
6	marked as Exhibit 19 just briefly.	14:11:30
7	In -- in -- in -- in Exhibit 19 you write,	14:11:41
8	PLM is an important technique for distinguishing amongst	14:11:42
9	particles in a bulk powder and remains an effective way	14:11:46
10	to determine --	14:11:50
11	MR. SATTERLEY: Can you -- can you tell us	14:11:51
12	what page and what paragraph?	14:11:53
13	MR. ASHBY: I think this is page 2.	14:11:53
14	BY MR. ASHBY:	14:11:55
15	Q. Let -- let -- let me just ask you this:	14:11:56
16	Do -- do you agree PLM is an important technique for	14:11:58
17	distinguishing amongst particles in a bulk powder and	14:12:01
18	remains an effective way to determine whether a sample	14:12:03
19	such as cosmetic talcum powder contains asbestos?	14:12:06
20	A. The answer is yes --	14:12:09
21	MR. SATTERLEY: Objection.	14:12:13
22	THE WITNESS: -- if the particle	14:12:14
23	population is of sufficient size. But the answer is	14:12:15
24	yes.	14:12:18
25	MR. SATTERLEY: Objection. Beyond the	14:12:19

1	scope.	14:12:22
2	BY MR. ASHBY:	14:12:22
3	Q. All right. Do you read that analysis of a	14:12:33
4	single isolated particle may not permit a definitive	14:12:34
5	identification of the particle as asbestos, especially	14:12:37
6	of the source -- especially if the source material is	14:12:40
7	uncharacterized or unknown?	14:12:44
8	A. That's generally yes; however, there are	14:12:46
9	methods of determining the surfaces expressed by the	14:12:51
10	particle as to whether they are surfaces separated by	14:12:58
11	cleavage, which would make it a fragment, or surfaces of	14:13:04
12	the particle that are related to other -- other	14:13:09
13	mineralogical mechanisms like twinning or intergrowth.	14:13:13
14	So it's -- it comes with a certain number of qualifiers.	14:13:20
15	Q. Yeah.	14:13:20
16	A. But the basic statement is it depends.	14:13:25
17	Q. Right. Well, you agree that the	14:13:29
18	identification of asbestos depends on the environment in	14:13:32
19	context. So if you're dealing with like a workplace	14:13:37
20	sample, for -- for example, you may have some	14:13:44
21	presumptive indication you're dealing with asbestos, but	14:13:45
22	if you're in another environment and you see an	14:13:48
23	elongated particle there's no proof that you're looking	14:13:52
24	at an asbestos fiber?	14:13:54
25	MR. SATTERLEY: Object --	14:13:54

1	THE WITNESS: I agree.	14:13:56
2	MR. SATTERLEY: Objection. It's vague,	14:13:57
3	ambiguous.	14:13:58
4	BY MR. ASHBY:	14:13:59
5	Q. So in situations like that where you'd see	14:13:59
6	a single particle by TEM, is it good protocol to	14:14:02
7	follow -- to also do PLM on the sample?	14:14:12
8	MR. SATTERLEY: Objection. Beyond the	14:14:15
9	scope.	14:14:18
10	THE WITNESS: Maybe you can't. Maybe the	14:14:18
11	particles are too small.	14:14:20
12	BY MR. ASHBY:	14:14:22
13	Q. All right. You've said that only using	14:14:29
14	analytical electron microscopy to identify asbestos in a	14:14:31
15	product is an error because it tells you something about	14:14:36
16	a subpopulation of particles but it doesn't tell you	14:14:39
17	enough about the entire population of particles?	14:14:41
18	A. This is true.	14:14:46
19	Q. And you've also said that electron	14:14:48
20	microscop -- microscopy provides information, but more	14:14:54
21	diagnostics are required to confirm the presence or	14:14:56
22	absence of asbestos?	14:15:00
23	A. I think that is correct.	14:15:01
24	Q. So in -- in the 1970s -- or my	14:15:02
25	understanding is that your lab considered three to five	14:15:16

1 chrysotile fibers per grid to be background when 14:15:19
2 examining talc by TEM? 14:15:22
3 A. That was -- that statement was made before 14:15:25
4 we installed laminar flow hoods with HEPA filters, 14:15:33
5 high-efficiency particulate absolute filters, which 14:15:42
6 enabled us to prepare air samples without fear of 14:15:48
7 contamination with ambient particles. So that statement 14:15:53
8 is -- may be true before the installation of these hoods 14:16:01
9 but not true following. 14:16:06
10 Q. Okay. 14:16:08
11 A. So the number of particles per grid 14:16:09
12 opening, which is background, or the number of particles 14:16:11
13 which is signal is -- is related to when these devices 14:16:15
14 were installed and the samples prepared. 14:16:24
15 Q. Right. And I think you're -- when you're 14:16:27
16 saying you're -- the -- the statement that we're 14:16:33
17 referring to, there was a statement in Exhibit 23 about 14:16:34
18 the 3 to 5 -- 14:16:37
19 A. Yes. 14:16:39
20 Q. -- fibers. Okay. 14:16:39
21 A. That could be early on, yeah. 14:16:40
22 Q. And you mentioned a word, ambient, that we 14:16:41
23 haven't talked about yet. In -- in the 1970s is there 14:16:51
24 an ambient level of chrysotile asbestos that exists in 14:16:55
25 New York City? 14:16:59

1	A.	Yes. Of course.	14:17:00
2	Q.	And your colleague, Dr. Nicholson,	14:17:01
3		reported extensively on ambient levels throughout the	14:17:06
4		United States; is that true?	14:17:10
5	A.	Yes. His 50-city study for EPA, correct.	14:17:11
6	Q.	Okay. So -- so who was -- actually,	14:17:17
7		strike that.	14:17:19
8		Well, Dr. Nicholson I don't think was in	14:17:20
9		any -- any of those pictures that we saw?	14:17:21
10	A.	No.	14:17:21
11	Q.	Was he?	14:17:24
12		Okay. And who was Dr. Nicholson?	14:17:25
13	A.	Bill -- let's see. I guess Bill was --	14:17:26
14		joined our group in 1967 perhaps. He was a -- his	14:17:34
15		background was physics. He did some work in solid-state	14:17:44
16		physics. He did some work over in one of the computer	14:17:50
17		labs around Columbia. And he lived in the same town as	14:17:55
18		Irving Selikoff, and so he had interaction with Irv, and	14:18:01
19		Irv hired him, so...	14:18:07
20	Q.	Do you have in mind that -- the ambient	14:18:09
21		levels or concentrations of asbestos that Dr. Nicholson	14:18:13
22		reported in -- in the 1970s?	14:18:17
23	A.	Do I have what, a knowledge of them?	14:18:21
24	Q.	Yeah. Do you have knowledge of them,	14:18:23
25		sure.	14:18:26

1	A. Yes.	14:18:27
2	MR. SATTERLEY: Objection. Beyond the	14:18:27
3	scope.	14:18:28
4	MR. ASHBY: All right.	14:18:28
5	THE WITNESS: Of course.	14:18:28
6	BY MR. ASHBY:	14:18:29
7	Q. Do you have in mind what the numbers were	14:18:29
8	that he was reporting in the 1970s for a place like New	14:18:32
9	York, for example?	14:18:36
10	A. The issue was in his 50-city study for the	14:18:36
11	Environmental Protection Agency he did not report fibers	14:18:39
12	per ML or fibers per cubic meter of air. He reported	14:18:47
13	the mass, the weight percentage, of fiber per volume of	14:18:53
14	air, nanograms per cubic whatever, per cubic meter,	14:19:01
15	nanograms per ML, and so on.	14:19:08
16	Q. Are you familiar with any of the reports	14:19:11
17	about the concentrations of ambient asbestos in New York	14:19:15
18	City in the 1970s?	14:19:20
19	A. Yes, of course. I --	14:19:22
20	MR. SATTERLEY: Objection.	14:19:24
21	THE WITNESS: I published with Irv	14:19:25
22	Selikoff and Nicholson on the asbestos levels following	14:19:28
23	spray application of rising steel structures in New York	14:19:32
24	City. And the spray operations were described, the	14:19:38
25	release of the insulating material that was applied to	14:19:44

1	steel structures, and the overspray which entered the	14:19:54
2	air of New York City. We described Manhattan levels,	14:20:00
3	Bronx levels, Queens, Brooklyn, Staten Island, per --	14:20:07
4	per borough. And the source material was from the	14:20:13
5	construction of high steel structures.	14:20:19
6	BY MR. ASHBY:	14:20:19
7	Q. Well --	14:20:19
8	A. That would be the source of the -- of --	14:20:24
9	of the fiber in air. And, yes -- and those values were	14:20:27
10	published.	14:20:31
11	Q. Is -- okay. Is -- is there a number you	14:20:32
12	would cite in fibers per cc for whatever the average	14:20:34
13	concentration of ambient level asbestos is in New York	14:20:38
14	City in the 1970s?	14:20:42
15	A. No, but it was -- the further out from the	14:20:43
16	epicenter, the source -- the further out from the source	14:20:48
17	of these operations the lower the values became. But	14:20:53
18	can I cite them directly now? No. I -- I'd have to	14:21:00
19	look in --	14:21:07
20	Q. That's -- that's fair.	14:21:07
21	A. -- my files.	14:21:09
22	Q. That's fair. I just didn't know if you	14:21:09
23	had something off the top of your head. That's fine.	14:21:12
24	Thank you, Dr. Langer.	14:21:15
25	Are you familiar with the NIOSH 1976	14:21:16

1	recommended criteria document?	14:21:19
2	MR. SATTERLEY: Objection. Beyond the	14:21:23
3	scope.	14:21:24
4	THE WITNESS: What is the recommended	14:21:25
5	criteria of?	14:21:26
6	BY MR. ASHBY:	14:21:28
7	Q. The -- the revised recommended criteria	14:21:28
8	for an asbestos standard in 1976 that was --	14:21:30
9	A. Sure. Of course.	14:21:33
10	Q. Okay. The -- in that document there --	14:21:34
11	NIOSH cited much of Dr. Nicholson's work in regards to	14:21:38
12	the ambient levels, if you recall?	14:21:42
13	A. Yes. How foolish of them.	14:21:45
14	The -- the levels. The levels -- the	14:21:48
15	original standard, fiber standard, in the United States	14:21:50
16	was 12 fibers per cc, 1970. The emergency standard in	14:21:53
17	'72, five fibers.	14:22:02
18	Q. The --	14:22:02
19	A. The standard in '76 was two fibers. It	14:22:02
20	went down to .2 in '86, then up to '93 0.1, which it is	14:22:05
21	now.	14:22:15
22	Q. Yeah. And I'm just --	14:22:15
23	MR. SATTERLEY: Let me just -- let me just	14:22:15
24	place a general objection. Beyond the scope.	14:22:16
25	BY MR. ASHBY:	14:22:18

1 Q. Yeah. And I'm just focused on the ambient 14:22:18
2 piece of it, so not -- not the workplace standards. 14:22:20
3 A. Oh. Yes. 14:22:23
4 Q. So let -- so let me just ask you this: 14:22:24
5 It -- does it sound right to you if I tell you that 14:22:26
6 NIOSH was reporting, based on Dr. Nicholson's work, 14:22:30
7 ambient levels at peak levels of 0.03 fibers per cc? 14:22:34
8 MR. SATTERLEY: Objection. Beyond the 14:22:40
9 scope. Foundation. 14:22:41
10 THE WITNESS: 0. -- .03 fibers? 14:22:44
11 BY MR. ASHBY: 14:22:52
12 Q. Uh-huh. 14:22:52
13 A. Based on Nicholson's data? 14:22:53
14 Q. Yeah. 14:22:55
15 A. Oh, boy. There's a problem with 14:22:57
16 Nicholson's data. The original data coming out of the 14:22:58
17 50-city study was mass data, that is nanograms per cubic 14:23:01
18 meter. Now, you could assume a certain morphology for 14:23:11
19 chrysotile, and using the density of the mineral you can 14:23:18
20 arrive at some estimate of fibers per ML or fibers per 14:23:22
21 cc. So that value, 0.03 fibers per ML, is -- if I was 14:23:28
22 generous of spirit I would say an estimate or -- 14:23:37
23 Q. Okay. 14:23:40
24 A. -- otherwise it would be a guess. 14:23:41
25 Q. Okay. That's fair. 14:23:43

1 Do -- do you -- maybe this is the better 14:23:44
2 question: Do you recall the -- in the NIOSH 1976 14:23:46
3 document that when citing the ambient levels across the 14:23:50
4 United States they said the peak levels could get as 14:23:54
5 high as 0.03 fibers per cc? 14:23:57
6 MR. SATTERLEY: Objection. Beyond the 14:24:00
7 scope. 14:24:01
8 THE WITNESS: It sounds -- 14:24:02
9 (Speaking simultaneously)
10 MR. SATTERLEY: Foundation. Speculation.
11 THE WITNESS: Yeah. Okay.
12 BY MR. ASHBY:
13 Q. Yeah. I mean, does that --
14 MR. SATTERLEY: Let me place my objection, 14:24:04
15 Matt. You've interrupted me. 14:24:04
16 Did you get my objection? 14:24:04
17 THE REPORTER: I got yours, but I couldn't 14:24:13
18 get the answer. 14:24:15
19 MR. SATTERLEY: Okay. 14:24:15
20 THE REPORTER: Can you answer again, 14:24:15
21 please? 14:24:17
22 BY MR. ASHBY: 14:24:17
23 Q. So -- what -- what was my question? 14:24:18
24 All right. So if -- if NIOSH stated in 14:24:20
25 1976 in that recommended criteria document that peak 14:24:23

1	levels for ambient asbestos in the United States could	14:24:28
2	get as high as 0.03 fibers per cc in the 1970s, that is	14:24:30
3	something that you believe could be accurate?	14:24:41
4	MR. SATTERLEY: Let me --	14:24:43
5	BY MR. ASHBY:	14:24:43
6	Q. -- correct?	14:24:43
7	MR. SATTERLEY: -- object. Beyond the	14:24:45
8	scope. Calls for speculation. Foundation.	14:24:46
9	THE WITNESS: It could be an estimate,	14:24:51
10	yes.	14:24:54
11	BY MR. ASHBY:	14:24:55
12	Q. Okay. We touched a little bit on the	14:24:56
13	evolution of the microscopes, the electron microscopes.	14:25:01
14	Transmission or analytical electron	14:25:09
15	microscopy wasn't a standard method in the early 1970s	14:25:12
16	to detect for the presence or absence of asbestos in	14:25:16
17	a -- in talc; is that true?	14:25:20
18	A. It was not a routine technique used by	14:25:22
19	numerous laboratories. In 1969 there were four	14:25:31
20	laboratories established globally that assayed certain	14:25:40
21	workplaces, certain environments, for fiber, four in the	14:25:47
22	world: Pooley's laboratory, our laboratory in New York,	14:25:54
23	Morris Skikne, S-K-I-K-N-E -- Morris Skikne, South	14:26:01
24	Africa, the Ministry of Mines. He had a microscopy	14:26:08
25	unit.	14:26:11

1	Q.	Uh-huh.	14:26:11
2	A.	And Patrick Sabastien who was in Jean	14:26:12
3		Bignon's laboratory in Paris at that time before he went	14:26:19
4		to Canada.	14:26:21
5		So there are four laboratories using	14:26:23
6		electron beam instruments, TEM, for the analysis of	14:26:25
7		fibers in the workplace, in the ambient air, so on.	14:26:32
8	Q.	Uh-huh.	14:26:35
9	A.	So it was not routine. There weren't	14:26:36
10		enough microscopy labs. There weren't enough technical	14:26:39
11		experts to do things like diffraction or interpret data	14:26:45
12		or knew about chemistry or knew about the UICC standard	14:26:50
13		asbestos minerals and their characterization. So it was	14:26:57
14		few and far between.	14:27:02
15	Q.	Uh-huh. Right. Okay. So you -- you	14:27:04
16		anticipated my next question.	14:27:07
17		The instrument itself, the electron	14:27:12
18		microscope, wasn't widely available, and -- and even if	14:27:13
19		it was, there weren't a lot of people like you that knew	14:27:16
20		how to use it to analyze specifically for asbestos in a	14:27:21
21		matrix?	14:27:23
22	A.	Absolutely.	14:27:24
23	Q.	Okay. And what you said previously was it	14:27:25
24		wasn't routine by any stretch of the imagination to use	14:27:29
25		TM to analyze talc in the late 1960s and very early into	14:27:33

1 1970; is that fair? 14:27:38

2 A. Yeah. 14:27:40

3 Q. Okay. And you mentioned the -- the four 14:27:46

4 labs in 1969. At some point -- I'll strike that. 14:27:48

5 You -- you mentioned the four labs in 14:27:54

6 1969, one of them being Professor Pooley's lab? 14:27:55

7 A. Yeah. 14:27:58

8 Q. At some point in the 1970s, though, Walter 14:27:59

9 McCrone starts an -- an electron microscopy group that's 14:28:02

10 led by Ian Stewart, correct? 14:28:07

11 A. Yeah. 14:28:09

12 Q. Okay. 14:28:09

13 A. Of course, we're -- we're dealing with the 14:28:11

14 early rise -- the contamination of Lake Superior with 14:28:13

15 amphibole gang minerals, the processing of Taconite 14:28:21

16 ores, O-R-E-S -- the processing of taconite ores, and 14:28:28

17 the rise of the U.S. Steel microscopy lab. 14:28:33

18 And three individuals who scattered -- the 14:28:38

19 three individuals: R. J. Lee, Scott Lally, and the best 14:28:46

20 microscopist of all, Gordon Nord who went to the USGS, 14:28:54

21 who did really some excellent work on selected area 14:29:04

22 diffraction studies. But U.S. Steel as a corporate 14:29:08

23 entity became very interested in the analysis of 14:29:10

24 microparticles by analytical electron microscopy. 14:29:17

25 So when you start to talk about McCrone, 14:29:24

1	he was a consulting guy. He was a chemical	14:29:28
2	microscopist. And so he consulted with many industries.	14:29:32
3	He was known.	14:29:38
4	U.S. Steel -- they did work for the steel	14:29:41
5	manufacturers and then expanded out into asbestos in	14:29:44
6	different ways.	14:29:49
7	And then there was a birth -- everybody	14:29:51
8	was interested in asbestos in school buildings. And you	14:29:56
9	took the asbestos in school buildings. You had to	14:30:02
10	inspect. You had to do removal. You had to develop a	14:30:05
11	cadre of people in the United States who knew what in	14:30:12
12	the hell they were looking at and knew what they were	14:30:14
13	doing. And this -- this was the birth of an entire	14:30:17
14	industry.	14:30:24
15	Q. Uh-huh.	14:30:24
16	A. So that's the mid 1970s.	14:30:25
17	Q. Yeah. I think you even went into the '80s	14:30:27
18	with a hero there.	14:30:32
19	A. Of course.	14:30:35
20	Q. So that -- but that's -- those are all	14:30:35
21	really interesting points, and it -- it makes me think	14:30:35
22	of this when you say that: Analysts that use electron	14:30:38
23	microscopes are developing expertise in the 1970s on how	14:30:45
24	to identify asbestos, the presence or -- or lack thereof	14:30:49
25	in a -- a sample or assay, correct?	14:30:52

1	A. Yes.	14:30:54
2	Q. Okay. And in the 1970s -- in the early	14:30:55
3	1970s the -- the -- the standard at the time in terms of	14:31:01
4	analyzing consumer talcs that's being done by the	14:31:05
5	industry is not using TEM; is that correct?	14:31:09
6	MR. SATTERLEY: Objection. Foundation.	14:31:14
7	Calls for speculation. Beyond the scope.	14:31:15
8	THE WITNESS: Let's talk about a document	14:31:19
9	I'm sure you are familiar with.	14:31:20
10	BY MR. ASHBY:	14:31:22
11	Q. Oh, I don't know about that.	14:31:23
12	A. You're familiar with this. You know that	14:31:24
13	there's a group out in Colorado, let's say Dr. Kraus,	14:31:26
14	whose expertise is x-ray diffraction assay. He was	14:31:33
15	critical of our report.	14:31:38
16	These folks work for mineral industries,	14:31:42
17	mineral commodities of very -- and their focus was on	14:31:50
18	techniques like x-ray diffraction. They occasionally	14:31:54
19	use scanning electron microscopy. They use polarized	14:31:59
20	light microscopy. They use other techniques found in	14:32:01
21	European pneumoconiosis laboratories; differential	14:32:05
22	thermal analysis, infrared assays, infrared	14:32:13
23	spectroscopy. I mean, all kinds of interesting	14:32:18
24	techniques.	14:32:21
25	We used ones that focused on minerals and	14:32:24

1 particles that were colloidal size or less. Colloids 14:32:27
2 were particles -- let's say they had, well, 10 microns 14:32:33
3 in greatest dimension. And, of course, asbestos is far, 14:32:38
4 far less. 14:32:41
5 Q. Uh-huh. 14:32:43
6 A. So you're -- you're dealing with an 14:32:43
7 interesting situation. You had to have been there to -- 14:32:48
8 to recognize the fact that these -- these laboratories 14:32:52
9 grew like topsy. They just sprung. And they were 14:32:56
10 driven by the profit motive, whether it's Andy Longo 14:33:04
11 down in -- Bill Longo down in Florida or the RJ Lee 14:33:07
12 Group in Pennsylvania. They worked for various 14:33:15
13 companies and industries and provided interesting 14:33:20
14 analytical data. But those were different times, 14:33:24
15 weren't they? 14:33:32
16 MS. ASHBY: Yeah. I'll -- I'll move to 14:33:33
17 strike the nonresponsive portions from the question. 14:33:35
18 BY MR. ASHBY: 14:33:35
19 Q. So the -- my question really was more 14:33:38
20 about what's going on in the 1970s. And if a company 14:33:42
21 that wants to look at its talc and determine whether or 14:33:50
22 not it could have asbestos in it, you'd agree a good 14:33:53
23 thing would -- to do would be to send it out for a TEM 14:33:57
24 analysis? 14:33:59
25 A. Absolutely. 14:34:00

1 Q. But not everybody in the industry was 14:34:01
2 doing that; is that right? 14:34:02
3 MR. SATTERLEY: Objection. Foundation. 14:34:04
4 Calls for speculation. 14:34:05
5 THE WITNESS: Not to my knowledge. 14:34:07
6 BY MR. ASHBY: 14:34:09
7 Q. You're familiar with a Dr. James Millette? 14:34:11
8 A. Yes, of course. 14:34:14
9 Q. I'm sorry. 14:34:16
10 And -- and you're aware that Dr. James 14:34:19
11 Millette ran the electron microscope lab for McCrone 14:34:21
12 in -- sometime in the '80s? 14:34:31
13 A. I thought Millette was NIOSH. 14:34:32
14 Q. He -- he -- he was. And then he went to 14:34:35
15 work for McCrone. 14:34:38
16 A. Well, that's possible, but I'm not -- I 14:34:39
17 didn't follow his career. 14:34:42
18 Q. Okay. That's fine. 14:34:44
19 Now, you -- you -- you know Dr. Millette 14:34:45
20 to be a competent electron microscopist, although you 14:34:46
21 may not always agree with him? 14:34:52
22 A. Well, that's another issue. Yes. 14:34:54
23 Q. He is a reputable micro -- microscopist, 14:34:56
24 correct? 14:34:58
25 MR. SATTERLEY: Objection. Beyond the 14:35:00

1	scope.	14:35:01
2	THE WITNESS: Yes.	14:35:01
3	MR. ASHBY: All right. I think the last	14:35:09
4	document I wanted to look at was this one. This will be	14:35:11
5	Exhibit 27.	14:35:25
6	(Exhibit 27 was marked and	14:35:26
7	attached to the transcript.)	14:35:28
8	BY MR. ASHBY:	14:35:28
9	Q. Why don't you tell me if you recognize	14:35:29
10	that document?	14:35:31
11	A. Oh. Yes. This is the -- yes, of	14:35:44
12	course -- El Dorado Hills. He was correct. And Wiley	14:35:47
13	was correct. Yeah. Distinguishing cleavage fragments	14:35:53
14	from asbestos. Yeah. Okay.	14:36:02
15	Q. Okay. You -- you recognize this as a	14:36:07
16	document that you drafted?	14:36:08
17	A. Yes.	14:36:09
18	Q. And you stand by this letter that you	14:36:10
19	wrote?	14:36:14
20	A. Yes.	14:36:15
21	Q. So this --	14:36:19
22	MR. SATTERLEY: Objection. Beyond the	14:36:19
23	scope.	14:36:21
24	BY MR. ASHBY:	14:36:22
25	Q. This -- this letter -- well, let -- let me	14:36:24

1	see if I can paraphrase.	14:36:25
2	This -- this letter is a letter that you	14:36:27
3	wrote in response to some EPA analysis that was being	14:36:29
4	done in -- in El Dorado Hills in which the EPA was	14:36:33
5	finding these really high levels of tremolite asbestos;	14:36:38
6	is that fair?	14:36:40
7	A. Correct.	14:36:42
8	MR. SATTERLEY: Objection. Beyond the	14:36:44
9	scope.	14:36:45
10	BY MR. ASHBY:	14:36:46
11	Q. And R. J. Lee was asked to take a look at	14:36:46
12	some of those same samples and determine if they could	14:36:49
13	duplicate the findings of the EPA, more or less?	14:36:52
14	A. Yeah.	14:36:55
15	MR. SATTERLEY: Objection. Beyond the	14:36:56
16	scope.	14:36:57
17	BY MR. ASHBY:	14:36:58
18	Q. And RJ Lee Group determined that some of	14:36:58
19	these things, these particles that the EPA was calling	14:37:01
20	asbestos, wasn't really asbestos because it was cleavage	14:37:04
21	fragment?	14:37:08
22	A. Correct.	14:37:08
23	MR. SATTERLEY: Objection. Beyond the	14:37:09
24	scope.	14:37:10
25	BY MR. ASHBY:	14:37:11

1 Q. And so you drafted this letter, which was 14:37:11
2 a -- a letter basically in -- in support of RJ Lee but 14:37:13
3 really explaining your views on what you thought the EPA 14:37:18
4 findings represented; is that fair? 14:37:21
5 A. Yes. 14:37:23
6 MR. SATTERLEY: Objection. Beyond the 14:37:24
7 scope, and compound. 14:37:25
8 BY MR. ASHBY: 14:37:26
9 Q. And I'm looking at the first paragraph. 14:37:26
10 In the first paragraph you say, The RJ Lee Group 14:37:28
11 critique was detailed, couched in solid mineralogical 14:37:32
12 science and one that I was in -- in agreement with. 14:37:36
13 MR. SATTERLEY: Objection. Beyond the 14:37:38
14 scope. 14:37:38
15 THE WITNESS: Yes. 14:37:40
16 BY MR. ASHBY: 14:37:40
17 Q. You agree with that, don't you? 14:37:40
18 A. Yes, I do. I did. 14:37:42
19 Q. And if I -- I'm just going to skip ahead 14:37:46
20 to the next page, to page 2. I'm looking at the top 14:37:48
21 paragraph. And I -- there's an interesting discussion 14:37:51
22 you have about explaining tremolite and how it can be 14:37:53
23 found. 14:37:58
24 And what you write is, 14:37:59
25 Tremolite-actinolite is found in schists -- and what's 14:38:02

1	that word?	14:38:05
2	A. Gneis -- gneisses.	14:38:06
3	Q. Gneisses?	14:38:06
4	A. A schist.	14:38:08
5	Q. And con -- or contact metamorphic	14:38:10
6	terrains, metamorphic limestone, and is found as	14:38:13
7	replacement minerals in, for example, pyroxenes?	14:38:16
8	A. Pyroxenes, yes.	14:38:19
9	Q. Pyroxenes. Okay.	14:38:21
10	And you say it is also ubiquitous.	14:38:22
11	What -- what do you mean by that, it is also ubiquitous?	14:38:26
12	A. In some terrains, like in metamorphic	14:38:29
13	terrains or areas in which you have metamorphosed	14:38:32
14	ultramafic rock, it is found commonly, it's found all	14:38:38
15	over, so it's ubiquitous.	14:38:42
16	Q. And then you go on, Their presence,	14:38:44
17	meaning the tremolite-actinolite, dis -- distinction and	14:38:46
18	identification is but one important issue. Their	14:38:51
19	morphological habit is another.	14:38:56
20	Do you --	14:38:57
21	A. Yes.	14:38:57
22	Q. -- agree with that?	14:38:58
23	A. Yes.	14:38:59
24	MR. SATTERLEY: Objection. Beyond the	14:38:59
25	scope.	14:39:01

1	BY MR. ASHBY:	14:39:01
2	Q. And -- and does this have to do with the	14:39:01
3	fact that ul -- the tremolite can be ubiquitous, which	14:39:03
4	to me means --	14:39:08
5	A. One of the common minerals, yes.	14:39:09
6	Q. Yes. So one of these common minerals that	14:39:11
7	can be in a lot of places.	14:39:14
8	The precise morphological habit that is	14:39:15
9	asbestiform, that is tremolite, is not ubiquitous?	14:39:21
10	A. Rare. Yes.	14:39:24
11	MR. SATTERLEY: Let me object to the form	14:39:25
12	of the question, compound, and the commentary before the	14:39:27
13	question.	14:39:30
14	BY MR. ASHBY:	14:39:31
15	Q. Okay. So you would agree with me that the	14:39:32
16	morphological habit of chrysotile that is asbestiform	14:39:34
17	is --	14:39:37
18	A. Tremolite.	14:39:37
19	Q. Oh, shoot. Yeah. You're right. Sorry.	14:39:38
20	Let me start over. Sharper than me, obviously.	14:39:41
21	So would you agree with me that the	14:39:48
22	tremolite, although it might be ubiquitous, the	14:39:53
23	particular habit that is asbestiform isn't rare?	14:39:57
24	A. That's correct.	14:40:05
25	Q. And you go on to say in the next	14:40:05

1	paragraph, The EPA-EDE -- I'm sorry. Start over.	14:40:14
2	You say, The EPA-EDH study should have	14:40:17
3	incorporated among the discussion and results statements	14:40:20
4	regarding their data mean -- mean in terms of hazard or	14:40:23
5	risk to various segments of the El Dorado population.	14:40:27
6	All right.	14:40:31
7	MR. SATTERLEY: Objection. Beyond the	14:40:31
8	scope.	14:40:32
9	MR. ASHBY: Okay.	14:40:33
10	THE WITNESS: Yes.	14:40:33
11	BY MR. ASHBY:	14:40:34
12	Q. And at the bottom of that same paragraph	14:40:43
13	you say, The EPA should follow the existing policy of	14:40:45
14	OSHA and not be concerned with cleavage fragments.	14:40:48
15	Do you see that?	14:40:51
16	MR. SATTERLEY: Objection. Beyond the	14:40:52
17	scope. Expert opinion.	14:40:53
18	THE WITNESS: Yes, I agree.	14:40:53
19	BY MR. ASHBY:	14:40:53
20	Q. You agree with that?	14:40:56
21	And I -- and -- and when you're	14:40:58
22	referencing OSHA there, are you referencing the fact	14:40:59
23	that OSHA had looked at this idea of whether or not	14:41:01
24	tremolite cleavage fragments or amphibole cleavage	14:41:06
25	fragments could cause disease and -- and OSHA	14:41:11

1	specifically determined that they could not?	14:41:13
2	MR. SATTERLEY: Objection. Beyond the	14:41:15
3	scope.	14:41:16
4	THE WITNESS: In fact, they had a major	14:41:16
5	hearing with that. Yes, that's correct.	14:41:19
6	BY MR. ASHBY:	14:41:24
7	Q. And you agreed with OSHA at that major	14:41:27
8	hearing, and you agree with that now, correct?	14:41:29
9	MR. SATTERLEY: Objection. Beyond the	14:41:31
10	scope.	14:41:33
11	THE WITNESS: Yeah. I testified at that	14:41:34
12	hearing. Yes.	14:41:35
13	BY MR. ASHBY:	14:41:36
14	Q. I understand.	14:41:37
15	And then the first paragraph on page 3	14:41:38
16	says -- I'm in -- I'm kind of in the middle of it. It	14:41:40
17	starts with tremolite asbestos.	14:41:48
18	A. Okay.	14:41:50
19	Q. Tremolite asbestos does exist in El Dorado	14:41:50
20	County. However, non-asbestiform tremolite and other	14:41:52
21	amphiboles exist as well, and their morphological habits	14:41:58
22	form prismatic cleavage fragments when crushed.	14:42:02
23	So that -- okay. So did you write that?	14:42:06
24	A. Yes.	14:42:09
25	Q. And you agree with that?	14:42:09

1	MR. SATTERLEY: Objection. Beyond the	14:42:11
2	scope.	14:42:12
3	THE WITNESS: Yes.	14:42:12
4	MR. SATTERLEY: Beyond the scope.	14:42:12
5	BY MR. ASHBY:	14:42:12
6	Q. And -- and if I understand what's being	14:42:12
7	said there is that something can start in this habit,	14:42:20
8	this massive habit, tremolite can start in a massive	14:42:23
9	habit, and it can be crushed, like milled, even in	14:42:28
10	manufacture, and that can create many little cleaved	14:42:30
11	elongate particles that -- that resemble asbestos?	14:42:33
12	A. Correct.	14:42:33
13	MR. SATTERLEY: Move to --	14:42:38
14	THE WITNESS: Correct.	14:42:38
15	MR. SATTERLEY: Oh, excuse me. Objection.	14:42:41
16	Beyond the scope. Calls for expert opinion. And	14:42:42
17	mischaracterizes the document.	14:42:44
18	BY MR. ASHBY:	14:42:46
19	Q. But even though the -- those --	14:42:46
20	MR. SATTERLEY: Let him answer the	14:42:48
21	question.	14:42:49
22	MR. ASHBY: He said correct.	14:42:49
23	THE WITNESS: Yes.	14:42:49
24	MR. SATTERLEY: Oh. Okay.	14:42:49
25	BY MR. ASHBY:	14:42:49

1	Q.	But even though those particles may	14:42:50
2		resemble asbestos, these cleaved elongate particles from	14:42:52
3		tremolite, they are not asbestos?	14:42:55
4	A.	Yes.	14:42:57
5		MR. SATTERLEY: Objection. Beyond the	14:42:57
6		scope. Calls for expert opinion.	14:42:59
7		THE WITNESS: Yes.	14:43:02
8		BY MR. ASHBY:	14:43:04
9	Q.	And if someone's not careful -- well,	14:43:05
10		if -- I'll -- I'll just ask it this way: And you say,	14:43:08
11		Every effort must be made to distinguish between the	14:43:14
12		two.	14:43:17
13		Do you see that?	14:43:17
14	A.	Yes, of course.	14:43:18
15	Q.	And you agree with that?	14:43:19
16	A.	Yes.	14:43:20
17		MR. SATTERLEY: Objection. Beyond the	14:43:23
18		scope.	14:43:24
19		BY MR. ASHBY:	14:43:24
20	Q.	And the -- the -- the reason for that is	14:43:25
21		that if you don't distinguish between the two you -- the	14:43:26
22		analysts might indicate a false positive, meaning a	14:43:30
23		finding of asbestos even though it's not?	14:43:34
24		MR. SATTERLEY: Beyond the scope.	14:43:36
25		THE WITNESS: Yes.	14:43:38

1	BY MR. ASHBY:	14:43:39
2	Q. And it was your conclusion that the EPA	14:43:42
3	made a critical flaw in their analysis resulting in an	14:43:45
4	overwhelming number of false-positive identifications of	14:43:49
5	asbestos?	14:43:54
6	MR. SATTERLEY: Objection. Beyond the	14:43:54
7	scope.	14:43:55
8	THE WITNESS: I agree.	14:43:55
9	BY MR. ASHBY:	14:43:56
10	Q. And the reason for this flaw was they were	14:43:57
11	counting these cleaved tremolite fragments as asbestos	14:43:59
12	particles?	14:44:02
13	MR. SATTERLEY: Beyond the scope.	14:44:03
14	THE WITNESS: Yeah. There may have been	14:44:04
15	not only tremolite but other calcic amphiboles.	14:44:05
16	BY MR. ASHBY:	14:44:17
17	Q. And at the very last sentence you write, I	14:44:28
18	believe it offered -- and what you're talking about	14:44:31
19	there, the it is R. J. Lee's criticism -- offered an	14:44:35
20	honest effort to provide insight into the inherent	14:44:40
21	complexities of the mineral issues discussed in the EDH	14:44:43
22	study.	14:44:47
23	MR. SATTERLEY: Objection. Beyond the	14:44:47
24	scope.	14:44:49
25	BY MR. ASHBY:	14:44:49

1	Q.	You agree with that, right?	14:44:50
2	A.	Of course.	14:44:51
3	Q.	You mentioned --	14:44:51
4		MR. SATTERLEY: And let me also place an	14:44:54
5		objection, improper opinion testimony.	14:44:58
6		BY MR. ASHBY:	14:44:59
7	Q.	Okay. You mentioned a minute ago William	14:44:59
8		Longo?	14:45:03
9	A.	Yes.	14:45:03
10	Q.	You're familiar with William Longo?	14:45:03
11		You -- well, I'll strike that.	14:45:06
12		Are you familiar with William Longo?	14:45:08
13	A.	Yes, of course.	14:45:09
14		MR. SATTERLEY: Beyond the scope.	14:45:11
15		BY MR. ASHBY:	14:45:13
16	Q.	And -- and you're familiar with some of	14:45:14
17		his work in litigation, preparing reports that he calls	14:45:15
18		them work practice simulations?	14:45:20
19	A.	Sure.	14:45:21
20		MR. SATTERLEY: Objection. Beyond the	14:45:22
21		scope.	14:45:23
22		BY MR. ASHBY:	14:45:23
23	Q.	And with regard to his findings in	14:45:24
24		these -- in these work practice simulations generically,	14:45:26
25		like for joint compound, for example, you said that his	14:45:30

1 studies exaggerate fiber release and are flawed? 14:45:33

2 MR. SATTERLEY: Objection. Beyond the 14:45:36

3 scope. 14:45:37

4 THE WITNESS: I found those videos -- I 14:45:37

5 found those videos -- what's the phrase you guys use? I 14:45:42

6 find that they are -- they are prejudicial rather than 14:45:48

7 probative. 14:45:57

8 BY MR. ASHBY: 14:45:58

9 Q. Uh-huh. Meaning -- well, let me see if I 14:46:00

10 can put words in your mouth. 14:46:04

11 A. Well, I'm -- 14:46:04

12 Q. And then you -- you agree with me or 14:46:05

13 disagree with me. 14:46:07

14 I think that means you find them to be 14:46:08

15 something that are intended to evoke emotion and rely 14:46:10

16 less on science? 14:46:15

17 MR. SATTERLEY: Objection. Beyond the 14:46:17

18 scope. Foundation. Calls for legal opinion. 14:46:18

19 THE WITNESS: It is -- you mentioned the 14:46:21

20 drywall studies. There is a dust generated. And he 14:46:27

21 looks at this dust in a black box, an exposure chamber, 14:46:36

22 with incident light so that the dust is exaggerated. 14:46:45

23 But there it is, the dust, a cloud. But the jury looks 14:46:50

24 at that and says, Look at that asbestos cloud. But the 14:46:55

25 asbestos content of that dust cloud could have been only 14:47:03

1	1 percent or less, therefore it is prejudicial. But	14:47:07
2	that's just the nature of that.	14:47:19
3	Yeah, there's asbestos in the dust cloud,	14:47:21
4	but not as intense or dramatically concentrated as this	14:47:23
5	video implies.	14:47:29
6	BY MR. ASHBY:	14:47:41
7	Q. All right, Dr. Langer. You -- I'm not	14:47:52
8	paying you for your testimony here today, correct?	14:47:54
9	A. Correct. However, if you change your	14:47:56
10	mind...	14:48:05
11	Q. And -- and you came here today and gave	14:48:05
12	your best and most -- most truthful account of your	14:48:07
13	experience in the 1970s, and the 1980s, and 1990s; is	14:48:10
14	that true?	14:48:14
15	A. I -- I think that's a fair representation.	14:48:15
16	MR. ASHBY: All right. I don't have any	14:48:16
17	other further questions.	14:48:17
18	MR. SATTERLEY: I'm -- I'm okay to	14:48:18
19	continue from here if you're okay to continue.	14:48:19
20	THE WITNESS: Absolutely.	14:48:21
21	MR. SATTERLEY: Hopefully I won't have a	14:48:23
22	lot.	14:48:25
23	EXAMINATION BY COUNSEL FOR THE PLAINTIFF:	14:48:26
24	BY MR. SATTERLEY:	14:48:26
25	Q. With regards to the compensation question	14:48:27

1	counsel asked you, when you met with those five	14:48:29
2	attorneys in 2017 for J&J did they compensate you for	14:48:31
3	your time?	14:48:35
4	A. I think they did.	14:48:36
5	Q. And did they at any point in time between	14:48:37
6	2017 and 2023, the last six years, come back to you and	14:48:40
7	say, We want your expert opinion regarding any of the	14:48:45
8	topics Mr. Ashby asked you about on cross-examination?	14:48:50
9	A. No.	14:48:52
10	Q. At any point in time have they asked you	14:48:53
11	to evaluate all the cases of individual mesothelioma	14:48:56
12	after a decades-long consumer talc exposure so that you	14:49:01
13	can give opinion about that?	14:49:07
14	A. No.	14:49:08
15	Q. Have they presented to you the tissue	14:49:08
16	digestion analysis of folks exposed only to talcum	14:49:11
17	powders and say, Look at the mineral assemblages here	14:49:14
18	and give us your opinions about that?	14:49:18
19	A. No.	14:49:20
20	MR. ASHBY: Objection. Calls for	14:49:21
21	speculation. Lacks foundation.	14:49:23
22	BY MR. SATTERLEY:	14:49:25
23	Q. Did -- did -- back in the 1970s when	14:49:26
24	Dr. Gavin Hil -- Hildick-Smith met with you or when you	14:49:28
25	saw Bill Ashton at these meetings, did they ever present	14:49:31

1	to you any of the J&J internal documents where other	14:49:35
2	scientists documented asbestos in their baby powder?	14:49:39
3	MR. ASHBY: Assumes facts. Lacks	14:49:42
4	foundation. Calls for speculation.	14:49:45
5	THE WITNESS: No.	14:49:46
6	BY MR. SATTERLEY:	14:49:47
7	Q. For example, he mentioned McCrone and Ian	14:49:47
8	Stewart. Have -- have -- have you ever seen the letters	14:49:50
9	in the 1970s from Ian Stewart to Johnson & Johnson's	14:49:53
10	mineral company, called Windsor Minerals, about the	14:50:00
11	presence of asbestos in their baby powder?	14:50:03
12	MR. ASHBY: Objection. Calls for	14:50:06
13	speculation. Lacks --	14:50:07
14	BY MR. SATTERLEY:	14:50:07
15	Q. Have you ever seen those?	14:50:07
16	MR. ASHBY: Lacks foundation. Assumes	14:50:09
17	facts.	14:50:11
18	THE WITNESS: No.	14:50:11
19	BY MR. SATTERLEY:	14:50:11
20	Q. Have you ever seen the letters from Ian	14:50:11
21	Stewart regarding the raw talc from the Vermont talc	14:50:13
22	mines documenting asbestos in their talcum powder	14:50:17
23	products --	14:50:22
24	MR. ASHBY: Lacks foundation. Calls for	14:50:22
25	speculation.	14:50:22

1	BY MR. SATTERLEY:	14:50:22
2	A. -- from Ian Stewart?	14:50:22
3	MR. ASHBY: Assumes facts.	14:50:29
4	THE WITNESS: Same answer. No.	14:50:29
5	BY MR. SATTERLEY:	14:50:31
6	Q. All right. And with regards to Fred	14:50:31
7	Pooley -- he asked you about Fred Pooley. Had -- had	14:50:32
8	you seen the internal documents between Fred Pooley and	14:50:37
9	J&J regarding his identification of fibrous tremolite in	14:50:40
10	J&J talc?	14:50:47
11	MR. ASHBY: Lacks foundation. Calls for	14:50:47
12	speculation. Assumes facts.	14:50:49
13	THE WITNESS: No.	14:50:50
14	BY MR. SATTERLEY:	14:50:51
15	Q. The -- did you -- did you -- you -- you	14:50:52
16	understood Fred Pooley to be with Cardiff, right?	14:50:56
17	A. Yes.	14:50:59
18	Q. Okay. And have you seen the J -- the J --	14:51:00
19	four or five J&J attorneys that met with you in 2017,	14:51:01
20	did they show you the documents from the 1971 timeframe	14:51:06
21	that required Fred Pooley to let J&J edit his papers?	14:51:09
22	MR. ASHBY: It assumes facts.	14:51:15
23	THE WITNESS: No.	14:51:17
24	MR. ASHBY: Calls for speculation. Lacks	14:51:17
25	foundation.	14:51:17

1 THE WITNESS: No. 14:51:17

2 BY MR. ASHBY: 14:51:23

3 Q. Counsel asked you about -- about your '76 14:51:23

4 paper. And I -- I think you were suggesting that -- let 14:51:26

5 me just look at my notes here -- that papers -- other 14:51:28

6 papers are potentially edited. You said -- you 14:51:33

7 mentioned that you published roughly 100 papers. How 14:51:37

8 many of those 100 papers, to your knowledge, had been 14:51:41

9 secretly edited by industry? 14:51:45

10 MR. ASHBY: Lacks foundation. Calls for 14:51:48

11 speculation. Assumes facts. 14:51:50

12 THE WITNESS: I have no idea. 14:51:52

13 BY MR. SATTERLEY: 14:51:53

14 Q. Okay. And do you know -- you were not 14:51:54

15 provided any of the changes to your '76 paper that were 14:51:56

16 given to Dr. Mehlman, the editor of the journal, were 14:52:01

17 you? 14:52:06

18 A. No. 14:52:06

19 MR. ASHBY: Lacks foundation. Calls for 14:52:07

20 speculation. Assumes facts. 14:52:09

21 THE WITNESS: No. 14:52:10

22 BY MR. SATTERLEY: 14:52:11

23 Q. Now, with regards to Dr. Selikoff, they 14:52:12

24 show -- he showed you Exhibit 24. I think you never saw 14:52:14

25 this letter written by Dr. Selikoff to this Washington 14:52:17

1 Post reporter, correct? 14:52:22

2 A. Correct. 14:52:23

3 Q. All right. And that's dated March the 14:52:24

4 26th, 1976. Do you recall that? 14:52:26

5 A. Well, I don't recall it. It's the first 14:52:29

6 time I've seen it. 14:52:31

7 Q. I mean, earlier today he showed it to you. 14:52:32

8 It's been marked -- 14:52:34

9 A. Yes, of course. Yes. 14:52:34

10 Q. All right. And did you know how much 14:52:35

11 pressure Dr. Chalmers put on Dr. Selikoff? 14:52:37

12 A. Phew. 14:52:45

13 MR. ASHBY: Assumes facts. Calls for 14:52:45

14 speculation. Lacks foundation. 14:52:48

15 BY MR. SATTERLEY: 14:52:50

16 Q. Let me show you -- did you answer the 14:52:51

17 question? 14:52:53

18 A. No. 14:52:53

19 Q. Okay. I -- 14:52:53

20 A. I haven't answered that question. I'm 14:52:53

21 sitting here -- 14:52:55

22 Q. All right. 14:52:55

23 A. -- thinking about it. 14:52:56

24 Q. Sure. Let me show you a -- a -- a memo on 14:52:57

25 the sec -- excuse me. It's the wrong -- wrong memo. 14:53:00

1	Let's see where am I going here. The	14:53:04
2	26th. Oh. The 26th. We're going to mark this as	14:53:07
3	Exhibit 28.	14:53:11
4	(Exhibit 28 was marked and	14:53:11
5	attached to the transcript.)	14:53:11
6	BY MR. SATTERLEY:	14:53:11
7	Q. This is from D. D. Johnston, the president	14:53:18
8	of Johnson & Johnson, the very same date --	14:53:20
9	MR. SATTERLEY: Here you go, counsel.	14:53:23
10	BY MR. SATTERLEY:	14:53:25
11	Q. The very same date, to Dr. Chalmers. And	14:53:26
12	the president of Johnson & Johnson writes: Dear Dr.	14:53:34
13	Chalmers, attached is a copy of the Washington Post	14:53:37
14	treatment of your press release in this morning's paper.	14:53:41
15	It also was carried in its entirety by the Washington	14:53:43
16	Post wire service, which goes on -- goes to 340	14:53:46
17	newspapers nationally. The article falls short of our	14:53:50
18	mutual goal of reassuring consumers about the safety of	14:53:53
19	present day talcum powders.	14:53:57
20	I will stop there. Have you ever seen	14:54:00
21	this letter in the past?	14:54:02
22	A. No.	14:54:03
23	Q. Okay. Counsel asked you about	14:54:03
24	Dr. Chalmers and a press release Dr. Chalmers released.	14:54:04
25	Did Dr. Chalmers ever test baby powder for the presence	14:54:09

1	of asbestos?	14:54:15
2	A. Of course not.	14:54:16
3	Q. Did he even have the skill set to do so?	14:54:17
4	A. No.	14:54:20
5	Q. He -- he read the retraction or -- not the	14:54:21
6	retraction. He read -- he read the press release. And	14:54:27
7	he said the Mount Sinai Department of Pediatrics. Did	14:54:30
8	the Mount Sinai Department of Pediatrics test baby	14:54:35
9	powder for the presence of asbestos?	14:54:41
10	A. Of course not.	14:54:44
11	Q. Did they even have the skill set that you	14:54:45
12	had?	14:54:47
13	A. Had the department -- the department --	14:54:48
14	there was no -- there was no survey taken amongst the	14:54:53
15	department members. It was Horace Hodes, H-O-D-E-S,	14:55:00
16	Horace Hodes, who was chair of that department who was a	14:55:08
17	recipient of a major grant from Johnson & Johnson.	14:55:10
18	Q. What was the name, Dr. Hodes?	14:55:14
19	A. Horace Hodes. Horace Hodes. And he -- he	14:55:16
20	fell into line.	14:55:20
21	And so you asked about whether Chalmers	14:55:23
22	had -- whether Chalmers had analyzed talc. Well,	14:55:25
23	Chalmers, he was responding to his own outward	14:55:32
24	pressures --	14:55:36
25	Q. Did --	14:55:36

1 A. -- from the board of trustees. 14:55:37

2 Q. And Dr. Hodes was -- 14:55:39

3 MR. ASHBY: Let me -- 14:55:39

4 BY MR. SATTERLEY: 14:55:39

5 Q. -- on the board of trustees? 14:55:42

6 MR. ASHBY: Let me -- let me object. 14:55:43

7 THE WITNESS: No. He's going to object 14:55:44

8 that this is just -- just a guess, just a hypothetical, 14:55:45

9 whatever. 14:55:49

10 But I'm talking about the politics of an 14:55:50

11 institution and pressures brought to bear on individuals 14:55:53

12 who are scientists, doctors, who are part of that 14:55:58

13 institution under -- who were undertaking research, and 14:56:04

14 pressures from the institution as to how the research is 14:56:09

15 conducted, what are the rules and regulations. 14:56:16

16 These were the times -- and let me just 14:56:22

17 close and say these are the times when letters to the 14:56:28

18 editor by individual faculty members first had to go 14:56:32

19 through their department chairs before they were 14:56:38

20 submitted to a newspaper or a journal or any other -- 14:56:41

21 BY MR. SATTERLEY: 14:56:48

22 Q. Let's go to Exhibit 28. 14:56:48

23 A. -- form of -- 14:56:49

24 MR. ASHBY: I just need to get my -- there 14:56:50

25 was no question pending. It lacks foundation and calls 14:56:52

1	for speculation.	14:56:55
2	MR. SATTERLEY: Sure there was a question.	14:56:55
3	BY MR. SATTERLEY:	14:56:55
4	Q. Let's go back to Exhibit 28, the president	14:56:56
5	of Johnson & Johnson Baby Products Company to	14:56:59
6	Dr. Chalmers. The second paragraph: In fact,	14:57:02
7	statements attributed to Dr. Selikoff and his staff	14:57:03
8	allegedly commented upon your press release serve only	14:57:06
9	to perpetuate increased public anxiety. Dr. Selikoff's	14:57:11
10	inflammatory remarks have once again been supported with	14:57:13
11	references to data not published or reviewed with other	14:57:17
12	experts.	14:57:20
13	Once again there is confusion about simple	14:57:24
14	facts like whether there are six or 10 recently	14:57:26
15	purchased samples and whether some of the original 19	14:57:29
16	samples were purchased more recently than 1973.	14:57:32
17	Dr. Selikoff and staff continue to treat	14:57:35
18	their findings as facts, ignoring Dr. Pooley's results,	14:57:37
19	dismissing FDA results, promulgating the	14:57:40
20	no-dose-response thesis, implicating attributing the	14:57:43
21	effects of chrysotile to tremolite, et cetera.	14:57:47
22	I'm particularly disturbed by	14:57:50
23	Dr. Selikoff's chink in their armor remark, end quote.	14:57:52
24	If the chink exists, in fact it clearly has potential	14:57:56
25	for alarming the consumer, embarrassing the industry,	14:58:00

1	and publicizing Dr. Selikoff, but its potential for any	14:58:02
2	constructive effect appears nil. Very truly yours, D.	14:58:06
3	D. Johnson, president.	14:58:09
4	And then he does PS. After finishing this	14:58:10
5	letter I learned that the New York Post today quotes	14:58:14
6	some additional intemperate remark by Dr. Selikoff	14:58:20
7	taking exception to the characterization of baby powders	14:58:20
8	as useful and safe.	14:58:25
9	MR. ASHBY: That's -- I'll object that it	14:58:27
10	lacks foundation. Improper refreshment of recollection.	14:58:28
11	Calls for speculation.	14:58:31
12	BY MR. SATTERLEY:	14:58:32
13	Q. This is an admission of the president of	14:58:33
14	Johnson & Johnson. This is a statement made by -- at no	14:58:35
15	point in time did any J&J attorney ever share this with	14:58:38
16	you, correct?	14:58:42
17	MR. ASHBY: Same -- same objections.	14:58:43
18	THE WITNESS: Correct.	14:58:44
19	BY MR. SATTERLEY:	14:58:44
20	Q. Either -- either in 2017 or today,	14:58:44
21	correct?	14:58:46
22	A. Correct.	14:58:46
23	MR. ASHBY: Same objections.	14:58:50
24	MR. SATTERLEY: We'll mark this as Exhibit	14:58:54
25	29.	14:58:56

1	(Exhibit 29 was marked and	14:58:56
2	attached to the transcript.)	14:58:58
3	BY MR. SATTERLEY:	14:58:58
4	Q. This is a few days later; March 31st,	14:59:04
5	1976. Meeting with Johnson & Johnson personnel at Mount	14:59:09
6	Sinai School of Medicine. On Monday, March 22nd, 1976 a	14:59:14
7	meeting was held with Dr. Thomas Chalmers, president of	14:59:18
8	Mount Sinai School of Medicine; Dr. S. D. Pomrinse --	14:59:22
9	that's the same person that's carbon-copied on -- on	14:59:30
10	that -- that one earlier, right?	14:59:33
11	MR. ASHBY: Objection.	14:59:36
12	BY MR. SATTERLEY:	14:59:37
13	Q. Pomrinse?	14:59:38
14	A. Pomrinse, yeah.	14:59:39
15	Q. Okay.	14:59:39
16	A. He was president of the hospital --	14:59:40
17	Q. Yeah.	14:59:40
18	A. -- the medical school.	14:59:42
19	Q. And Samuel Rovner, director of personnel	14:59:43
20	relations at Mount Sinai. Do you know Dr. Samuel	14:59:45
21	Rovner?	14:59:48
22	A. I knew of him. I didn't have very much	14:59:49
23	contact with him when I was there.	14:59:51
24	Q. Johnson & Johnson was represented by D. D.	14:59:54
25	Johnston. We saw that he's the president. Mr. J. --	14:59:56

1	J. E. Burke, do you know who he is?	15:00:00
2	A. No.	15:00:01
3	Q. Dr. D. Peterson, Mr. L. Foster, and Dr. G.	15:00:02
4	Hildick-Smith. You knew Dr. Hildick-Smith, right?	15:00:09
5	A. Yes, of course.	15:00:12
6	Q. All right. Now -- and this is signed off	15:00:13
7	by Dr. Gildick -- G. Gil -- Hildick-Smith, right?	15:00:15
8	A. Yes.	15:00:19
9	Q. Okay. Right on the third paragraph it	15:00:19
10	says, and I've highlighted and underlined it, The Mount	15:00:22
11	Sinai group indicated that over the weekend the Selikoff	15:00:27
12	group had been studying six new samples of talc and	15:00:29
13	reported that all of them contained minimal amounts of	15:00:32
14	asbestos.	15:00:34
15	Do you see that?	15:00:35
16	A. Yes.	15:00:35
17	Q. Is that a true statement?	15:00:36
18	MR. ASHBY: Objection.	15:00:38
19	THE WITNESS: Well, it's reported,	15:00:39
20	although I have no recollection of it.	15:00:40
21	MR. ASHBY: Lacks foundation. Calls for	15:00:42
22	speculation.	15:00:44
23	BY MR. SATTERLEY:	15:00:44
24	Q. Do -- do you recall in the mid 1970s, at	15:00:45
25	this timeframe, testing cosmetic talcum products in your	15:00:48

1	laboratory?	15:00:52
2	A. Yes. We occasionally got some, and we	15:00:52
3	looked at them.	15:00:56
4	MR. SATTERLEY: The same day -- and we can	15:01:01
5	put that exhibit to the side. This will be Exhibit 30.	15:01:05
6	(Exhibit 30 was marked and	15:01:08
7	attached to the transcript.)	15:01:10
8	THE VIDEOGRAPHER: I need to change media	15:01:10
9	real quick. We've been going for 90 minutes.	15:01:12
10	MR. ASHBY: Okay.	15:01:15
11	THE VIDEOGRAPHER: The time is 3:01. This	15:01:16
12	is the end of media number four. We are off the video	15:01:18
13	record.	15:01:22
14	All right. The time is 3:01. This is the	15:01:22
15	beginning of media number five, and we are back on the	15:01:32
16	video record.	15:01:35
17	BY MR. SATTERLEY:	15:01:35
18	Q. On Exhibit -- Exhibit 30 -- this is a,	15:01:37
19	once again, Johnson & Johnson letterhead from Dr. Gavin	15:01:41
20	Hildick-Smith. It says, At 3:30 p.m. -- and this is for	15:01:45
21	the record, telephone call from Dr. Hodes. At 3:30 p.m.	15:01:48
22	on March 26th, 1976, Dr. Hodes called to inform us that	15:01:52
23	the New York Post had an article that resulted	15:01:58
24	apparently from an interview with Dr. Selikoff.	15:02:00
25	So this phone call on -- on the 26th just	15:02:04

1	so happens to be on the very same day that Dr. Selikoff	15:02:06
2	writes that letter?	15:02:09
3	MR. ASHBY: Objection.	15:02:11
4	BY MR. SATTERLEY:	15:02:12
5	Q. Do you see that?	15:02:12
6	A. Yep.	15:02:12
7	MR. ASHBY: Objection. Lacks foundation.	15:02:13
8	BY MR. SATTERLEY:	15:02:14
9	Q. And it says, The article incriminated --	15:02:15
10	excuse me -- intimated -- the article intimated that	15:02:17
11	Dr. Selikoff disagreed with Dr. Hodes, Chairman of the	15:02:19
12	Department of Pediatrics, in relationship to the safety	15:02:22
13	of talc and they would live to regret their statement.	15:02:25
14	Dr. Hodes considered this a personal	15:02:30
15	attack on the -- his integrity and intended to have the	15:02:32
16	matter corrected. He indicated that perhaps	15:02:35
17	Dr. Selikoff would "live to regret his actions."	15:02:40
18	Dr. Hodes indicated he believed that	15:02:45
19	Dr. Selikoff had approved the retraction statement given	15:02:47
20	the press by Dr. Chalmers and was very concerned about	15:02:51
21	Dr. Selikoff's change in the attitude towards the safety	15:02:54
22	of talc. And it's carbon-copied to a number of	15:02:57
23	individuals, including Mr. D. Johnston.	15:03:01
24	At any of the meetings that you met	15:03:03
25	with -- at the meeting you met with the J&J lawyers in	15:03:06

1	2017, did they share this with you?	15:03:09
2	A. No.	15:03:11
3	MR. ASHBY: Objection. Lacks foundation.	15:03:11
4	BY MR. SATTERLEY:	15:03:14
5	Q. And when -- when the attorney today from	15:03:14
6	Johnson & Johnson showed you the Dr. Selikoff letter,	15:03:16
7	did he share the fact that Dr. Hodes had called on the	15:03:19
8	same day complaining about Dr. Selikoff?	15:03:23
9	A. Yes.	15:03:25
10	MR. ASHBY: Lacks foundation.	15:03:26
11	BY MR. SATTERLEY:	15:03:28
12	Q. Is this the first time you've seen it now	15:03:28
13	that I'm showing this to you?	15:03:30
14	A. First time I've seen that group of	15:03:32
15	documents.	15:03:35
16	Q. Okay. Now, counsel asked you questions	15:03:36
17	about the FDA. Had -- did J&J attorneys present to you	15:03:41
18	any of the internal documents of -- of J&J meeting with	15:03:45
19	the FDA with regards to asbestos in talc?	15:03:49
20	A. No.	15:03:55
21	Q. Did --	15:03:55
22	MR. ASHBY: Lacks foundation. Calls for	15:03:56
23	speculation. Assumes facts.	15:03:57
24	BY MR. SATTERLEY:	15:03:59
25	Q. Do you know what the -- the concept of	15:03:59

1	revolving door is?	15:04:01
2	A. No.	15:04:03
3	Q. Where -- where folks will go from industry	15:04:03
4	to work in the government and then work back in industry	15:04:05
5	again. Have you ever heard of that?	15:04:08
6	A. Yeah. It's called double dipping.	15:04:10
7	Q. And -- and do you know how many J&J former	15:04:12
8	employees worked at the FDA?	15:04:15
9	A. I have no idea.	15:04:17
10	MR. ASHBY: Calls for speculation.	15:04:18
11	BY MR. SATTERLEY:	15:04:21
12	Q. With regards to the exhibit, the November	15:04:21
13	10th, 1971 letter from you to Dr. Gavin Hildick-Smith,	15:04:24
14	you were asked about this document. And -- and I think	15:04:28
15	there was some suggestion that no diffraction patterns	15:04:31
16	were taken. I think I've underlined -- this is where	15:04:36
17	you found chrysotile in 1971 in the baby powder. Do you	15:04:41
18	see the reference to diffraction pattern?	15:04:44
19	A. Yes.	15:04:47
20	Q. And so, in fact, there was some	15:04:47
21	diffraction patterns that were taken for the	15:04:49
22	identification of chrysotile, correct?	15:04:52
23	A. Yes.	15:04:55
24	Q. And in addition to chry -- isn't	15:04:58
25	chrysotile -- morphologically you're able to identify	15:05:00

1	what chrysotile looks like in addition to simply	15:05:04
2	diffraction patterns, correct?	15:05:09
3	A. Of course.	15:05:10
4	Q. Okay. And is that -- which allowed you to	15:05:11
5	have confidence do -- that you found chrysotile both in	15:05:13
6	the product and in the tissue?	15:05:19
7	A. The first few years of my work in the	15:05:21
8	Mount Sinai group I studied asbestos mineral samples	15:05:28
9	that were provided us by Johns-Manville Corporation.	15:05:38
10	And I studied -- I have extensively studied chrysotile	15:05:43
11	from various deposits in North America and elsewhere;	15:05:47
12	overseas, South Africa. And my identification criteria	15:05:52
13	was developed on the standards that I studied the first	15:06:02
14	several years as a member of the laboratory.	15:06:08
15	Q. Is --	15:06:14
16	A. I studied soft and harsh chrysotile. I	15:06:15
17	studied the chrysotile UICC-B and A from Canada and	15:06:18
18	Rhodesia. Well, it was Rhodesia then. Now it's	15:06:26
19	Zimbabwe. And therefore I developed a sense based on	15:06:30
20	the behavior of the mineral fiber under an electron	15:06:35
21	beam, its character and its changes in structure based	15:06:40
22	on the heating of the object, that the identification of	15:06:48
23	the mineral became -- became easily discernible.	15:06:54
24	Q. And -- and based upon all of that, were	15:07:03
25	you confident in your identification of chrysotile when	15:07:05

1	you wrote that letter to Dr. Gavin Hildick-Smith?	15:07:09
2	MR. ASHBY: Objection.	15:07:13
3	THE WITNESS: Oh, absolutely.	15:07:14
4	BY MR. SATTERLEY:	15:07:15
5	Q. The -- counsel asked you about several	15:07:16
6	comments or -- or reports, I think Exhibit 26, Exhibit	15:07:21
7	19, Exhibit 25. In each of these you were retained as	15:07:31
8	an expert witness to assist somebody in litigation,	15:07:37
9	correct?	15:07:39
10	A. Yes.	15:07:39
11	Q. And you -- as a matter of fact, one of the	15:07:40
12	reports was written to the -- was it National Stone,	15:07:42
13	Sand & Gravel Association, correct?	15:07:51
14	A. That's right.	15:07:52
15	Q. And -- and so that was the 2005. And --	15:07:54
16	A. That was the evaluation of the RJ Lee	15:07:58
17	Group analysis of the soil samples and the EPA samples	15:08:02
18	from El Dorado County, yes.	15:08:07
19	Q. And -- and the -- the discussion regarding	15:08:10
20	your -- the major hearing at OSHA, you -- you were an	15:08:13
21	expert consultant for the National Stone, Sand -- Sand	15:08:20
22	Gravel Assoc --	15:08:23
23	A. And Gravel. Yeah.	15:08:24
24	Q. The -- I think back then it was only	15:08:24
25	called the National Stone Association, wasn't it?	15:08:27

1	A. Yes.	15:08:30
2	Q. Okay. And counsel asked you questions	15:08:30
3	about Dr. Longo. You have not evaluated Dr. Longo's	15:08:33
4	testing of talc for the presence of asbestos over the	15:08:39
5	last five, six years, have you?	15:08:41
6	A. No.	15:08:43
7	Q. You've not evaluated any of his	15:08:43
8	publications regarding identifying asbestiform materials	15:08:46
9	in talcum powder products, have you?	15:08:52
10	A. No. In fact, I didn't know that he --	15:08:56
11	that there was any paper published.	15:08:57
12	Q. And -- and -- and I -- I believe -- I	15:08:59
13	believe there has been.	15:09:03
14	And with regards to the opinions you gave	15:09:05
15	about Dr. Longo and the -- the work practice	15:09:12
16	simulations, you saw those in connection with serving as	15:09:14
17	an expert witness? He was --	15:09:18
18	A. Joint compound.	15:09:19
19	Q. Yeah.	15:09:21
20	For joint compound. Only that had nothing	15:09:22
21	to do with talcum powder products, correct?	15:09:24
22	A. Correct.	15:09:26
23	Q. Okay. You were a defense expert in a	15:09:27
24	case, and Dr. Longo was a plaintiff's expert in a case?	15:09:28
25	A. I believe so. Yes.	15:09:31

1	Q.	And you guys -- that's -- that's the	15:09:32
2		context in which you saw that -- that video, correct?	15:09:33
3	A.	Yes.	15:09:36
4	Q.	Okay. And you have not evaluated any work	15:09:36
5		practice simulation -- well, excuse me. Strike that	15:09:43
6		question.	15:09:45
7		You have not evaluated any simulations	15:09:46
8		with regard to talcum powder exposures, have you?	15:09:48
9	A.	No.	15:09:50
10	Q.	And there was a lot of questions posed to	15:09:51
11		you about ambient air. And I think you -- you mentioned	15:09:55
12		that there were some problems with ambient air because	15:10:00
13		the source of the exposure causes the ambient air to	15:10:02
14		have asbestos in it, correct?	15:10:06
15	A.	Sure. Yes.	15:10:08
16	Q.	Okay. And you haven't evaluated the	15:10:09
17		ambient air of any place in California where my clients	15:10:13
18		lived, correct?	15:10:19
19	A.	Correct.	15:10:20
20	Q.	Okay. Let me just look at my notes. I	15:10:21
21		think I'm just about -- oh, one last thing. Do you have	15:10:23
22		your '76 paper, the -- on the talc, the -- I think it's	15:10:27
23		in that stack.	15:10:35
24	A.	Yes, it is.	15:10:36
25	Q.	Can you grab that real quick?	15:10:37

1	Review of Current Techniques for the	15:10:39
2	Analysis --	15:10:43
3	A. That -- that's number 14, isn't it?	15:10:43
4	Q. I think so. It's got the color copy of	15:10:45
5	the --	15:10:51
6	A. 14. Okay.	15:10:51
7	Q. All right. In the introduction, on page	15:10:52
8	28 there, it looks like it's the third sentence that	15:10:57
9	says, Some investigators. It says, Some investigators	15:11:02
10	have suggested fibrous talcs possess greater	15:11:11
11	fibrogenicity than the platy varieties. This	15:11:15
12	observation, as well as evidence, suggests that	15:11:19
13	talc-associated disease -- diseases resemble asbestos	15:11:22
14	diseases.	15:11:27
15	And you have a citation there at the end	15:11:27
16	of that, correct?	15:11:31
17	A. Yes.	15:11:31
18	Q. The first citation, the first sentence	15:11:32
19	is -- is footnote 5 and 11, right?	15:11:34
20	A. Yes. That's correct.	15:11:37
21	Q. If we go over to references, the footnote	15:11:38
22	5 is the Porro study from 1942?	15:11:45
23	A. Yes.	15:11:53
24	Q. And then what's the number 11 reference?	15:11:54
25	A. It's McLaughlin, Rogers, and Dunham,	15:11:58

1	British Journal of Industrial Medicine.	15:12:03
2	Q. And if we just look at the list of	15:12:05
3	references here, we can see that -- and this is	15:12:07
4	specifically a paper about tech -- techniques for talc,	15:12:12
5	correct?	15:12:15
6	A. Yes. Yes.	15:12:15
7	Q. And you have 65 citations already by 1976,	15:12:16
8	correct?	15:12:26
9	A. Yes.	15:12:26
10	Q. And so if someone were to look at the	15:12:27
11	scientific literature going back to the 1930s to the	15:12:31
12	1970s, you're going to find at least 65 articles	15:12:35
13	relating to this topic, right?	15:12:41
14	A. Yes.	15:12:43
15	Q. Okay. Counsel asked you a -- a --	15:12:44
16	questions about risk. And I think I asked you that	15:12:51
17	earlier. No one in this case has asked you to give any	15:12:58
18	opinions about risk, correct?	15:13:03
19	A. Correct.	15:13:04
20	Q. And you did say that the regulatory model	15:13:06
21	is that there is no safe level of asbestos known,	15:13:10
22	correct?	15:13:13
23	A. Correct.	15:13:13
24	Q. Using -- using the linear model, right?	15:13:14
25	A. Correct.	15:13:17

1 Q. And Dr. Selikoff made that exact statement 15:13:17
2 back in 1976, did he not? 15:13:21
3 MR. ASHBY: Objection. 15:13:24
4 THE WITNESS: Yes. 15:13:25
5 MR. SATTERLEY: Those are all the 15:13:28
6 questions I have, Dr. Langer. Thank you so much for 15:13:29
7 your time today. 15:13:31
8 MR. ASHBY: All right. Can you give me a 15:13:33
9 minute to get my stuff together? Can we just take a 15:13:35
10 break? 15:13:38
11 THE WITNESS: Sure. 15:13:38
12 THE VIDEOGRAPHER: Do you have any more 15:13:40
13 questions on the record? 15:13:41
14 MR. ASHBY: I do. I've just got to -- 15:13:42
15 THE VIDEOGRAPHER: Okay. Gotcha. 15:13:45
16 (A recess was taken.) 15:13:49
17 THE VIDEOGRAPHER: All right. The time is 15:31:15
18 3:31, and we are back on the video record. 15:31:16
19 EXAMINATION BY COUNSEL FOR THE DEFENDANTS JOHNSON & 15:31:16
20 JOHNSON AND LTL: 15:31:21
21 BY MR. ASHBY: 15:31:21
22 Q. Okay. Okay. Dr. Langer, Mr. Satterley 15:31:22
23 asked you about some of the documents that expressed 15:31:24
24 some of your beliefs and statements at the time, and he 15:31:26
25 suggested that they were made in your position as an 15:31:30

1 expert witness capacity in those cases. Do you recall 15:31:34
2 that questioning? 15:31:37
3 A. I recall the questioning. 15:31:38
4 Q. When you say something as an expert 15:31:40
5 witness, do you do it with the belief that you're say -- 15:31:45
6 what you're saying might not be true? 15:31:46
7 A. I believe you're asking me if I would make 15:31:48
8 a statement and couch it in some terms that would be 15:31:56
9 less than definite, it would be couched in some terms 15:32:03
10 that are not as strong as you would like them to be. 15:32:12
11 Q. No. That's not really what -- what I'm 15:32:15
12 asking you is when -- when you give a -- when you make a 15:32:17
13 statement as an expert, you make -- your statements are 15:32:22
14 still honest even though you're acting as an expert; is 15:32:24
15 that true? 15:32:28
16 A. Of course. 15:32:29
17 Q. Okay. So the fact that Mr. Satterley was 15:32:29
18 suggesting you were doing this in some expert capacity 15:32:32
19 when you made a statement doesn't mean you were being 15:32:36
20 untruthful at the time? 15:32:38
21 A. No. That's a -- a condition one finds in 15:32:39
22 many experts on both sides of the issue. 15:32:48
23 Q. Okay. But in relation to your statements 15:32:51
24 that you've made in an expert capacity, whether you're 15:32:56
25 being paid or not your statements are true? 15:32:58

1	A.	Absolutely. I give the best possible	15:32:59
2		evaluation or answer, yes.	15:33:01
3	Q.	In -- in fact, you are somebody who	15:33:04
4		developed your opinions outside of litigation, and then	15:33:08
5		at some point somebody came along and asked you, Hey,	15:33:12
6		can you give these same opinions in a courtroom; is that	15:33:15
7		correct?	15:33:17
8	A.	Right.	15:33:17
9	Q.	Okay. And whether you're in the courtroom	15:33:18
10		or you're outside the courtroom, the things you say are	15:33:27
11		the same, and they're truthful --	15:33:29
12	A.	The same.	15:33:31
13	Q.	-- in both places?	15:33:31
14	A.	Correct.	15:33:33
15	Q.	All right. The -- I wanted to show you a	15:33:40
16		document. He was asking you a lot about Mr. Chalm -- or	15:33:41
17		Dr. Chalmers. And I wanted to show you one document	15:33:49
18		that I didn't show you. We'll have to --	15:33:55
19	MR. ASHBY:	Did you mark any new exhibits	15:34:01
20		the last time?	15:34:02
21	MR. SATTERLEY:	I did.	15:34:03
22		I think we're up to like 32 or 33,	15:34:04
23		something like that.	15:34:08
24	MR. SATTERLEY:	All right. I'll mark this	15:34:08
25		as Exhibit 33.	15:34:09

1	(Exhibit 33 was marked and	15:34:10
2	attached to the transcript.)	15:34:10
3	BY MR. ASHBY:	15:34:11
4	Q. All right. This is a letter from	15:34:11
5	Dr. Chalmers to D. D. Johnston on March 30th, 1976.	15:34:14
6	I'll -- I'll tell you this isn't one that Mr. Satterley	15:34:18
7	used with you, but it is a document that comes in	15:34:19
8	between some of the ones that he did.	15:34:22
9	And do you see the word -- this is	15:34:24
10	Dr. Chalmers talking -- or writing to D. D. Johnston,	15:34:29
11	correct?	15:34:33
12	A. Yes.	15:34:33
13	Q. Okay. Again, it's March 30th, 1976. Do	15:34:34
14	you see that at the top?	15:34:37
15	A. Yes.	15:34:38
16	Q. And Chal -- Dr. Chalmers says, I was	15:34:39
17	terribly distressed when I returned from Canada to read	15:34:43
18	the articles in the Washington and New York Post. I had	15:34:45
19	been confident that the press -- press release with --	15:34:48
20	with which Dr. Selikoff had agreed and my talking to the	15:34:50
21	various faculty members involved had ended the matter.	15:34:54
22	Do you see that?	15:34:58
23	A. Yes.	15:34:58
24	Q. All right. And so this is Dr. Chalmers	15:34:59
25	indicating that Dr. Selikoff had agreed with the press	15:35:00

1	release --	15:35:03
2	MR. SATTERLEY: Let --	15:35:03
3	BY MR. ASHBY:	15:35:03
4	Q. -- right? Correct?	15:35:03
5	MR. SATTERLEY: Let me object.	15:35:06
6	Foundation. Beyond the scope. And calls for	15:35:08
7	speculation.	15:35:10
8	BY MR. ASHBY:	15:35:13
9	Q. Do you see that?	15:35:14
10	A. Yes.	15:35:15
11	Q. And what he says here, Upon my return I	15:35:15
12	found out -- or I found that Dr. Selikoff had already	15:35:18
13	sent a letter to Ms. Burros and I quote from the letter.	15:35:20
14	And then he goes on to quote the letter.	15:35:24
15	But what we see here is Dr. Selikoff	15:35:27
16	before even talking to Dr. Chalmers, after getting back,	15:35:30
17	had already went out of his way to send that scathing	15:35:33
18	letter to Ms. Burros, correct?	15:35:37
19	MR. SATTERLEY: Same objection.	15:35:40
20	THE WITNESS: Correct.	15:35:41
21	BY MR. ASHBY:	15:35:43
22	Q. Okay. All right. We talked about -- all	15:35:44
23	right. He -- let's see. He -- he also talked to you	15:35:52
24	about risk. And he talked to you about these letters at	15:35:54
25	the time. So I wanted to go back to something we looked	15:35:59

1 at before, which was Exhibit 23. 15:36:02

2 And even in your view at the time, 15:36:04

3 Dr. Langer, what you -- what we established you were 15:36:08

4 telling people, including the FDA, is that you 15:36:11

5 considered the chrysotile in the two products where you 15:36:15

6 found it to be quite low, and in general -- this is the 15:36:19

7 more important thing -- in general you did not think 15:36:22

8 that chrysotile was a real problem as far as cosmetic 15:36:25

9 talcs were concerned, correct? 15:36:29

10 A. Correct. 15:36:30

11 Q. And at your last deposition in 2021 you 15:36:31

12 agreed that you had made a public statement that the 15:36:48

13 litigations today with Johnson & Johnson have nothing to 15:36:51

14 do or little to do with science, correct? 15:36:55

15 MR. SATTERLEY: Objection. Beyond the 15:36:58

16 scope. Foun -- speculation. Improper opinion 15:36:59

17 testimony. 15:37:02

18 THE WITNESS: Yes. 15:37:04

19 MR. ASHBY: Okay. No further questions. 15:37:05

20 EXAMINATION BY COUNSEL FOR THE PLAINTIFF: 15:37:05

21 BY MR. SATTERLEY: 15:37:05

22 Q. Let me ask you, Dr. Langer, you haven't 15:37:10

23 been testifying as an expert in as -- in talc 15:37:12

24 litigation, consumer talc litigation, against Johnson & 15:37:14

25 Johnson or for -- or for Johnson & Johnson, correct? 15:37:18

1	A. Correct.	15:37:21
2	Q. And so your knowledge of the talc	15:37:22
3	litigation with regard to individuals having	15:37:25
4	mesothelioma would come from either reading in the press	15:37:28
5	or talking to JJ lawyers, correct?	15:37:31
6	MR. ASHBY: Ob -- ob -- objection.	15:37:35
7	THE WITNESS: Yes.	15:37:35
8	MR. ASHBY: Overbroad.	15:37:39
9	BY MR. SATTERLEY:	15:37:41
10	Q. Because in 2021 you and I had never talked	15:37:42
11	or -- or --	15:37:44
12	A. Correct.	15:37:44
13	Q. All right. So your -- when you said that	15:37:45
14	in that 2021 deposition about litigation and science,	15:37:47
15	your basis would have been basically either reading it	15:37:52
16	from the press or talking to Mr. Bicks and Mr. Bishop	15:37:55
17	and the other J&J lawyers in 2017?	15:37:59
18	A. Yes. The only --	15:38:01
19	MR. ASHBY: Calls for speculation. Lacks	15:38:03
20	foundation.	15:38:03
21	THE WITNESS: Yeah. The only sources.	15:38:06
22	Yeah, that's correct.	15:38:07
23	MR. SATTERLEY: Okay. Thank you,	15:38:08
24	Dr. Langer. I appreciate your time. I'm sorry we	15:38:08
25	didn't take a lunch today, but we thought the -- the	15:38:11

1	process would be shorter.	15:38:13
2	MR. CHARCHALIS: Just real quick since	15:38:15
3	your questions are done. I just want to clarify for the	15:38:17
4	record, I had said that I was appearing for the retailer	15:38:22
5	defendants. Just to be clear, that's Albertsons	15:38:23
6	Companies, Inc., Lucky Stores, Safeway, Save Mart	15:38:26
7	Supermarkets, LLC, Target Corporation, and Walmart, Inc.	15:38:29
8	Thank you.	15:38:32
9	MR. SATTERLEY: And let's put on the	15:38:32
10	record, also, that Exhibits 34, 35, and 36 will be the	15:38:34
11	three videos that I shared with the videographer,	15:38:37
12	defense attorney, and showed it to Dr. Langer.	15:38:41
13	34 will be the Peter Bicks video.	15:38:44
14	35 will be the Alex Calfo video.	15:38:47
15	And 36 will be the Mike Brown video.	15:38:49
16	And we can go off the record.	15:38:53
17	(Exhibits 34, 35, and 36 were	15:38:54
18	marked and attached to the	15:38:54
19	transcript.)	15:38:54
20	THE VIDEOGRAPHER: All right. The time is	15:30:00
21	3:30 p.m. This is the end of media number five. We are	15:30:01
22	off the video record. And this is the end of this	15:30:04
23	deposition.	15:30:08
24		15:34:05
25		15:34:05

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(Signature having not been waived, the
videotaped deposition of ARTHUR M. LANGER, Ph.D. was
concluded at 3:30 p.m.)

15:34:05
15:34:06
15:34:06

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ACKNOWLEDGMENT OF WITNESS

I, ARTHUR M. LANGER, Ph.D., do hereby
acknowledge that I have read and examined the foregoing
testimony, and the same is a true, correct and complete
transcription of the testimony given by me and any
corrections appear on the attached Errata Sheet signed
by me.

(DATE)

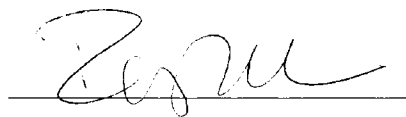
(SIGNATURE)

1 COMMONWEALTH OF VIRGINIA AT LARGE, to wit:

2
3 I, Penny C. Wile, Registered Merit
4 Reporter, Certified Realtime Reporter, and Notary Public
5 for the Commonwealth of Virginia at large, whose
6 commission expires January 31, 2025, do certify that the
7 aforementioned appeared before me, was sworn by me, and
8 was thereupon examined by counsel; and that the
9 foregoing is a true, correct, and full transcript of the
10 testimony adduced.

11 I further certify that I am neither
12 related to nor otherwise associated with any counsel or
13 party to this proceedings, nor otherwise interested in
14 the event thereof.

15 IN WITNESS WHEREOF, I have hereunto set my
16 hand and affixed my notarial seal this 6th day of April,
17 2023.

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19
20
21 

22 Penny C. Wile, Notary Public, #212528

23 Commonwealth of Virginia at Large

24 REGISTERED MERIT REPORTER

25 CERTIFIED REALTIME REPORTER

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3 April 6, 2023

4 RE: ANTHONY HERNANDEZ VALADEZ VS. JOHNSON & JOHNSON

5 APRIL 3, 2023, ARTHUR M. LANGER, PH.D., JOB NO. 5806091

6 The above-referenced transcript has been
7 completed by Veritext Legal Solutions and
8 review of the transcript is being handled as follows:

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10 to schedule a time to review the original transcript at
11 a Veritext office.

12 _X_ Per CA State Code (CCP 2025.520 (a)-(e)) – Locked .PDF
13 Transcript - The witness should review the transcript and
14 make any necessary corrections on the errata pages included
15 below, notating the page and line number of the corrections.
16 The witness should then sign and date the errata and penalty
17 of perjury pages and return the completed pages to all
18 appearing counsel within the period of time determined at
19 the deposition or provided by the Code of Civil Procedure.

20 ___ Waiving the CA Code of Civil Procedure per Stipulation of
21 Counsel - Original transcript to be released for signature
22 as determined at the deposition.

23 ___ Signature Waived – Reading & Signature was waived at the
24 time of the deposition.

25

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1 ___ Federal R&S Requested (FRCP 30(e)(1)(B)) – Locked .PDF
2 Transcript - The witness should review the transcript and
3 make any necessary corrections on the errata pages included
4 below, notating the page and line number of the corrections.
5 The witness should then sign and date the errata and penalty
6 of perjury pages and return the completed pages to all
7 appearing counsel within the period of time determined at
8 the deposition or provided by the Federal Rules.
9 ___ Federal R&S Not Requested - Reading & Signature was not
10 requested before the completion of the deposition.

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1 RE: ANTHONY HERNANDEZ VALADEZ VS. JOHNSON & JOHNSON
2 ARTHUR M. LANGER, PH.D., JOB NO. 5806091
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19 PAGE_____ LINE_____ CHANGE_____
20 _____
21 REASON_____
22 _____
23 _____
24 WITNESS _____ Date _____
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California Code of Civil Procedure

Article 5. Transcript or Recording

Section 2025.520

(a) If the deposition testimony is stenographically recorded, the deposition officer shall send written notice to the deponent and to all parties attending the deposition when the Original transcript of the testimony for each session of the deposition is available for reading, correcting, and signing, unless the deponent and the attending parties agree on the record that the reading, correcting, and signing of the transcript of the testimony will be waived or that the reading, correcting, and signing of a transcript of the testimony will take place after the entire deposition has been concluded or at some other specific time.

(b) For 30 days following each notice under subdivision (a), unless the attending parties and the deponent agree on the record or otherwise in writing to a longer or shorter time period, the deponent may change the form or the substance of the answer to a question, and may either approve the transcript of the deposition by signing it, or

refuse to approve the transcript by not signing it.

(c) Alternatively, within this same period, the deponent may change the form or the substance of the answer to any question and may approve or refuse to approve the transcript by means of a letter to the deposition officer signed by the deponent which is mailed by certified or registered mail with return receipt requested. A copy of that letter shall be sent by first-class mail to all parties attending the deposition.

(d) For good cause shown, the court may shorten the 30-day period for making changes, approving, or refusing to approve the transcript.

(e) The deposition officer shall indicate on the original of the transcript, if the deponent has not already done so at the office of the deposition officer, any action taken by the deponent and indicate on the original of the transcript, the deponent's approval of, or failure or refusal to approve, the transcript. The deposition officer shall also notify in writing the parties attending the deposition of any changes which the deponent timely made in person.

(f) If the deponent fails or refuses to approve the transcript within the allotted period, the

deposition shall be given the same effect as though it had been approved, subject to any changes timely made by the deponent.

(g) Notwithstanding subdivision (f), on a seasonable motion to suppress the deposition, accompanied by a meet and confer declaration under Section 2016.040, the court may determine that the reasons given for the failure or refusal to approve the transcript require rejection of the deposition in whole or in part.

(h) The court shall impose a monetary sanction under Chapter 7 (commencing with Section 2023.010) against any party, person, or attorney who unsuccessfully makes or opposes a motion to suppress a deposition under this section, unless the court finds that the one subject to the sanction acted with substantial justification or that other circumstances make the imposition of the sanction unjust.

DISCLAIMER: THE FOREGOING CIVIL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE ABOVE RULES ARE CURRENT AS OF 3/1/2018. PLEASE REFER TO THE APPLICABLE STATE RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS
COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

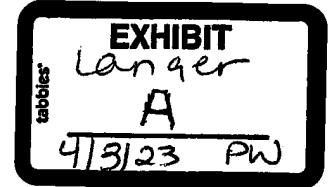
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Attorneys for Plaintiff

SUPERIOR COURT OF CALIFORNIA

COUNTY OF ALAMEDA

ANTHONY HERNANDEZ VALADEZ,

Plaintiff,

vs.

JOHNSON & JOHNSON, et al.,

Defendants.

Case No. 22CV012759

PREFERENCE MOTION GRANTED

Assigned for All Pre-Trial Purposes to
 Judge Richard Seabolt
 Department 18

**NOTICE OF TAKING AND VIDEO
 RECORDING OF DEPOSITION OF
 ARTHUR LANGER, PH.D.**

Date: April 3, 2023
Time: 7:00 a.m. PDT/10:00 a.m. EDT
Location: 310 South England Street
 Williamsburg, VA 23185

Action Filed: June 15, 2022
 Trial Date: April 17, 2023

TO ALL PARTIES AND THEIR ATTORNEYS OF RECORD:

PLEASE TAKE NOTICE that pursuant to this Court's trial-setting order, Code of Civil Procedure sections 2025.240, 2025.280(a), and 2026.010, and this Deposition Notice, Plaintiff Anthony Hernandez Valadez, through his counsel, will take the video-recorded deposition of non-party witness Arthur Langer, Ph.D., on April 3, 2023, at 7:00 a.m. PDT/10:00 a.m. EDT. The deposition shall be at the Williamsburg Lodge, 310 South England Street in Williamsburg, VA. Plaintiff has retained Veritext Legal Solutions for purposes of this deposition.

The deposition will be taken before a Notary Public or duly qualified court reporter authorized to administer oaths. The deposition will be recorded stenographically through instant

Kazan, McClain, Satterley & Greenwood

A Professional Law Corporation

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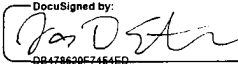
1 visual display and/or by audio or video technology under Code of Civil Procedure sections
2 2025.220(a)(5), 2025.330, and 2025.340.

3 Plaintiff reserves the right to use the deposition as allowed by the Evidence Code and Code
4 of Civil Procedure, including at trial.

5 The accompanying Proof of Service shows a list of all parties or attorneys for whom this
6 Notice of Deposition is being served.

7
8 DATED: March 24, 2023

KAZAN, McCLAIN, SATTERLEY & GREENWOOD
A Professional Law Corporation

9
10
11 By: 
12 Joseph D. Satterley

13 Attorneys for Plaintiff
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PROOF OF SERVICE

Anthony Hernandez Valadez v. Johnson & Johnson, et al.
Alameda County Superior Court Case No. 22CV012759

STATE OF CALIFORNIA, COUNTY OF ALAMEDA

At the time of service, I was over 18 years of age and not a party to this action. I am employed in the County of Alameda, State of California. My business address is Jack London Market, 55 Harrison Street, Suite 400, Oakland, CA 94607.

On March 24, 2023, I served true copies of the following document(s) described as:

**NOTICE OF TAKING AND VIDEO RECORDING OF DEPOSITION OF
ARTHUR LANGER, PH.D.**

on the interested parties in this action as follows:

SEE ATTACHED SERVICE LIST

BY ELECTRONIC SERVICE: I electronically served the document(s) by using the File & ServeXpress system. Participants in the case who are registered users will be served by the File & ServeXpress system. Participants in the case who are not registered users will be served by mail or by other means permitted by the court rules.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on March 24, 2023, at Oakland, California.

/s/ Brenda Leal Alvarez
Brenda Leal Alvarez

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INC., SAFEWAY INC., SAVE MART

SUPERMARKETS , SAVE MART

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LLC sii/pae/et JOHNSON & JOHNSON

BABY PRODUCTS COMPANY, LTL

MANAGEMENT LLC sii/pae/et JOHNSON &

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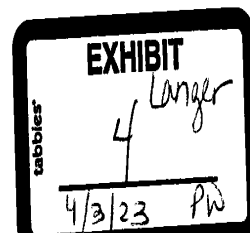
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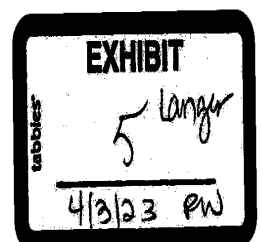
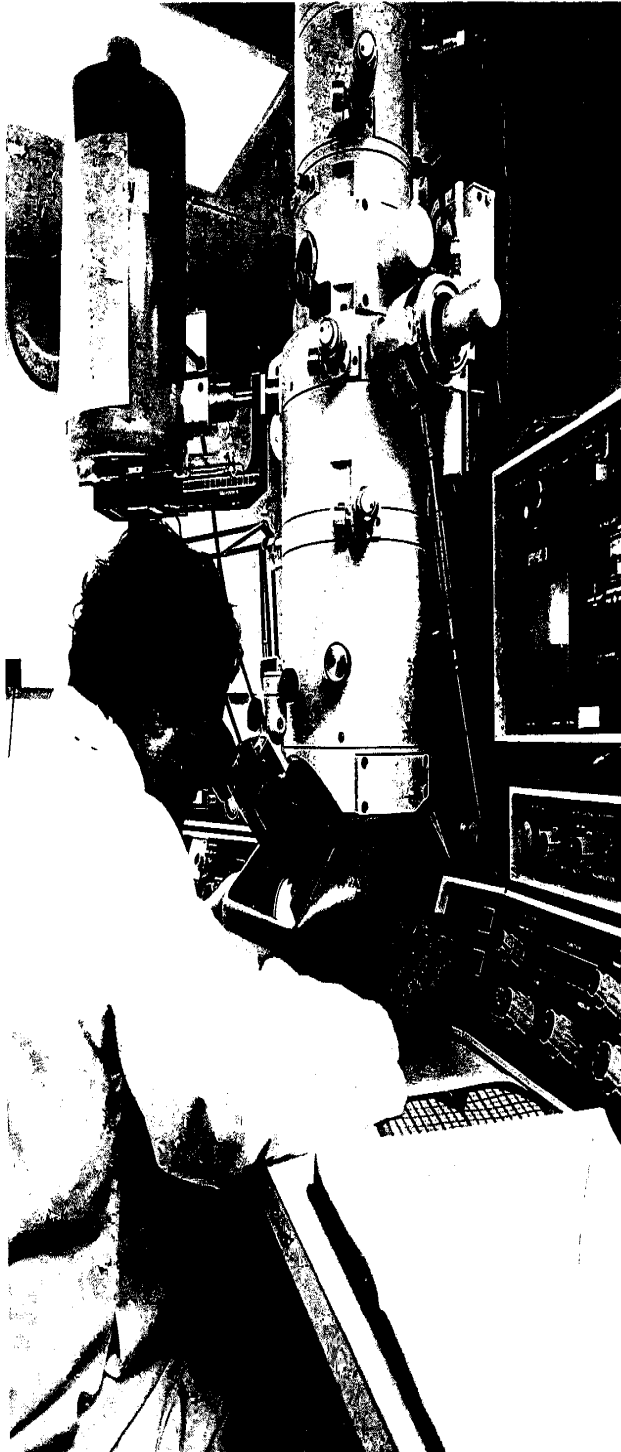


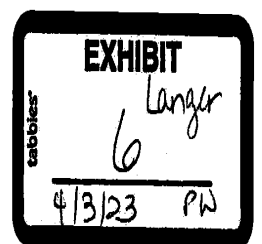
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Lange
4/13/23 PW















Fibrous and Mineral Content of Cosmetic Talcum Products

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☞ In searching for sources of fibers ubiquitous to our everyday environment and of respirable size, the authors examined 22 talcum products commonly available on retail shelves and found fiber contents ranging from 8 to 30% by count, with an average of 19%. Fibrous particulates were generally under $1.0\ \mu$ in diameter with lengths ranging from 1.5 to $6.0\ \mu$. From 0.3 to 3.0% quartz was found in 21 of the samples and the remaining sample had 54.4% quartz. The samples were also analyzed for metals; with four exceptions, the levels of cobalt, nickel, chromium and manganese were low. Further research will be needed to assess the significance of these findings.

REPORTS OF FINDING pulmonary fibrous bodies, previously referred to as "asbestos" and now as "ferruginous" bodies, in the lungs of persons coming to autopsy in hospitals in a number of cities have recently been increasing. The first report of these morphologically distinctive fibrous bodies in the sputum and lungs of asbestos workers was made in 1906 by Marchand.¹ Current interest dates from 1963 when Thompson *et al.*² found these fibrous bodies in the lungs in 26.4% of the autopsies in a series of examinations in Cape Town. Subsequent investigations³⁻⁵ provide evidence that the occurrence of these bodies in the lungs of urban residents is not restricted to those in isolated localities and is not a one-time chance observation.

The identity of the fibrous core of these coated bodies, however, was never determined by the investigators. The fibers were routinely considered as asbestos bodies on the basis of their morphological structure.

In searching for the sources of these ubiquitous fibers, Cralley *et al.*⁶ reported that talcum powder contained a significant percent-

age of respirable fibers and was a potential source of the ferruginous bodies observed in the lungs of humans. This observation led to further study to characterize cosmetic talcum products.

The major purpose of the investigation reported here was to develop and present data on some of the constituents found in cosmetic talcum products and to discuss their health aspects in the light of today's knowledge. It is not our intent to make a general appraisal of health factors in the use of talcum products because of the many variables involved and the limited data available on the consumption of various "sources of talcs" in the formulation and use of cosmetic talcum products. The potential health aspects of some of the data, however, are discussed.

Twenty-two cosmetic talcum products (representing body powder, bath powder, and all purpose powder) purchased off-the-shelf, were analyzed for fibrous content, selected metals, and quartz. The data and a discussion of their possible significance follow.

Analysis of Talcum Products

Talc is a natural mineral, hydrous magnesium silicate, with the general formula $(OH)_2-$

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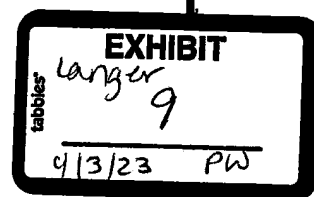


TABLE I
Designated Analyses of Cosmetic Talcum Products

Talcum Product No.	% Fibers	% Free SiO ₂	ppm*				mg/gm**						
			Co	Cr	Ni	Mn	Zr	Ti	Zn	Fe	Mg	Si	Al
1	19	0.3	13	9	13	16	<10	0.9	ND	20	>10	>10	50
2	21	0.4	<10	<10	<10	23	"	0.5	5	10	"	"	6
3	23	0.2	<10	<10	20	78	"	0.3	ND	7	"	"	5
4	19	2.2	67	240	1270	55	"	0.8	40	30	"	"	40
5	30	0.6	<10	<10	14	<10	"	0.2	ND	6	"	"	5
6	18	1.5	21	14	16	13	"	0.1	"	15	"	"	60
7	14	2.1	ND	<10	17	14	"	0.4	"	10	"	"	5
8	19	3.6	<9	329	479	45	"	0.3	"	15	"	"	3
9	21	53.4	<11	ND	<10	14	20	20.0	ND	8	0.5	"	>100
10	8	0.9	25	<12	24	33	<10	30.0	40	12	>10	"	30
11	8	1.4	18	22	20	61	"	20.0	10	50	"	"	40
12	25	1.3	10	13	17	41	"	0.8	ND	10	"	"	8
13	26	1.7	ND	<10	<10	19	"	0.8	"	10	"	"	10
14	28	1.3	<10	10	<10	26	"	0.8	"	10	"	"	15
15	28	1.9	<10	<10	16	24	"	0.3	"	10	"	"	9
16	12	1.2	<11	<11	16	62	"	10.0	"	20	"	"	15
17	13	1.7	<10	10	19	70	30	10.0	"	20	"	"	12
18	16	0.4	16	<9	14	18	<10	0.5	5	15	"	"	40
19	18	1.0	<10	<10	21	16	"	0.7	ND	10	"	"	6
20	16	1.2	22	10	29	50	"	0.8	40	10	"	"	40
21	25	3.3	10	9	19	26	"	0.6	5	10	"	"	10
22	14	0.5	14	1170	1210	84	"	0.3	ND	30	"	"	4

*Microgram of metal per gram of sample.

**Milligram of element per gram of sample.

Mg₃Si₄O₁₀. Talc mineral is formed by the hydrothermal alteration of serpentine and tremolite or directly from unserpentinized ultrabasic rocks. Talc may also be formed by the thermal metamorphism of silicious dolomites.¹⁰⁻¹² The characteristics of the mineral deposits vary widely from the pure talc formula and from each other according to the mineralogy involved. Some deposits may contain varying amounts of tremolite, chrysotile, pyrophyllite, or serpentine, or other basic material from which the talc may be derived. The deposits may also contain varying amounts of metals such as iron, nickel, cobalt, chromium, and manganese as associated minerals, as well as silica. Cosmetic talcum may be basically pure talc or may be a formulation of talc with other materials such as clay, chalk, stearates, etc. Zinc, titanium, manganese, and iron compounds may be added as pigments and opacifiers.

The particle-size distribution and percentage by count of fibers in the talcum particulates were determined by dispersing the talcum in water, filtering the mixture through an "AA" membrane filter, and measuring with a phase contrast microscope at 430

magnification. The percentage of free silica was determined by x-ray diffraction. Cobalt, chromium, nickel, and manganese were determined by means of atomic absorption spectrophotometry. Zirconium, titanium, zinc, iron, and magnesium were determined by means of semi-quantitative emission spectrography.

Table I gives analytical data on 22 different cosmetic talcum products. Figures 1 and 2 are representative photomicrographs of two talcum specimens showing the presence of fibers.

Size Distribution of Talcum Particulates

Seven of the twenty-two talcum products were selected for size-distribution measurements of the fibrous and non-fibrous particulate components.

The diameter of 80 to 95% of all the particulates in these samples was under 5.0 microns (μ). The median of the diameter of the non-fibrous particulates in the seven products ranged from 0.7 to 2.0 μ , with a median average around 1.0 μ .

A fiber is defined as a particulate having at least a 1:3 ratio of diameter to length. The fibrous particulates in the seven products were



FIGURE 1. Photomicrograph of talcum specimen showing presence of fibers (430 $\times$).



FIGURE 2. Photomicrograph of talcum specimen showing presence of fibers (430 $\times$).

generally under $1.0\ \mu$ in diameter, with lengths ranging from 1.5 to $6.0\ \mu$.

The 22 talcum products analyzed showed fiber contents ranging from 8 to 30% by count of the total talcum particulates with an average of 19%. Although the specific fibrous materials were not identified, they were predominantly fibrous talc, as shown by x-ray diffraction, with the probable presence in minor amounts of other fibrous minerals such as tremolite, anthophyllite, chrysotile, and pyrophyllite.

The electron microscope, with its higher power of resolution, shows a number of sub-micron diameter particulates not visible by means of phase contrast microscopy.

Free Silica

In 8 of the 22 talcum products (Table I), the presence of quartz ranged from 0.3 to 1.0%; in 13 products, 1.2 to 3.0% quartz, and in 1 product, 54.4% quartz.

Metals

With the exception of talcum products Nos. 4, 8, and 22 (Table I), the cobalt content of the products analyzed was under 25 parts per

million by weight (ppm), chromium under 22 ppm, nickel under 29 ppm, and manganese under 78 ppm. Product No. 4 had a nickel content of 1270 ppm; chromium 340 ppm; and cobalt, 67 ppm. Product No. 8 contained 479 ppm nickel and 329 ppm chromium. Product No. 22 contained 1210 ppm nickel and 1170 ppm chromium. Qualitative tests showed some of the chromium in the talcum products to be in the hexavalent state. The nickel, chromium, cobalt, and manganese in the talcum products may have come from the talc mineral deposit¹⁰ or from the alloy metals of the pulverizing equipment used in reducing the talc.¹³

The zirconium content of the products was all under 10 milligrams per gram (mg/gm) except for products Nos. 9 and 17, which had 20 and 30 mg/gm respectively. The titanium, zinc, and iron ranged from a few tenths to 50 mg/gm of talcum and were probably present as pigments or opacifiers. The magnesium content of the products was over 10 mg/gm, except for product No. 9 which had only 0.5 mg/gm. The magnesium was probably present as an additive in the formulation or as a part of the talc molecule or other amphiboles in the products.



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The aluminum and silicas were in all probability associated either with the talc molecule, or additives such as kaolin, or the base material from which the talc was derived.

Known Health Effects of Talc

Much of our knowledge of the health effects of talc is derived from studies of occupational exposures in its mining, milling, and industrial use. In extrapolating this knowledge to the cosmetic use of talcum powder, it must be recognized that the pattern of exposures in the use of talcum product varies markedly from person to person, not only in frequency of use but also in amount and in location.

In contrast to industrial exposures where the pattern is likely to be more continuous with accompanying peaks, exposure in the use of cosmetic talcum products is very intermittent with peak exposures dominating. The exposure pattern may continue a lifetime, especially if the use of talcum is established in the earlier years as a part of personal habits. The air-borne dosage to workers from industrial exposures to talc that have resulted in injury to health were undoubtedly much higher, however, than would be predicted from the use of cosmetic talcum products.

Mining, Milling, and Industrial Use

The clinical entity of talc pneumoconiosis, "talcosis," has been observed repeatedly in workers with long exposure to talc in its mining, milling, and industrial use.¹⁴⁻¹⁷ Elongated, terminally clubbed pulmonary fibrous bodies, both segmented and unsegmented and similar in morphology to ferruginous bodies, have been found in talc workers, but these workers had received a mixed exposure—to talc, tremolite, anthophyllite, and silica.^{18,19} In one study²⁰ the mortality rate from cancer of the lung and pleura was four times greater for a group of talc workers than for the general population. In pulmonary cancer from asbestos, the role of fibers and trace metals is uncertain. Some investigators have assumed the fibers play a dominant and direct role; more recent investigations indicate that the fibers may have been only an index concealing a spectrum of unidentified agents and relationship.¹³

Surgical and Cosmetic Use

The only reported cutaneous reactions from the use of talcum powder are talc granulomas, and these have been rare.^{21,22} Talcum powder, however, is no longer used on surgical gloves and should not be applied to broken skin. Occasionally, perfume oils used in talcum powder formulations sensitize the skin and produce dermatitis.^{23,24}

Conclusions

With the exception of 4 of the 22 cosmetic talcum products analyzed, the levels of free silica, cobalt, nickel, chromium, and manganese were generally of a low magnitude and within a narrow range. It is not known whether the four products represent a significant proportion of sales in the industry or to what extent the sources of the talc in these four formulations are the same as sources of talc specified for use in other talcum products in the competitive market. The levels of silica, chromium, and nickel in these four products are sufficiently high, however, to be of concern in their potential to cause disease.

All of the 22 talcum products analyzed have an appreciable fiber content, ranging from 8 to 30% by count of the total talcum particulates, and averaging 19%. The fibrous material was predominantly talc but probably contained minor amounts of tremolite, anthophyllite, and chrysotile as these are often present in fibrous talc mineral deposits. Cosmetic talcum products should be included as a source of the fibers, from which may be derived ferruginous bodies observed in the lungs of humans. The meaning of the presence of these ferruginous bodies, however, is uncertain.

Industry has the know-how to safely handle fibrous material as well as toxic metals such as nickel, chromium, cobalt, and manganese once adequate criteria have been established. Unknown significant amounts of such materials in products that may be used without precautions may create an unsuspected problem. For this reason continued research and investigations and communication of findings are necessary in this area.

Acknowledgments

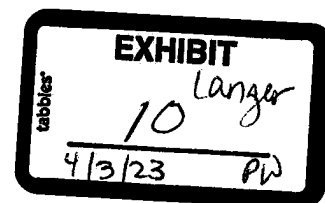
The authors acknowledge, with appreciation, the technical assistance of Harrold B. Norris who made the free silica determinations; Patricia L. Maurer who made the atomic absorption spectrophotometric determinations for nickel, cobalt, chromium, and manganese; John R. Carlberg who made the emission spectrographic determinations for zirconium, titanium, zinc, iron, magnesium, and aluminum; and Stephen Bayer and Ralph Zumwalde for the fiber determinations.

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Human Factors Association of Canada

On June 1 a group of 29 people gathered in Toronto, Canada, and formed the Human Factors Association of Canada. It is anticipated that the Association will have membership throughout Canada and will represent interests of the many disciplines concerned with man's functioning in his physical and machine environments. The following officers were elected: President, Dr. R. B. Bromiley, Vice-President, Dr. E. Llewellyn Thomas, Secretary-Treasurer, Mr. Ronald E. F. Lewis. The following were named Directors: Dr. J. R. Brown, Dr. A. C. Bryan, Dr. Ruth Hoyt and Mr. J. F. Martin. Correspondence should be addressed to: Secretary-Treasurer, Human Factors Association of Canada, c/o Defence Research Establishment Toronto, Box 2000 Downsview, Ontario, Canada.



TALC AND CARCINOMA OF THE OVARY AND CERVIX

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Summary

An extraction-replication technique was used to examine tissue from patients with ovarian and cervical tumours. In both conditions talc particles were found deeply embedded within the tumour tissue. The close association of talc to the asbestos group of minerals is of interest.

THE development in this laboratory of an extraction-replication technique (Henderson, 1969) for the study of foreign particles within tissues has allowed the *in situ* identification of crocidolite asbestos within the tissue of various mesotheliomas (Henderson *et al.*, 1969) removed from patients who had been concerned with the manipulation of asbestos in industry. This technique has now been applied to the study of tissue from ovarian and cervical carcinoma.

MATERIALS AND METHODS

Tissue

The tissue studied was obtained from patients with cancer of either the ovary or the cervix, and was first prepared as paraffin sections for normal routine histological examination but was unstained. Sections were then stained for histological assessment in the usual manner, and adjacent unstained tissue prepared for electron microscopy.

Replication Technique

The extraction-replication procedure has been described (Henderson, 1969). Sections of tissue were immersed in xylene and in ethanol, and the dehydrated tissue was then embedded by

impregnating the section on to the surface of a thin sheet of acetone-softened cellulose acetate, mounted on a glass slide, and left to harden. On removing the slide, the embedded tissue was left in the cellulose acetate. The tissue was then outlined with thin strips of Scotch tape to form a shallow well, and a 10 per cent (v/v) polyvinyl alcohol (PVA) solution applied. When the PVA had hardened it was stripped from the section providing a replica of the tissue surface. Foreign particles associated with the tissue are often removed with the PVA during this stripping process.

A complete sequential examination through the embedded tissue is possible by taking successive strippings. These surface replicas were then preshadowed with platinum, a carbon film deposited for strength, and the PVA removed by floating the replica in a hot water bath. Replicas were mounted on electron microscope grids for examination, using the AEI-6B microscope.

RESULTS

No asbestos particles were found in any of the tissue studied. Particles of talc were identified in approximately 75 per cent (10 of 13) of the



FIG. 1
Typical decoration pattern on a particle of natural talc. Numerous crystal lattice planes are shown (a). ($\times 30\,000$.)
Scale refers to $1.0\,\mu$.

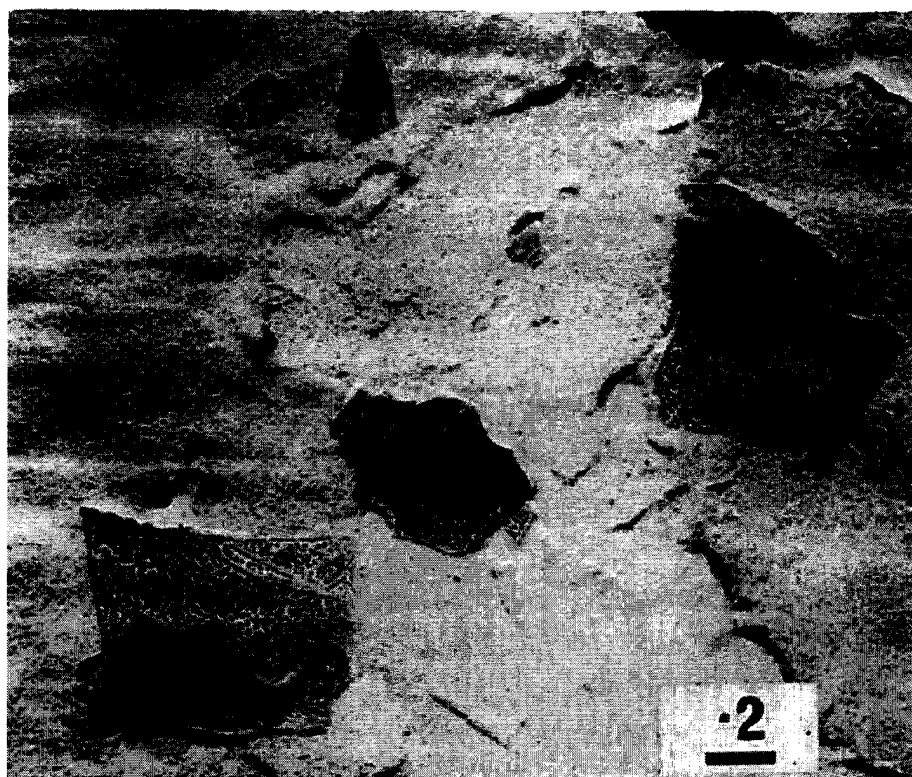


FIG. 2
Commercial talc preparations illustrating the decoration pattern. ($\times 40\,000$.)



FIG. 3

Micrograph of tissue from a serous papillary cystadenocarcinoma of the ovary removed from a 27-year-old female. No previous abdominal operations had been carried out. The decoration pattern and lattice planes are shown. ($\times 30\,000$.)

ovarian tumours. Using the replication technique identification of talc is possible because of the characteristic "decoration pattern" induced by the evaporation of platinum *in vacuo* on the crystal surface. Figure 1 shows this pattern on a particle of *natural* talc and the distinctive lattice planes of the crystals. Anthophyllite asbestos, which is known to be converted naturally to talc, is the only crystalline material which is at present indistinguishable from talc by using the replication technique. The decoration pattern on material from a commercial talc preparation is also demonstrated in Figure 2.

Material found within the ovarian tumours

and identified as talc is illustrated in Figure 3. The talc particles were found deep within the tumour tissue. Some were as small as $1000\text{\AA}$ in size but they were generally within a range from $1000\text{\AA}$ to $2\text{ }\mu$.

Talc particles were also found embedded within tumours of the cervix. Figure 4 shows one such particle embedded in a capillary wall within the tumour, and Figure 5 illustrates the decoration pattern of the particle at a higher magnification. Crystals as large as $5\text{ }\mu$ were found in tissue from the cervical tumours and were generally larger than those seen in the ovarian tumours. Talc crystals were found in

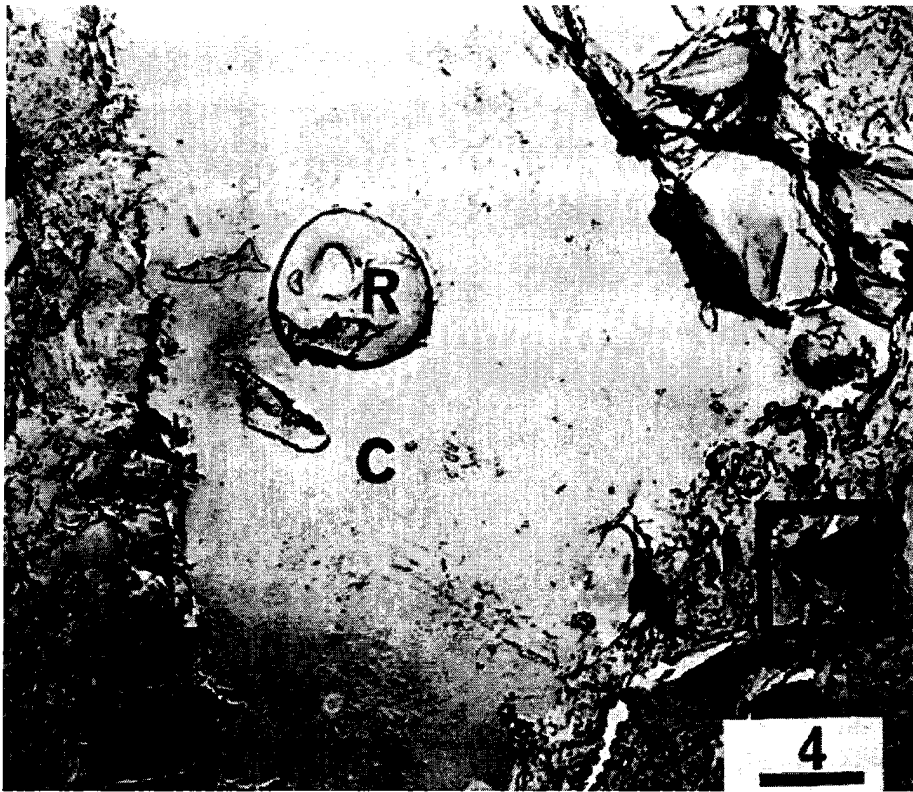


FIG. 4

Micrograph of tissue from a squamous-cell carcinoma of the cervix from a 62-year-old female. C—capillary, R—red cell. The particle of talc can be seen in the wall of the capillary. ($\times 3500$.)



FIG. 5

A higher magnification of the talc particles outlined in Fig. 4. The typical decoration pattern is shown. ($\times 40\ 000$.)



FIG. 6
Talc particles found in
tissue from a pneumo-
coniotic lung. ($\times 30\,000$.)

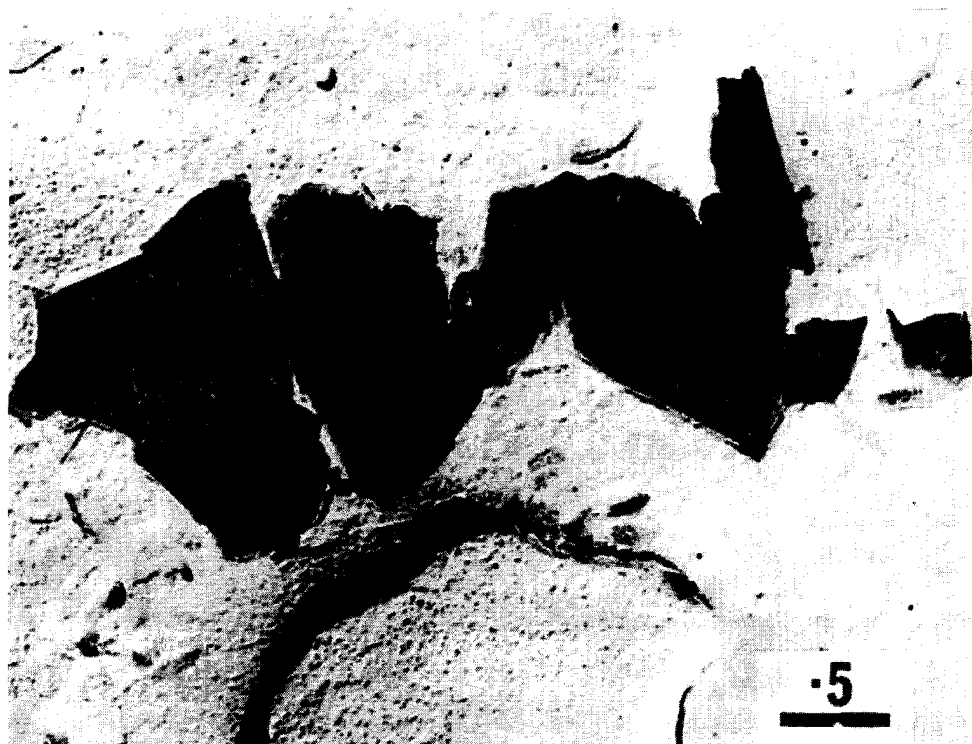


FIG. 7

Micrograph from the deepest part of an extensive papillary adenocarcinoma entirely replacing the endometrium in a 58-year-old woman, 8 years postmenopausal. Both ovaries were enlarged by hilar metastases, showing histological features similar to the primary endometrial lesion. Numerous talc particles were found in the primary endometrial carcinoma, but none in the metastatic ovarian tumours. ($\times 26\,000$.)

approximately 50 per cent of the cervical tumours examined (12 of 21) but it must be realized that these particles are extremely minute, often with the dimensions of viruses, and only small regions of the tumour tissue could be studied. Approximately ten replication "stripings" for electron-microscope examination are usually taken from each thin section of the tissue. Figure 6 illustrates the use of the technique in the examination of pneumoconiotic lung tissue from a patient whose industrial history indicated long exposure to Norwegian talc.

Many particles of talc were found concentrated in the deeper layers of a primary carcinoma of the endometrium (Fig. 7) whereas extensive studies of a secondary tumour in the ovary in the same patient did not show the presence of talc. Application of the technique to "normal" ovarian tissue removed from patients with breast cancer has also shown talc particles in 5 of 12 such tissues studied. Extensive study at high magnification with the electron microscope is, however, required for evaluation of a replica and particles could easily be missed.

The application of electron-microscope micro-analysis (EMMA-AEI, Harlow, England) to the particles extracted by the replication technique has provided preliminary evidence that the crystals contain magnesium and silicon, talc being a magnesium silicate.

DISCUSSION

The possibility that the increasing incidence of carcinoma in western society may be related to a corresponding increase in the use of asbestos (Graham and Graham, 1967) is of interest, especially with regard to pleural and peritoneal mesotheliomas in workers exposed to crocidolite asbestos in industry (Wagner *et al.*, 1960; Elwood and Cochrane, 1964). There have been a number of reports about the relationship between asbestos and carcinogenesis (Smith *et al.*, 1965; Jacob and Anspach, 1965). However, the identification of asbestos fibres within tissue is extremely difficult. Fine particles embedded within tumour tissue are usually beyond the limits of resolution of the optical microscope, and tissue incineration, followed by electron microscopy of the isolated particles, may be unreliable if chemical changes are

induced by the procedure. Using normal light microscopy, identification of asbestos particles is based on the presence of characteristic ferritin bodies on some of the fibres, although these cannot easily be distinguished from similar bodies around elastin fibres (Henderson *et al.*, 1970). This procedure may not, however, be as unreliable as the use of polarized light for the demonstration of brightly illuminated "birefringent crystals of asbestos".

The replication technique (Henderson, 1969) failed to show asbestos fibres in the ovarian neoplasms studied. On the other hand, there was good evidence for the presence of talc, often indistinguishable from anthophyllite asbestos, within the ovarian tissue. (Anthophyllite is converted naturally to talc.) The talc particles were found localized deep within tumour tissues, and not universally dispersed throughout the tumour. The talc particles in the ovary were generally much smaller than those found in the tissue from the tumours of the cervix.

The relationship between asbestos and mesotheliomas appears well established, and the replication technique has provided unequivocal evidence for the presence of fibres within such tumours. This technique has also produced evidence for the presence of talc in tissue from pneumoconiotic lungs of a patient with an industrial history of exposure to Norwegian talc (Henderson *et al.*, 1970). The presence of mica, kaolin and asbestos fibres were also identified in tissue from these pneumoconiotic lung tissue.

Although it is impossible to incriminate talc as a primary cause of carcinomatous changes within either the cervix or the ovary on the preliminary observations described here, the possibility that talc may be related to other predisposing factors should not be disregarded and further investigations are obviously required.

ACKNOWLEDGEMENTS

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Meeting with Dr. Langer on July 9
Concerning Analytical Analysis of Talc



On Friday, July 9, I visited Dr. Arthur Langer, Mt. Sinai School of Environmental Science. The expressed purpose of this visit was to observe the preparation of tissue sections (from Tenovus Institute) for electron microscope examination. However, the subject of "asbestos" in JOHNSON'S* Baby Powder from Dr. Langer's point of view was also explored.

Analysis of the Tenovus Tissue Samples

Only the tissue labeled 34907 11 submitted by Uterus 1 Surface us was of sufficient size to be prepared for electron microscopy. The tissue was sectioned and prepared by the method of Dr. F. Pooley. This method involved removal of the wax embedding medium, ashing away the majority of the organic matter in a 450°C muffle furnace, casting a polyvinyl alcohol (PVA) film on the ashed section, carbon coating the section held in the hardened PVA film, and transferring the section to an electron microscope grid by floatation on hot water. This technique if properly executed leaves sufficient relic of the tissue so that the trained eye can tell where in the tissue an observed particle is located. As no replication step is involved, ambiguities in the final preparation related to this step are removed.

Viewing the grids prepared on Friday at about 11,000X in the electron microscope, we were unable to find any particles which could obviously be identified as talc, however, fibrous structures were observed under higher magnification (30,000X and up) these fibers were identified by Dr. Langer as chrysotile. His method of identification is based on his experiences in observing the fibers of "pure" chrysotile under similar experimental conditions.

The characteristic density profile across the diameter of the fibers is observed at high magnification, and indicates the presence of tubular chrysotile. Evidence such as this was observed in at least one other field in the one sample which was examined.

Light and Electron Microscopy of JOHNSON'S* Baby Powder

Dr. Langer demonstrated his technique for observing "fibrous minerals" in JOHNSON'S* Baby Powder. He shook a small amount of the talc from the container onto a glass slide, applied a drop of immersion liquid (index of refraction in the neighborhood of 1.52) and a cover slip. After examining the sample in the light microscope for a short time he stated that he could pick up some non plate particles that could be amphiboles other asbestos forms, or fibrous

talc (or, in my opinion, talc plate fragments). He said he estimates the amount in this sample to be on the order of one or two percent. He indicated that he has observed the amount of "fibrous" content to vary from sample to sample. He had examined a JOHNSON'S* Baby Powder sample and that of a competitor (which resulted in Kretchmers press release) by the method stated above. In Johnson's Product he estimated 5%, in the other 25% of the particles to be fibroic of which some could be "asbestos". I stress that he makes no attempt to actually count the particles or to identify the fibers at this level of magnification.

Using electron microscopy Dr. Langer has demonstrated to me the presence of some very fine fibers at moderately high magnification which he identifies as chrysotile asbestos by the typical tubular appearance of the fiber.

~~Photographs taken during the session at which I was present are appended.~~

The JOHNSON'S* Baby Powder sample was prepared for electron microscopy by sonifying a small portion of the powder in an excess of water (maybe 25 to 1) for ten minutes. The sonification served to break up agglomerated particles and to disperse the talc. A drop of the suspension was placed on an electron microscope grid and allowed to dry.

In addition to the observation of the tubular structures as an indication of chrysotile Dr. Langer also pointed out the typical thermal behavior of the fiber which is initiated by the heat generated at the sample by the electron beam. The mineral dehydroxylates and the surface of the fibers become amorphous. This process is observed as a slowly altering pattern of density in the microscope image. Eventually the crystal is so deformed by the heat that the fiber may appear to be segmented (~~see Figure 3~~). Although we did not perform selected area electron diffraction on Friday, Dr. Langer has observed these patterns from chrysotile fibers found in JOHNSON'S Baby Powder. Selected area diffraction patterns, though not necessarily specific for a mineral, do allow one to distinguish mineral fibers from non-crystalline artifact. It must again be stressed that Dr. Langer has, to my knowledge, made no particle counts with this technique either.

Summary

1. In the uterus sample from Tenovus, chrysotile rather than talc was found.
2. Chrysotile is identified in the electron microscope by its characteristic tubular appearance (at high magnification).

3. Light microscopy of JOHNSON'S* Baby Powder indicates the presence of fibrous minerals of which, according to Dr. Langer, some could be "asbestos". Neither true quantitative or qualitative analysis was performed.
4. Electron microscopy at high magnification shows a few fibers to be present in JOHNSON'S* Baby Powder which can be identified with chrysotile asbestos according to Dr. Langer. No quantitation was performed.



MOUNT SINAI SCHOOL OF MEDICINE
of The City University of New York
 FIFTH AVENUE AND 100TH STREET · NEW YORK, N.Y. 10039



Department of Community Medicine

November 10, 1971

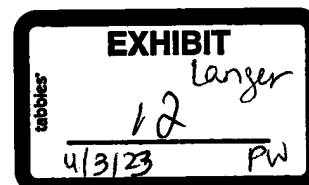
Dr. Gavin Hildick-Smith
 Director of Clinical Research
 Johnson and Johnson
 Research Division
 New Brunswick, New Jersey

Dear Dr. Hildick-Smith:

I have in front of me a letter dated August 9, 1971 addressed to Dr. Selikoff indicating your wish to receive some information on the Tenovus sample that you so kindly lent to us. I have been putting off answering this letter not because I am a feisty devil so much as the fact that I lost the letter on my desk! I called your office last week. You were out and I feel that I would do as well to report to you in writing.

In respect to the Tenovus samples that were sent to us, we made the following observations. We did find some grains that resembled talc with the usual electron diffraction pattern consistent for a sheet silicate structure. Again, we have no definitive means of identifying the particle on the basis of its electron diffraction pattern in that many sheet silicates yield a similar array of spots. We assume that the particles were talc or, rather, were consistent with talc. We also got a few surprises in that we observed some chrysotile asbestos to be present in the tissue as well. We have been kicking this observation around the Laboratory for a while and we might consider a publication somewhere -- just a short note indicating that we have observed these materials present in the tissues.

We have also analyzed one of your talc samples in some detail. In addition to the normal platy talc present, we have observed many "fibrous talcs" as well. This fibrous talc material closely resembles normal platy talc but appears with a greater length aspect. Its terminations are prism terminations and



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Dr. Gavin Hildick-Smith

November 10, 1971

Page Two

and the general characteristics under the electron microscope do indeed resemble normal talc. Electron diffraction on ~~these grains again yields~~ these grains again yields a talc pattern which is a very well-defined hexagonal array of spots. We also observed trace amounts of chrysotile asbestos only when the talc was sonified and markedly dispersed. The amounts of chrysotile are relatively small, occurring in amounts, we estimate, at less than .01%. The J & J baby talc is of quite high quality and as a matter of fact, in relation to the number of samples we have examined thus far, it is the "purest".

We just thought that we would pass this information along to you as our colleagues in scientific research and you may use it as you wish. Again, many thanks for giving us the samples and allowing us to look them over. Incidentally, I am very interested in obtaining some of your material called sodium sesquicitrate which has been bandied about as possessing a structure that is not unlike chrysotile. Do you think you could have one of your research boys send me some of this?

Again, many thanks, and if you need any further information, please don't hesitate to call on me.

Sincerely,



Arthur M. Langer
Associate Professor
Mineralogy

AML:1kh

J&J-0071383

F
December 14, 1971

Dr. Arthur M. Langer
Associate Professor
Mineralogy
Mount Sinai School of Medicine
Fifth Avenue and 100th Street
New York, New York 10029

Dear Dr. Langer:

I should like to thank you for your letter dated November 10, 1971, in which you kindly responded to my letter addressed to Dr. Sellikoff dated August 9, 1971.

You indicated in your letter that you had examined the Tenovus samples which we forwarded to you and other independent investigators for study. The samples forwarded to you were identified as follows:

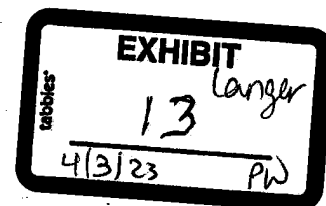
- A. No. 11 - Hospital No. 34907 - Uterus
(1) Surface - Tumor
- B. No. 13 - Hospital No. Ineson (130215)
Ovary (Normal)

It is understood that by the use of electron diffraction methodology you found in the samples grains that resembled talc and that they gave a diffraction pattern consistent for a sheet silicate structure although you have no definitive means of identifying these particles on the basis of their electron diffraction pattern. You also indicate that you observed some chrysotile asbestos to be present in the tissue although you do not mention the method by which you had precisely determined the identification of these particles.

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Dr. Arthur M. Langer

-2-

December 14, 1971

In relation to your observations on the Tenevus samples sent to you for study, it might be mentioned that it is our understanding that no attempt was made by the Tenevus group to prepare the samples under "particle-free" conditions and as such, the possibility of their contamination from the environment cannot be overlooked. It would seem, then, that it is impossible to determine whether the particles are contaminants or in fact were actually contained in the tissue. It is suggested, therefore, that a publication of your observations on potentially contaminated tissue may have limited scientific value.

We were interested to learn of your analysis of our talc samples and the fact that you had observed trace amounts of chrysotile asbestos in amounts you estimated to be less than .01%. We are, of course, somewhat surprised to learn that you found chrysotile asbestos as other independent workers have not so far reported such findings to us and we would like to know exactly the method used to obtain the figure of .01% of chrysotile asbestos and whether this was on a weight or count basis.

In my previous letter, we had requested that the Tenevus samples sent you be returned to us and that we would cover the expenses of your studies. As such, would you kindly forward to me the remaining Tenevus samples. We will be forwarding to you a check for \$1000. drawn on the Department of Community Medicine to cover costs of your studies which, if considered inadequate, please so inform me.

We greatly appreciate your kind interest and cooperation in helping us with the study of the talc sample and Tenevus samples forwarded to you.

Sincerely yours,

Gavin Hildick-Smith, M.D., F.A.A.P.
Director of Clinical Research

GNS:jm

cc: Dr. I.J. Solikoff

bcc: Dr. F.R. Rolle

Dr. W. Nashed✓

Dr. T.H. Shelley

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EXHIBIT
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REVIEW OF CURRENT TECHNIQUES FOR THE ANALYSIS OF FIBERS IN TALC

A. M. Langer, A. N. Rohl, M. S. Wolff,
R. Klimentidis, and S. B. Shirey

Environmental Sciences Laboratory
Mount Sinai School of Medicine

I. INTRODUCTION

A. Talc as a biologically active substance

Occupational exposure to talc dust in the work place has been associated with the development of lung scarring which has been termed talcosis.^{1-3,12,13,15} Clinicians have described talcosis as a fine, diffuse, bilateral progressive scarring which may, if severe, produce disability or premature death. In addition to scarred lungs, reports have suggested that excess malignant tumors occur among these workmen.¹⁴ Some investigators have suggested that "fibrous talcs" possess greater fibrogenicity than the platy varieties.^{6,11} This observation, as well as evidence suggesting that talc-associated diseases resemble asbestos diseases,⁵⁻⁸ has prompted investigators to suggest that the fibers within the talc are the biologically active agents. Yet, a number of clinical observations have demonstrated that nonfibrous platy talc may produce disease in occupationally exposed workmen.⁹⁻¹⁰

Some talc rocks are naturally contaminated with the asbestiform amphibole minerals anthophyllite and tremolite. Both tremolite and anthophyllite exposures have been shown to be associated with excess disease in workmen exposed to these minerals as aerosols.¹⁶⁻²³ Some investigators suggest that *any* fiber reaching the terminal bronchioles and alveolar spaces may induce pathogenic responses,²⁴⁻²⁷ which raises the question whether "pure" talc fiber, with fibrous rather than platy crystal habit, may be biologically active. These interesting observations have prompted the study of the natural mineral contaminants in currently marketed consumer talcums and powders. No evaluation can be made concerning the *possible* biological hazards associated with talc use, either

in an industrial or consumer product setting, unless the nature of the materials themselves are known. One objective of this study was the development of the analytical techniques required to answer this fundamental question.

B. Talc as a mineral

Talc has been defined as a mineral species on the basis of its structure, chemistry and physical properties.²⁸⁻³² Its geological origin is complex. The initial rock-types, metamorphic processes and minerals are so diverse that the talc end-product is often a complex mixture of many magnesium silicate minerals. Laboratory studies of talc mineral synthesis,³³⁻³⁴ and mineralogical studies of the materials themselves^{13,35,36} have demonstrated the intimate association, and, in some instances, intergrowth of talc mineral with other minerals (e.g., tremolite and anthophyllite). Such mineralogical curiosities, now being discovered with increasing frequency, include the "talcboles," which are mineral species consisting of mixed structures intermediate between amphibole double chains and talc infinite sheets.³⁷ Talc rock, as mined, may therefore contain platy talc minerals, talc fibers, asbestiform anthophyllite, tremolite, hexagonite and tirodite, and the fibrous serpentine mineral chrysotile. Numerous other minerals, such as chlorite minerals, the carbonate minerals, pyrophyllite, feldspar, micas and quartz also occur naturally with talc. These have been described in detail elsewhere.³⁸⁻⁴³

C. Talc as used in society

In the United States there are presently several grades of talc commonly in use. These grades are based upon the relative purity of the product, the physical and chemical properties of the material, and its ultimate use. One important grade is pharmaceutical talc, which is used for cosmetic purposes. It is reported to contain at least 90% platy talc mineral, and no detectable asbestos.⁴⁴ Several studies have shown, however, that highly contaminated products have found their way to the market place.^{38,39,45} The analysis of pharmaceutical grade talc, and cosmetic talcum products, has been the subject of a recent report.³⁸ The analytical procedures required for the detection of low-levels of asbestiform minerals in consumer talcs form the basis of the present communication.

II. INSTRUMENTAL TECHNIQUES FOR FIBER ANALYSIS

A number of instruments have been used for the analysis of mineral fibers in talc products, each with its uses and limitations. These techniques include optical microscopy, x-ray diffractometry, and electron beam instrumentation.

A. Optical microscopy

Optical microscopy is a widely used instrumental technique for the mineralogical analysis of talc and talcum products. Dispersion staining enables the investigator to determine the indices of refraction of the object in view.^{46,47} Dispersion staining—using bright field microscopy, with an annular stop—is a standard technique for the identification of minerals. With the use of immersion oils of known refractive indices, and the measurement of the optical properties of the crystalline object studied, mineral identity and chemistry may be determined with great accuracy.

However, there are many limitations to optical microscopic methods.^{38,48,49} The accurate determination of refractive indices is extremely difficult for particles less than 1 μm in width; the optical properties of fibrous minerals commonly found in talc frequently overlap, allowing only tentative identification; orientations of the particles are often random so that only a range of the refractive indices may be measured; optical characteristics such as birefringence may vary greatly from the "standard values" because of small particle size; similar mineral phases may be present in the same specimen producing overlapping properties.

Although light microscopy has severe limitations for the analysis of pulverized rock specimens (talc) it is often suited for the preliminary scan of materials in determining the overall degree of contamination. Mineral phases, present in quantities so small as to

escape detection by x-ray diffractometry, may often be observed by optical microscopic methods. It is well to remember that the light microscope must be used only as a *preliminary* analytical tool since asbestiform mineral fibers, occurring as contaminants in a larger mineral habit, often lie below the resolution of the light microscope.⁴⁹

B. X-ray diffractometry

X-ray diffractometry is one of the standard mineralogical techniques used in the analysis of crystalline substances. Crystalline materials may be subjected to x-ray bombardment and caused to "reflect" from their atomic planes a characteristic x-ray spectrum. This has been termed a structural "fingerprint" and may be used to identify, in most instances, which crystalline phases are present in the sample. The width of the reflections, and their relative intensities, may reflect absolute particle sizes of the phases. In addition to the identity of the mineral phase, shifts in interatomic periodicities may reflect chemical variations.

Powder x-ray diffractometry has been used in both the continuous scan and step-scan modes of operation for the identification of asbestiform mineral phases in talc and talcum products.⁴⁵ These x-ray techniques have also been used to quantitatively determine the asbestiform mineral content of consumer spackling and plastering compounds.⁵⁰ The proper use of this instrument entails the following requirements:^{38,50} 1) the selection of a number of standard minerals of high purity to be used for comparison purposes in the development of calibration standards for quantitative x-ray diffractometry, (i.e., a talc mineral of high purity to be used as a "matrix" and mineral fibers which are not contaminated with other mineral phases); 2) the preparation of talc-asbestiform fiber mixtures for the development of dilution standards for quantitative x-ray diffractometry; 3) the use of a sample preparation technique which is sensitive and reproducible; 4) the selection of non-interfering x-ray reflections specific for an individual mineral species.

In addition to the sample preparation and instrumental factors which affect the reproducibility of the system, a number of other factors affect the lower limits of detection of specific mineral phases dispersed in a talc matrix. These include: instrument geometry, design of x-ray diffraction equipment and proper scan speed, chemical makeup of the various components, particle size of components, preferred orientation of components, sample thickness, sample flatness and mass absorption characteristics of the material. There are also a number of "special factors" which also influence the reproducibility and relative accuracy of these determinations.^{50,52,53,54}

The limits of detection of asbestiform minerals in a talc matrix have been determined³⁸ as follows:

chrysotile, 0.25 to 0.5%; tremolite, 0.1%; anthophyllite, 2.0%. These detection limits are based upon the establishment of standard dilution curves which were determined from binary systems, although in most talc mixtures there are often two or more mineral phases. The sorption characteristics of major components are such that the comparison of unknown mixtures with the standard dilution curves yield conservative estimates of asbestiform mineral concentration.

Recently, the question has been asked: are fibrous amphiboles in talc equivalent to their asbestos analogs? For example, asbestos and asbestiform (non-asbestos) varieties possess different optical properties based on fiber structure (contiguous vs. parallel intergrowth of subunits) and their different cleavages.^{60,61} Both asbestos and asbestiform (non-asbestos) mineral analogues possess cleavage parallel to (010). Whereas rock-forming amphiboles possess prominent (110) cleavage, the asbestos analogues apparently do not. One can readily appreciate the importance of a preparation technique which eliminates such orientation effects.

The major drawback of x-ray diffractometry as an analytical tool in determining the fiber contents of talcs and talcums is the inability to distinguish shape (i.e., asbestiform particles from fragmented fibers or equidimensional particles). To do this requires the use of other instrumentation, particularly light or electron microscopy.

C. Transmission electron microscopy (TEM)

Since the size distribution of fibers in talcs and talcum products is often smaller than the resolution limit of light optical microscopy, large numbers of fibers may not be detected by this technique. TEM affords the opportunity to examine all particles visually and permit identification and characterization in most instances.

Talc may be prepared for TEM examination by sonically dispersing in distilled and filtered water, and directly pipetting onto Formvar-carbon-coated 200 mesh nickel locator TEM grids. After drying, the grids may again be carbon-coated to ensure a thermally and electrically stable preparation. Sonically dispersed aliquots may also be directly filtered through membrane or polycarbonate filters and directly transferred onto TEM grids through chemical dissolution techniques. Again, a film of a conductive material is required to ensure stability under the electron beam. (These techniques are described in many papers at this conference.) An alternative technique disperses particles in a drop of nitrocellulose solution on a glass slide. A second glass slide is placed on the first and the two are drawn apart, lightly, leaving a film. Films are then directly transferred to TEM grids. This technique is intended

to minimize the alteration of particle size distribution.

Samples thus prepared should be examined by TEM using accelerating voltages in excess of 100KV to ensure particle penetration. Scan magnifications may vary from 1500X to 40,000X direct.^{48,58}

The visualization of diffraction contrast images on the TEM screen, and their photographic recording, is necessary. Morphological characteristics, including length to width ratios, diffraction contrast figures, cleavage characteristics, edge characteristics and beam damage sequelae may be used in the characterization and identification of fibers in talc.^{55,60} Although amphibole fibers in talc may possess various morphologies, chrysotile fibers may be identified on a morphological basis alone.^{48,55,60,62}

While amphibole fibers may be distinguished from chrysotile on a morphological basis, very often it is difficult to distinguish talc fiber from amphibole fiber in the same specimen. Occasionally, talc fibers possess prismatic truncations which help distinguish between these mineral types. The morphological data determine length to width ratios and the size distribution of the fibers present. Often, structural characterization is required to distinguish between these mineral types.

D. Selected area electron diffraction (SAED)

Utilizing TEM, the diffraction image in the back focal plane of the objective lens may be focused on the viewing screen by means of defocusing the intermediate lens. In this manner, the image of the scattered electrons, related to diffraction effects consistent with the Bragg geometry, may be observed on the TEM screen.

Crystalline materials tend to scatter electrons in regular patterns which are related to the arrangement of atoms and the interplanar spacings between the atoms. This geometry is similar to that of the Laue method (fixed crystal and film) which enables the microscopist to determine interplanar spacing dimensions and planar angular relationships.^{55,57,58,60,62} A number of papers have been published which also deal with this technique (e.g., see Lee, this conference⁵⁹). SAED patterns have been described for chrysotile,^{55,60,62} for the amphibole asbestos minerals,^{48,61} and for fibrous minerals in talc.³⁵

For most accurate results, gold can be evaporated onto the same surface for use in calculation of the camera constant of the instrument. Because of the small particle size of evaporated gold, its selected area electron diffraction pattern consists of Debye-Scherrer rings. Gold, having known interplanar spacings, may be used to accurately determine the camera constant of the instrument under those specific conditions of operation. After obtaining a SAED pattern on a single fiber of interest (with

superimposed gold "rings"), the analyst may accurately determine the fiber interplanar spacings. Routinely, the pattern is photographed on film, cut to an appropriate size to fit a Philips film reader, and reflection periodicities measured to within $\pm 0.01\text{mm}$. Preliminary evaluation of the pattern permits determination of the Laue zone.

Generally, the two reflections nearest the center (000) are measured and their distances and angular characteristics determined. These reflections are assigned an index, and the calculated spacings and angular characteristics compared with known values for the mineral species. This technique has recently been automated.⁵⁸

The published patterns for amphiboles are varied, reflecting not only different mineral species, but a number of variables which are both specimen and instrumental in nature. One of the major shortcomings in obtaining a characteristic SAED pattern from an amphibole is the orientation effect. Asbestiform amphiboles (rock-forming silicates) normally cleave with a (110) or (210) orientation. Asbestos fibers, on the other hand, do not cleave well in these directions but rather in the (010) plane.⁶¹ In effect amphibole asbestos patterns are produced with bc planar projections, displaying b^* and c^* axes and periodicities. Occasionally, one sees the same projection for the asbestiform amphiboles, but this is not as common. Frequently the use of a goniometer stage is required for reorienting these crystals along a principal zone axis so that one of the principal Laue zone axes is obtained. Thin fibers often do not yield enough constructive interference for the production of SAED patterns; thick fibers do not permit penetration of the beam, and therefore do not produce patterns at all. Intermediate between these dimensions (which are related to a number of factors including accelerating voltage of the instrument) a range of diffraction effects may occur, from a two-dimensional array to a more complex three-dimensional array. This has yet to be studied.* Yet, despite these difficulties, one may distinguish amphibole fibers from talc fibers. In the future, with careful work, perhaps amphibole species may be distinguished with this technique.⁵⁹

E. Electron microprobe analysis of single crystals

The electron microprobe technique is based upon the concept that high energy electron bombardment of solid inorganic specimens causes the generation of x-rays characteristic of the elements present in

that particular specimen. There are two major probe techniques used for microchemical analysis today: wavelength dispersive focusing crystals, and energy dispersive x-ray analysis. A comparison of both techniques has recently been made.⁶²

The analysis of single fibers has been achieved utilizing both of these probe techniques.^{48,64} There are a number of sample and instrumental factors, which affect the output of chemical information with the x-ray spectrometry method. Although we have used wavelength dispersive focusing crystals, with excellent resolution, the system is relatively inefficient. The time of elemental scan is increased by the fact that only one element may be analyzed per unit time per crystal, and extremely high beam currents are required for small particle analysis. Although large crystals are easily analyzed with the wavelength dispersive technique, the time of elemental scan is such that it precludes large numbers of fibers from analysis.

Utilizing energy dispersive systems (EDXA) and field emission ("cold cathode") electron sources, virtually any fiber in a talc sample may be analyzed in an extremely short period of time. Although the ability to resolve light elements is not as good as with the wavelength dispersive system, the method is rapid and an entire spectrum may be obtained (atomic No. 11 and higher) in a short time. One of the drawbacks to this method is the requirement that the energy dispersive x-ray spectrum be compared with standards. The chemical information consists of a complex spectrum consisting of the specific line of interest, background radiation, and other superimposed peaks. Methods are now being developed for digital spectrum filtering of the peaks of interest, in which the entire spectrum is parameterized by a square search function.⁶³ Semiquantitative chemical analysis of unknown particles may be obtained in the near future.

Microchemical analysis of amphibole fibers is currently required for unique identification.⁴⁸ A number of reports at this conference concur that this technique is indispensable for single fiber analysis.

F. Other techniques

We have found that a bulk chemical analysis, with trace metals of the materials under investigation aids the identification of fibers in talc.³⁸ For example, knowledge of the total iron content of the sample may yield information as to the amount of anthophyllite in the sample when compared with the alumina, soda, and potash contents (which are also related to the chlorite, mica, and feldspar present). Silica content reflects both sample purity in terms of chlorite content and quartz content of the samples. Lime content may be used to gauge the carbonate and tremolite contents of the sample.

* The subject was discussed informally with Dr. Malcolm Ross at the symposium. Scientists using this technique note that some of the different diffraction patterns produced with the 1000 KV TEM, may in part be due to diffraction on thick crystals. The 1000 KV beam is able to penetrate these objects sufficiently to produce diffraction patterns. Workers who use 100 KV machines will essentially be dealing with "thin crystals" and may produce substantially different patterns.



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Environmental Sciences Laboratory
Mount Sinai School of Medicine

double chains and talc infinite sheets.³⁷ Talc rock, as mined, may therefore contain platy talc minerals, talc fibers, asbestiform anthophyllite, tremolite, hexagonite and tirodite, and the fibrous serpentine mineral chrysotile. Numerous other minerals, such as chlorite minerals, the carbonate minerals, pyrophyllite, feldspar, micas and quartz also occur naturally with talc. These have been described in detail elsewhere.³⁸⁻⁴³

CONSUMER TALCUMS AND POWDERS: MINERAL AND CHEMICAL CHARACTERIZATION

A. N. Rohl, A. M. Langer, I. J. Selikoff, A. Tordini, R. Klimentidis

Environmental Sciences Laboratory, Mount Sinai School of
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New York, New York

D. R. Bowes, D. L. Skinner

Department of Geology, The University of Glasgow,
Glasgow, Scotland

Representative consumer talcums and powders, including 20 body powders, baby powders, facial talcums, and also one pharmaceutical talc, were analyzed to determine their mineralogical and chemical composition. Where known, all were formulated prior to 1973. Of the 20 products 10 contained detectable amounts of tremolite and anthophyllite, principally asbestiform, while some also contained fragmented forms of these minerals. The amounts ranged from tenths of a percent to over 14% by weight; two contained detectable amounts of chrysotile asbestos fiber. Eight contained quartz, seven ranging from 2 to 5%, with one as high as 35%. The analyses showed that the consumer products examined were rarely the pure mineral talc, but rather were mixtures of various minerals; some samples consisted of three to five minerals, only one of which was talc. Other common mineral phases included chlorite, platy serpentine, pyrophyllite, mica, and carbonate minerals. Kaolin additive was identified in two products. The single pharmaceutical talc examined contained only a trace amount of quartz.

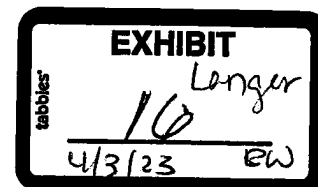
The chemical composition of these products, including both major oxide and trace element content, correlated with their mineral components. Four samples contained substantial concentrations of nickel, cobalt, and chromium, suggesting lattice substitution or the presence of trace mineral phases. Geological provenance of the talcs may be ascertained on the basis of chemistry. Possible adverse health effects from intermittent use of these products, especially those that contain asbestiform and fragmented anthophyllite and tremolite, chrysotile, quartz, and trace metals, are presently unknown and warrant evaluation.

INTRODUCTION

Consumer talcums and powders are considered by the general public to be talc, an impression that is conveyed and strengthened by the product

This study was supported in part by grant ES 00928 from the National Institute of Environmental Health Sciences. One of us (AML) received support under Career Scientist Award ES 44812, National Institute of Environmental Health Sciences.

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names and ingredients listed on the container labels. However, knowledge of the geological occurrence and mineralogical character of source materials suggests the nature of talc to be highly variable and complex. Twenty-one consumer talcums and powders (Table 1) were mineralogically and chemically analyzed to determine whether these products are actually talc mineral.

Talc is a defined mineral entity, based on specific chemical, crystalline, and physical properties (Ford, 1957). The empirical chemical formula, $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$, is seldom observed in nature as a result of cation substitution. For example, magnesium is frequently replaced by iron, nickel, chromium, or manganese in the crystal structure. Talc is a sheet silicate, with a structural unit consisting of three layers; a sheet of octahedrally coordinated magnesium hydroxide groups is sandwiched between two layers of tetrahedrally linked silica layers. The Van der Waals bond between the talc sheets are of low energy accounting for the ease with which talc as well as other sheet silicate minerals (micas, clays) cleave

TABLE 1. Designation of Contents in Brand Name or Label

Sample no.	Date of formulation
Products designated as talcs	
3	Not available
8	Not available
12	Approximately 1972
7	September 1972
17	Not available
6	April 16, 1973
19	May 1973
21	Not available
Products designated as powders (talc on label)	
4	December 1970
18	Not available
20	December 1970
5	February 1973
16	Not available
Products designated as powders (or dust)	
1	Between January 1968 and July 1970
14	October 3, 1970
15	Between October 1970 and March 1973
9	February or March 1973
11	July 1969
13	July 16, 1970
2	Not available
10	Approximately 1972

or break into platy fragments. This facile cleavage, with resultant high surface area, and its softness, small particle size, and whiteness confer upon talc its usefulness as a cosmetic material.

GEOLOGICAL OCCURRENCE OF TALC

Talc rocks (including those commercially worked) are formed by several complex geological processes reacting upon many possible, chemically diverse preexisting rock types. Hydrothermal alteration of magnesia- and silica-rich ultramafic rocks, under a range of low-to-moderate temperatures and pressures, may produce talc. Thermal metamorphism of silica-rich dolomite $[\text{CaMg}(\text{CO}_3)_2]$ will produce talc as well. These processes, however, also commonly result in the formation of a number of other coexisting mineral phases, predominantly hydrous magnesium silicates. Some of these, for example, anthophyllite, tremolite, and serpentine minerals (including chrysotile), occur as microscopic intergrowths with talc, as macroscopic nodules, or even as discrete zones within or adjacent to talc (Table 2). Talc rock is therefore generally not monominerallic but is often a mixture of minerals that may vary widely with respect to kind and quantity. Phlogopite, a magnesium mica, and chlorite, a group of minerals related to the micas, are also commonly associated with talc. Some of these associated mineral phases are asbestiform amphiboles and chrysotile (see discussion of the terms asbestos and asbestiform in Appendix A). Conversely, talc has been described as a common accessory mineral in commercial asbestos deposits (Hurlbut and Williams, 1935).

Talc deposits may be zoned, with different mineral assemblages physically changing in occurrence and proportions over extremely variable

TABLE 2. Minerals that Commonly Occur in Talc Deposits

Mineral group	Phase	Formula
Carbonates	Calcite	CaCO_3
	Dolomite	$\text{CaMg}(\text{CO}_3)_2$
	Magnesite	MgCO_3
Amphiboles	Tremolite ^a	$\text{Ca}_2\text{Mg}_5\text{Si}_8\text{O}_{22}(\text{OH})_2$
	Anthophyllite ^a	$(\text{FeMg})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$
Serpentine	Antigorite	$\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$
	Chrysotile (uncommon)	$\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$
	Lizardite (uncommon)	$\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$
Others	Quartz	SiO_2
	Mica, e.g., phlogopite	$\text{K}_2(\text{Mg,Fe})_6[\text{Si}_6\text{Al}_2\text{O}_{20}](\text{OH})_4$
	Chlorite, e.g., penninite	$(\text{Mg,Al,Fe})_{12}[(\text{Si,Al})_8\text{O}_{20}](\text{OH})_{16}$
	Pyrophyllite	$\text{Al}_4[(\text{Si}_8\text{O}_{20})](\text{OH})_4$

^aOccurring as fibrous and nonfibrous forms. Other trace mineral phases are often present but are not included.

distances, ranging from centimeters to tens of meters. Mineral phases in such deposits may include talc plates and fibers, tremolite and anthophyllite fibers, intergrowths of amphibole and talc, serpentine minerals (which may include chrysotile), and free silica (quartz) (Ross et al., 1968). The fiber intergrowth is often such that even extensive beneficiation may not yield a pure product. Thus, where fine-grained intergrowths of talc and tremolite occur, the processed product will likely contain residual tremolite. Further details concerning the crystal chemistry, structure, synthesis, and geological occurrence of talc are found in Appendix B.

INDUSTRIAL AND COSMETIC GRADE TALCS

It is generally recognized that various commercial grades of talc are marketed in the United States (Appendix C). Hildick-Smith (1976) has stated that a talc suitable for pharmaceutical purposes, used in cosmetic and toiletry products, contains at least 90% talc mineral and no detectable asbestos. Such stated compositional restrictions are not placed on industrial grade talcs. One study demonstrated that a number of industrial talcs contained substantial quantities of tremolite, up to 87% by weight of the sample (Schulz and Williams, 1942).

In 1968, a study (Cralley et al., 1968) of 22 cosmetic talcum products demonstrated fiber contents ranging

from 8 to 30% by count with an average of 19%. The fibrous material was predominately talc but probably contained minor amounts of tremolite, anthophyllite and chrysotile as these are often present in fibrous talc mineral deposits.

With the exception of 4 of the 22 cosmetic talcum products analyzed, the levels of free silica, cobalt, nickel, chromium, and manganese were generally of a low magnitude and within a narrow range. . . . The levels of silica, chromium, and nickel in these four products are sufficiently high, however, to be of concern in their potential to cause disease.

Thus, as late as 1968 some consumer talcum products marketed in the United States contained asbestiform minerals, free silica, and trace metals.

HUMAN DISEASE ASSOCIATED WITH TALC EXPOSURE

For nearly half a century a number of reports have shown that occupational exposure to talc dust is associated with a fine diffuse interstitial lung scarring known as talcosis. Fibrous talcs appeared to be more pathogenic than platy talcs, producing in addition to talcosis, increased risk of malignant tumors in exposed workers (Kleinfeld and

Messite, 1960; Kleinfeld et al., 1967). Studies concerning the biological consequences associated with talc dust exposure, including cancer, are referred to in Appendix D.

OBJECTIVES OF THE PRESENT STUDY

Twenty-one samples of consumer talcums and powders, including baby powders, body powders, facial powders, and a pharmaceutical talcum, were obtained at retail stores in the New York City area. These samples were acquired and studied during the period 1971-1975 (Table 1). The major purpose of the study was to determine the mineralogical and chemical composition, with particular emphasis on the quantitative determination of tremolite, anthophyllite, serpentine minerals, and quartz. Another objective was to establish a base line for consumer talcums and powders, based on a sampling of products available during the period 1971-1975. This base line provides an index for evaluating possible changes in subsequent formulations.

METHODOLOGY AND RESULTS OF MINERAL AND CHEMICAL CHARACTERIZATION

The analytical techniques employed for mineral identification and quantification included optical microscopy, transmission electron microscopy with selected area electron diffraction, X-ray diffraction, and scanning electron microscopy with X-ray analysis capabilities. Chemical determinations (bulk chemistry and trace metals) were made with a number of standard instruments and geochemical techniques, including spectrophotometry [SiO_2 , TiO_2 , Al_2O_3 , total Fe (Fe_2O_3 by difference from FeO), P_2O_5]; atomic absorption (MnO, MgO, CaO); flame photometry (Na_2O , K_2O); wet chemical assay (FeO); weight loss, volatiles (H_2O , CO_2 , organics). X-ray fluorescence was used for all trace metals (Bowes and Langer, 1974).

Optical Microscopy

Optical microscopy is a conventional technique for the identification of minerals and for the study of mineral relationships. A microscope equipped with bright field illumination and polarized light optics was used to analyze the cosmetic powders. Approximately 0.5 mg of powder was placed on a precleaned glass slide and immersed in index oils of known refractive indices. These were checked on a refractometer. The information obtained on particles with this method included most of the measurable optical properties, including indices of refraction, extinction angles of fibers, general morphology, and size characteristics of mineral phases (Fig. 1). In coarse-grained powders, fibers could be identified (tremolite, anthophyllite, talc). Two samples contained cornstarch, easily recognized

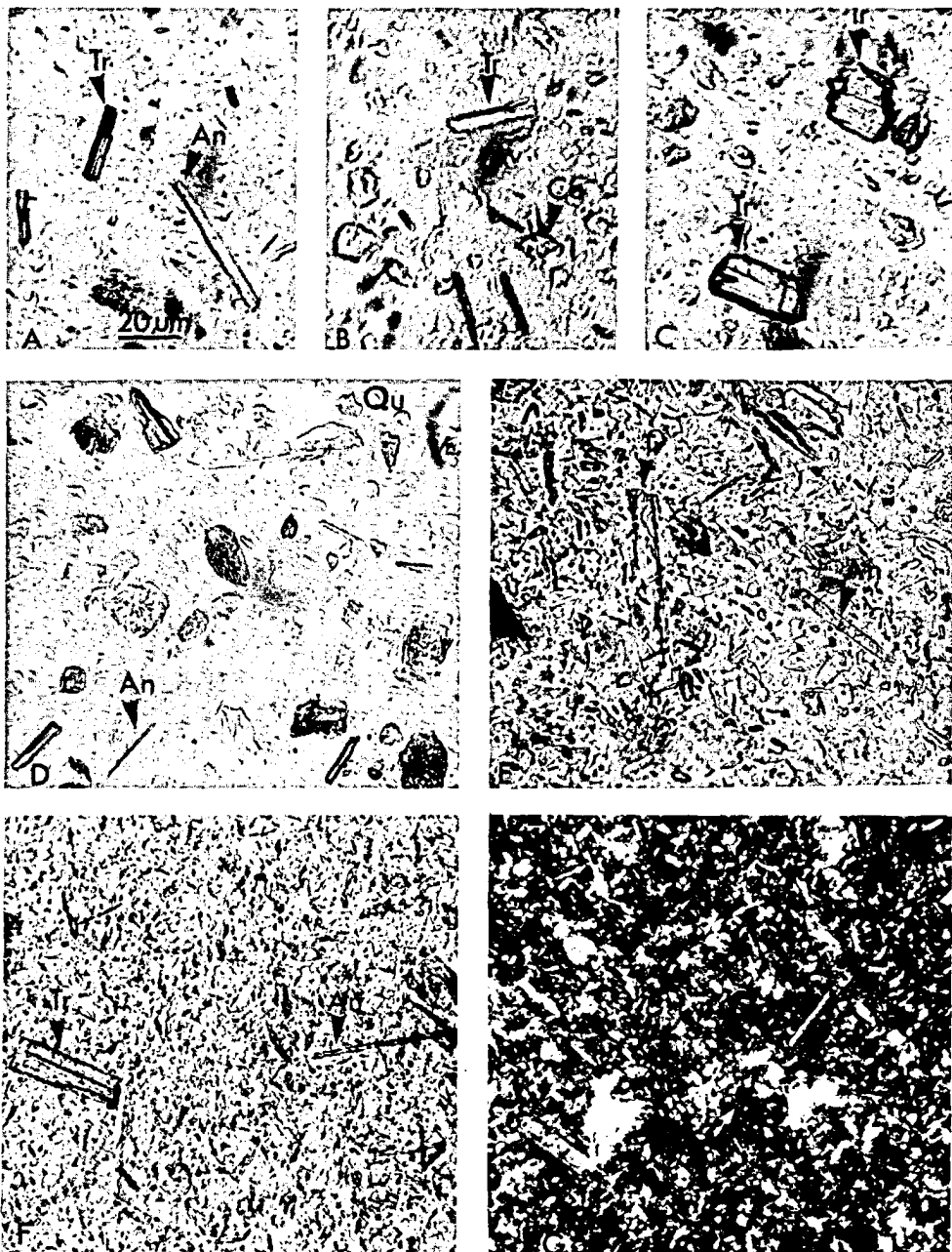


FIGURE 1. Optical photomicrographs of cosmetic talcums and powders grossly contaminated with asbestiform minerals. Photos obtained in plane polarized light (A-F) and between crossed polars (G). Scale in (A) for all photos. Fibers shown have optical properties consistent with tremolite (Tr) and anthophyllite (An). Quartz grains (Qu) and calcite fragments (Ca) are also shown. Most tremolite fibers tend to possess smaller length-to-width ratios than anthophyllite. Tremolite is observed as fragments (C). Photo obtained between crossed polars (G) also demonstrates the presence of fibers in the matrix material. Asbestiform length-to-width ratios measured up to 20:1 (F).

by morphological and optical characteristics. One product consisted entirely of cornstarch.

In most samples, however, the powders were too fine grained, with particle dimensions significantly less than 1.0 μm , for the technique to be useful. The limiting factor for determination of optical constants, and hence for identification of particles, is the resolving power of the microscope. The presence of talc fibers, which may have indices of refraction similar to amphibole (tremolite, anthophyllite) fibers, also confounds analysis. Therefore, although this technique is an excellent diagnostic instrument in some instances these restrictions limited its usefulness.

Other investigators have experienced similar difficulties. For example, in a study of the asbestos content of talc (Stanley and Norwood, 1973), there was difficulty in applying optical microscopy to the problem. The authors concluded that optical microscopy

while it works well on pure samples of fairly massive fiber length from 3 to 5 microns, our observations by transmission electron microscopy have shown that *naturally occurring asbestiform minerals often lie below the working resolution capabilities of the light microscope* and furthermore while massive fiber bundles can often be observed by either light or electron microscopy the observation of individual fibers smaller than 0.5 by 0.2 micrometers often will require the high resolution capability of the transmission electron microscope (emphasis added).

It is further stated that "light microscopy was helpful only in screening samples with large particles and high concentrations of objectionable fibers."

By comparing the results of optical microscopy with those of quantitative X-ray diffraction and electron microscopy, we observed that large numbers of fibers go undetected. In addition to the restraints of resolution imposed by light microscopy, another major drawback relates to the strong tendency of asbestiform minerals to cleave or break along planes of weakness when they are crushed, producing large numbers of small fibers. For example, light microscopic examination of a talc sample (no. 8), which contains over 7% tremolite (see Table 4), demonstrates the presence of mineral fragments that are primarily not asbestiform (Fig. 1C). However, electron microscopic examination of the same sample demonstrates that many of the submicroscopic tremolite particles are fibrous (see Fig. 3E). The problem involving the determination of the relative proportions of each of these morphological phases in the same sample (mass vs. number) is presently unresolved. Basically, the large fibers are broken during milling yielding a new size distribution in the submicroscopic range.

X-ray Diffraction

The application of X-ray diffraction analysis in step-scan mode for quantitative determination of asbestos in talc has been described in detail (Rohl and Langer, 1974), including the selection of talc and asbestos reference materials, the preparation of standard dilutions of asbestos minerals in talc to ensure sensitivity and reproducibility, the selection of characteristic X-ray reflections to be scanned, and instrumental technique.

Selection of talc mineral standard. Screening of various types of talcs for use as reference material was made by X-ray diffraction and transmission electron microscopic analysis. A continuous scan was first made to identify the major mineral phases present. Talcs that showed the presence of any serpentine mineral, tremolite, or anthophyllite were eliminated as reference materials. The possibility of false negatives for these minerals was checked by step scanning the diagnostic reflections (Table 3). Further verification of the absence of asbestiform minerals was made by transmission electron microscopy. These techniques permitted the selection of a matrix talc that was completely free of asbestiform minerals.

Chlorite minerals are hydrous iron-magnesium silicates, frequently associated with talcs. Their presence may interfere with the detection of serpentine minerals, both platy (antigorite) and fibrous (chrysotile). This is particularly true if they are present in equal or larger amounts than these latter minerals. Two intense basal reflections at 14.2 Å (001) and 7.1 Å (002) are characteristic of chlorite minerals. The latter reflection occurs close to the (002) reflection of serpentine minerals (7.3 Å). The 3.66 Å (004) reflection of serpentine was selected as diagnostic (Table 3), since the lower intensity (004) reflection of chlorite (3.53 Å) in this region was found not to cause interference.

Selection of the asbestos standard. Reference samples of pure asbestos minerals were obtained from various mineral collections and from the International Association for Research on Cancer (IARC). These were screened for purity and particularly for the presence of interfering contaminants according to the procedures previously described for talc. Two different specimens of chrysotile were used as reference materials: a triple air-jet milled sample from the Jeffrey Mine, Quebec (provided by the Johns-Manville Corp.) and a specimen from Coalinga, California (provided by the Calidria Division, Union Carbide Corp.).

Sample preparation. Among the variables that strongly influence the precision and accuracy of quantitative X-ray diffractometry are particle size, preferred orientation, and surface flatness. Variation due to particle size can be minimized by crushing and screening the asbestos and talc standards to ensure a uniform size distribution, with an effective crystallite dimension on the order of 5 µm or less. The effect of preferred orientation is more difficult to control. The tendency for preferred orientation is largely the function of mineral cleavage properties. Both the talc and the asbestos minerals have excellent cleavages, platy in talc and

TABLE 3. Calibration Curve Data for the Determination of Asbestiform Minerals and Quartz in Talc by X-ray Analysis^a

Parameter	Mineral phase			
	Anthophyllite	Chrysotile	Quartz	Tremolite
Miller index of diagnostic reflection	(210)	(004)	(211) ^b	(110)
Corresponding <i>d</i> -spacing (Å)	8.26	3.66	1.54	8.38
Relative intensity	55	80	15	100
Step-scan interval (2 theta)	10.0-11.0	23.5-25.0	59.5-60.5	10.0-11.0

Percent mineral in talc and corresponding area of reflection							
Anthophyllite		Chrysotile		Quartz		Tremolite	
%	in. ^{2c}	%	in. ²	%	in. ²	%	in. ²
5.0	0.92	0.25	0.01	5.0	2.75	0.1	0.13
10.0	2.35	0.5	0.03	10.0	3.75	0.5	0.30
15.0	3.99	1.0	0.08	20.0	7.11	2.2	0.43
20.0	4.65	2.0	0.22	25.0	9.30	2.7	0.67
25.0	5.12	5.0	0.94	30.0	13.20	4.3	1.25
30.0	7.22	7.0	1.52	40.0	16.90	5.0	1.65
35.0	9.92	8.5	2.21	—	—	7.0	2.08
—	—	8.9	2.34	—	—	10.0	2.80

Detection limit			
Wt % Anthophyllite	= Area (210) = 0.27 (%An) - 0.52 R ² = 0.95		2.0%
Wt % Chrysotile	= Area (004) = 0.27 (%Ch) - 0.50 R ² = 0.98		0.7%
Wt % Quartz	= Area (211) = 0.43 (%Q) - 0.60 R ² = 0.96		1.4%
Wt % Tremolite	= Area (110) = 0.28 (%Tr) - 0.04 R ² = 0.98		0.1%

^aInstrumental settings: target/filter, Cu/Ni, 45 kV/20 mA; scintillation counter, 1450 VDC; monochromator, graphite; pulse-time analyzer, 20 V, 5 V (width, level); continuous scan, 1° 2 θ /min; step-scan, 0.02° 2 θ at 2,000 counts fixed.

^bRhombohedral index.

^cRepeated measurements of areas under curves with a polar planimeter indicated average deviation of ± 0.02 -0.05 in.².

fibrous in the case of tremolite, anthophyllite, and chrysotile (see Rohl and Langer, 1974, Fig. 2). In attempting to reduce or eliminate the effects of preferred orientation in X-ray analysis, a number of sample preparation and instrumental techniques have been developed (Bragg, 1967; Brindley and Kurtossy, 1961; Cullity, 1956; Klug and Alexander, 1954). In the present study these techniques were tested, but none was found to provide adequate precision (reproducibility). Accordingly, a sample preparation technique was developed that was successfully used, in conjunction with X-ray diffraction in the step-scan mode, to detect diagnostic reflections of these minerals in a talc matrix over a range of concentrations (Table 3).

The reproducibility of reflection intensities was also greater than other preparation techniques tested.

Binary dilution standards of chrysotile, anthophyllite, and tremolite in talc were prepared gravimetrically. Asbestos fiber concentrations were prepared initially at 5.0, 4.0, 2.0, 1.0, 0.5, 0.2, and 0.1%. Fifty milligrams of the talc-asbestos mixtures were homogenized in 10 ml filtered water utilizing ultrasonic energy. This slurry was poured into a 30 cc syringe and filtered through a 0.22 μm pore size membrane filter. To prevent stratification due to differential particle size and density effects, the syringe is held in a horizontal position, rotated, and shaken during filtration. The residue forms a flat cake of about 0.5 mm uniform thickness on the membrane filter. When dried, the sample is affixed to a glass slide for X-ray diffraction analysis (Rohl and Langer, 1974).

Selection of X-ray reflections. Because of crystal structure similarities in the minerals being studied (i.e., tremolite and anthophyllite), considerable overlapping and interference of X-ray reflections occur. The low symmetry and consequent complex X-ray diffractograms of such minerals as talc, chlorite, and mica, as well as possible interferences from admixed phases such as kaolinite, make it necessary to select a reflection or set of reflections for each mineral component that could be used as an index of the amount of that mineral in a mixture. Such diagnostic reflections were selected by referring to standard X-ray powder diffraction data. These diagnostic reflections were step-scanned at 0.02° 2θ in a fixed count mode (2×10^3 counts). Precise positions and profiles of the diagnostic reflections were determined. In the fixed count mode, each of the angular intervals selected are scanned with equal accuracy. Thus weak reflections can be determined with equal precision as high intensity reflections. The statistical accuracy depends only on the total number of counts recorded, and the counting rate selected gives a percentage probable error of about 2%. Profiles of the diagnostic reflections, plotted as a function of number of counts vs. 2θ , are measured with a compensating polar planimeter. The intensity of a reflection is proportional to, but not necessarily a linear function of, its concentration. Other factors that may influence reflection intensities include instrumental conditions, particle size, degree of preferred orientation, sample thickness and flatness, and absorption characteristics (Klug and Alexander, 1954; Rohl and Langer, 1974).

Figure 2 shows calibration curves obtained for chrysotile, anthophyllite, tremolite, and quartz using the step-scan technique. Measured areas of diagnostic reflections are plotted against percent dilution in talc. As indicated in Table 3 tremolite may be determined at levels as low as 0.10% by weight, chrysotile from 0.25 to 0.50%, and anthophyllite, as low as 2% in talc. It is important to note that the limits of detection given in Table 3 are higher and based on a best fit regression analysis. For example, regression analysis indicates that the detection limit for chrysotile is 0.7%, whereas from 0.25 to 0.5% can be actually detected,

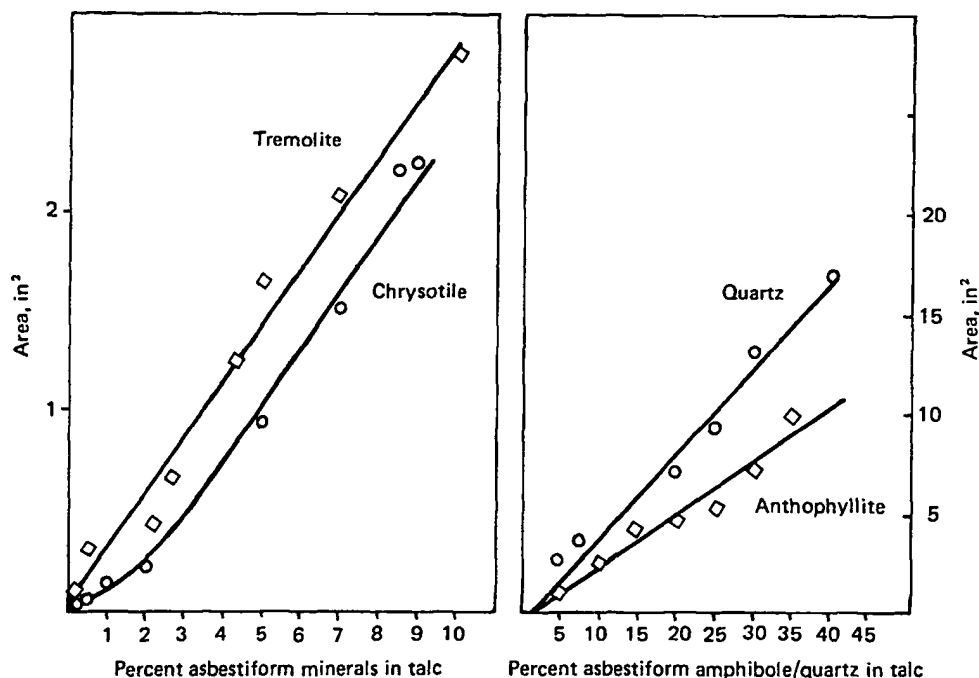


FIGURE 2. Calibration of asbestiform amphiboles and quartz in talc.

depending on particle size, degree of crystallinity, etc. The changes in slope at the lower end of the curves are not reflected so that axial intercepts are exaggerated on the high end of the abscissa.

By using X-ray diffraction in the step-scan mode, Stanley and Norwood (1973) were able to detect a minimum of 0.25% tremolite in talc and a minimum of 0.5% chrysotile and the other asbestiform minerals. However, such low levels of chrysotile were not detected when chlorite was present.

Step scanning. The contents of the containers were thoroughly mixed with a sample splitter to avoid stratification effects. Aliquots of each, weighing 50 mg, were prepared using the identical methodology described for preparation of the dilution standards. The filter-mounted samples were then step scanned over the goniometric intervals diagnostic for the standard asbestiform minerals and quartz. Instrument operating conditions were identical with those used for analyzing the dilution standards. Profiles plotted for the diagnostic intervals and reflection areas after peak stripping were measured by polar planimetry. The weight percents of anthophyllite, tremolite, and quartz contents were estimated by referring to the appropriate regression curve. The quantities of asbestiform materials in the 21 talcums and powders found by this technique are shown in Table 4. The results show that 10 of the 21 samples contain amphibole

minerals, ranging in amounts from a few tenths of a percent to over 14%. Tremolite was the most commonly found (9 of the 21), and anthophyllite occurred with tremolite in 6 of the 21. A serpentine mineral phase was indicated in two samples, in amounts at or near the lower limits of detection. Verification of the serpentine phase as chrysotile in the two samples in amounts corresponding to the observed concentrations was made by electron microscopy.

Continuous scanning. In order to study the presence of all mineralogical (and possibly other crystalline) components the samples were scanned from 5° to 70° 2θ at a scanning rate of 1° 2θ per minute. This technique, as expected, proved satisfactory for the identification of major components, but it was generally found to be incapable of detecting tremolite, anthophyllite, or serpentine minerals except in cases of gross contamination. The high noise level (low peak-to-background ratio) often prevents the detection of quantities on the order of 4–6% or less and also excludes this technique for quantitative analysis. As a result of high noise level three false positives, as indicated by continuous scanning, were subsequently shown to be negative for amphibole by step scanning and electron microscopy. In addition, continuous scanning may not generally detect serpentine minerals in the presence of chlorite or kaolinite.

Electron Microscopy and Electron Diffraction

The transmission electron microscope has been shown to possess the sensitivity required for fiber identification and for determination of particle size distribution of submicroscopic particles (Langer and Pooley, 1973; Langer et al., 1973).

Accordingly, aliquots of talcum samples were prepared for electron microscopic analysis by a technique that disperses particles in a drop of nitrocellulose solution on a glass slide. A second glass slide is placed on the first and the two are drawn lightly apart, leaving a film. This technique is intended to minimize the alteration of particle size distribution. The film is mounted on electron microscope grids and scanned at magnifications of X20,000.

Morphologically, amphibole minerals are generally quite dissimilar from other silicate minerals. Both anthophyllite and tremolite are rectilinear, often with amphibole-type step cleavage or, infrequently, with prismatic terminations. Tremolite fibers tend to be electron dense and shorter than anthophyllite (Fig. 3), while the latter has a tendency to be electron translucent and to show diffraction contrast figures (Langer and Pooley, 1973). Sheet silicate minerals (talc, chlorite, micas) tend to be equidimensional in shape, often with pseudo-hexagonal outlines (Fig. 4). Curled talc plates or talc fibers on edge may superficially resemble asbestiform minerals, but selected area electron diffraction patterns easily distinguish between the two (compare Fig. 5A, C, and D).

Electron microscopy, in combination with selected area diffraction,

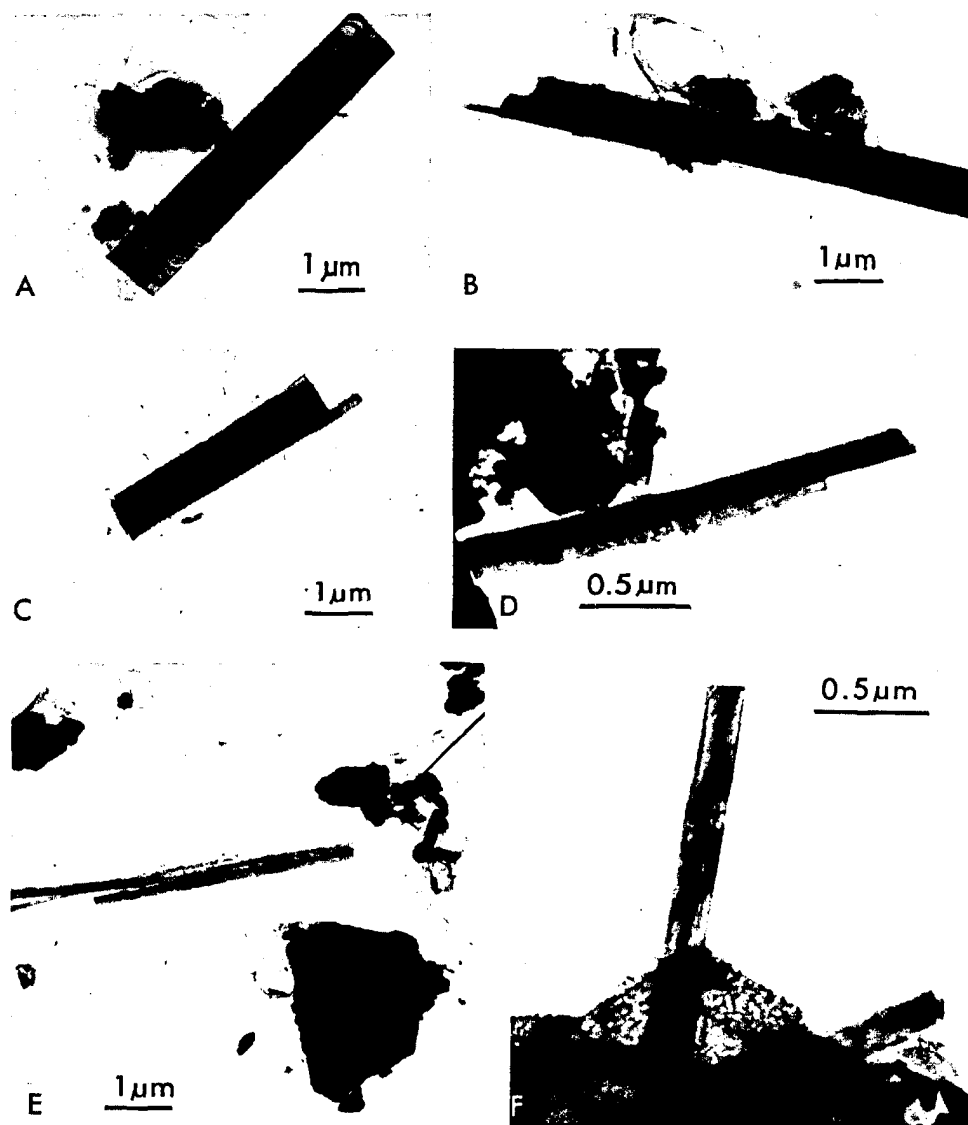


FIGURE 3. Transmission electron micrographs showing range in morphological characteristics of asbestiform tremolite and anthophyllite in talc. The entire range of morphological variations observed for these minerals is observed in the asbestos standards: rectilinear fibers with parallel ends and edges (A); step-cleavage ends (B); unit fibrils protruding from fiber body, (C); curvilinear fiber with amphibole cleavage end (D); high length-to-width ratio fibers (E); fibers protruding from interiors of talc plates (F). All of these morphological variations and forms (A-E) have been described in anthophyllite and tremolite asbestos samples. The amphibole structure was confirmed in all cases by selected area electron diffraction characterization. Scale as marked. Micrographs obtained on a JEOL JEM 120 U with an accelerating voltage at 120 kV.

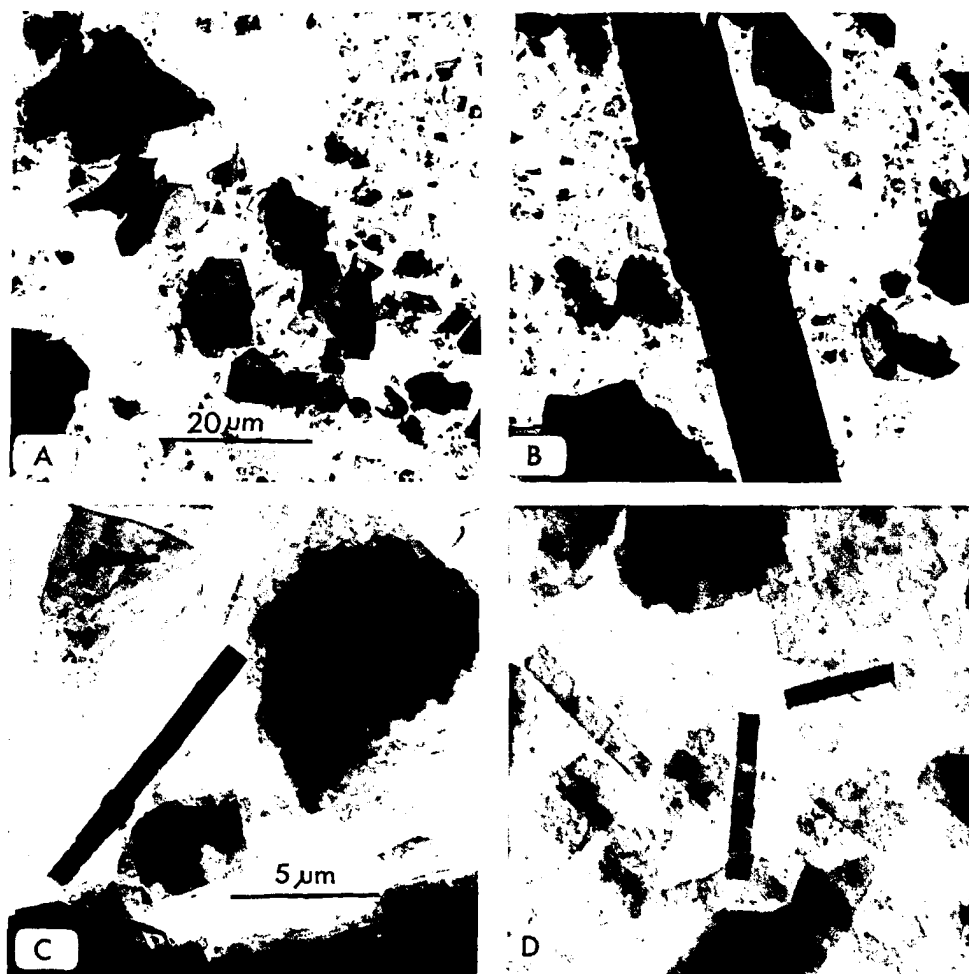


FIGURE 4. Transmission electron micrographs of cosmetic talc samples composed primarily of plates with an occasional large talc fiber (B, C); talc with many talc fibers (D); Scale is the same in (A) and (B) and in (C) and (D). All selected area electron diffraction patterns obtained on fibers yielded those consistent for talc plates (see Fig. 5, A and B). In all talc-containing samples examined by electron microscopy talc grains tended to range from 25 to 0.2 μm in greatest dimension. Micrograph obtained on a JEOL JEM 120 U with an acceleration voltage at 120 kV.

was used to verify the presence of amphibole in the 10 samples shown to be positive by X-ray diffraction. Electron microscopy, while not quantitative, also showed that amphibole fibers were present in relative amounts that corresponded to their percentages as shown by X-ray diffraction.

The presence of traces of chrysotile, rather than platy serpentine, in samples 12 and 15 was verified by electron microscopy (Fig. 6). By

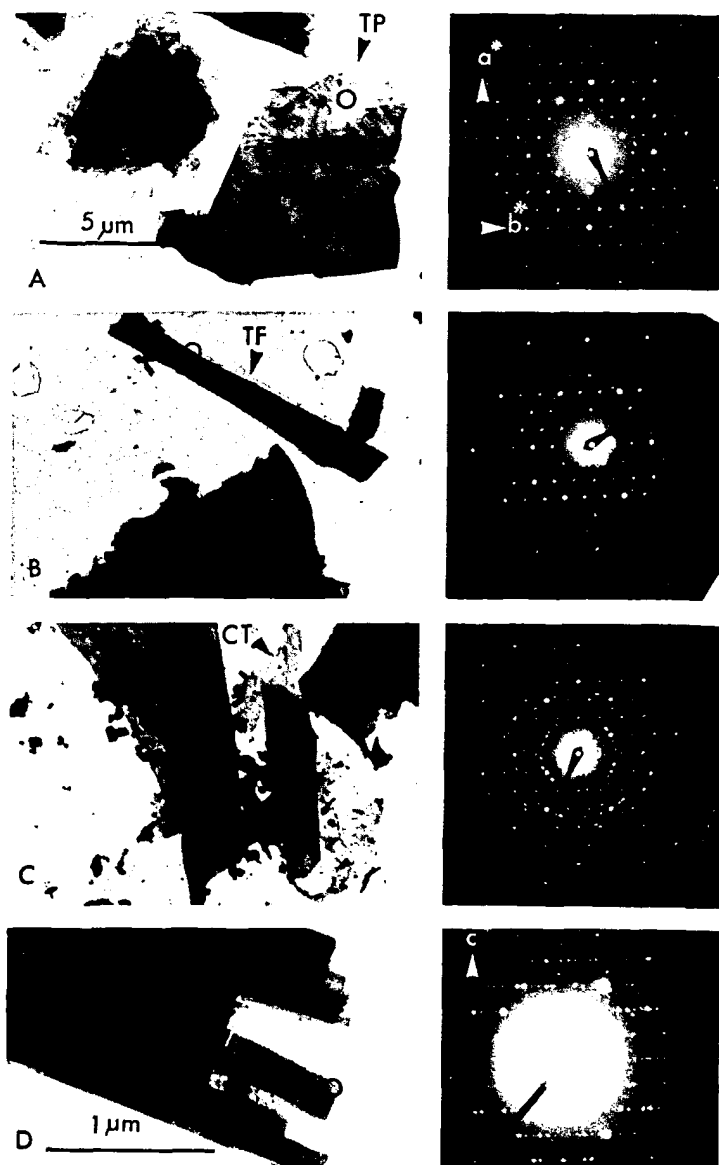


FIGURE 5. Transmission electron micrographs and accompanying selected area electron diffraction (SAED) patterns for cosmetic talc samples. The talc plate (TP) in (A) shows typical polygonal cleavage and diffraction contrast contours for the mineral species. The accompanying SAED pattern displays the characteristic reciprocal ab^* plane pseudo-hexagonal symmetry for talc. Talc a^* and b^* directions indicated on (A). Measurement of pattern indicates a 5.3 Å repeat along a^* and a 9.1 Å repeat for b^* (measured at $[110]$). Talc fiber (TF) in (B) displays irregular ends and nonrectilinear edges. The SAED pattern is also pseudo-hexagonal, but some reflection intensities [e.g., the (060), (0.12.0)] are more pronounced. This may be due to both orientation and structural effects. The curled talc plate (CT) in (C) displays an incipient Debye-Scherrer ring pattern (the effects of both folding over of talc and small associated grains). The amphibole fiber (D) was diffracted only on one of the protruding unit fibrils. The c^* axis is shown, with repeat measured at 5.3 Å. Areas where diffraction patterns were obtained are indicated by location circles; particles were photographed at the SAED magnification X26,500. Scale is the same in A-C; scale in D as marked. Micrographs obtained on a JEOL JEM 120U with an accelerating voltage at 120 kV.

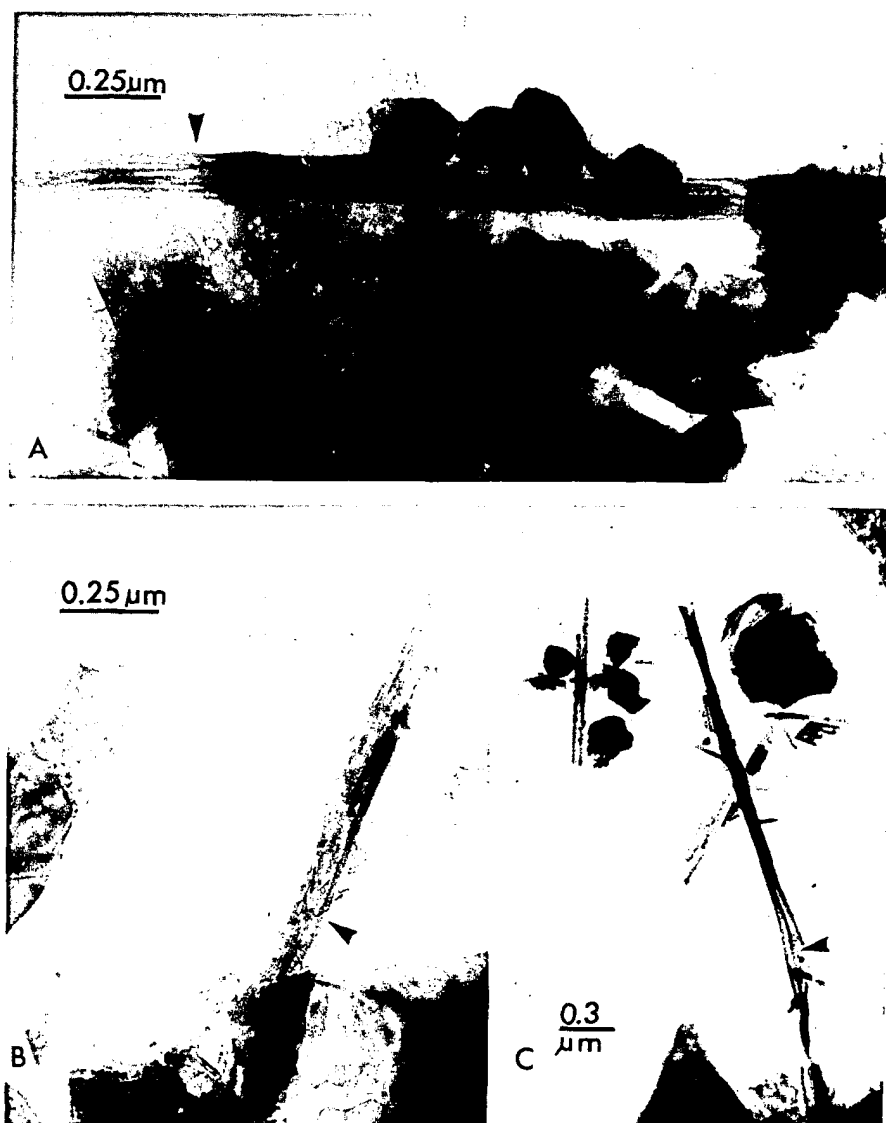


FIGURE 6. Transmission electron micrographs of asbestiform minerals in cosmetic talc, other than amphibole. (A and B) Two chrysotile fibers with morphological characteristics induced by electron beam damage. No diffraction pattern was obtained on either fiber. Arrow markers (A and B) indicate areas where these beam-damaged features are most prominent. Both fiber bundles appear to rest on talc plate substrates. Free chrysotile fibers and fibrils (C) were found in a sample found negative for asbestos by all other techniques. Scale as marked. Micrographs obtained on a JEOL JEM 120 U with an accelerating voltage at 120 kV.

comparison with known dilution levels of chrysotile in talc observed by electron microscopy, the levels of contamination of chrysotile in the two samples correspond to about 0.25–0.5% chrysotile, which was suggested by the X-ray diffraction results. The chrysotile fibers were all shorter than 2 μm and the diameters less than 0.2 μm , explaining why they were not visible by optical microscopy.

Chemistry of Consumer Talcums and Powders

The bulk chemistry (Table 5) and mineral contents (Table 4) of the talcums and powders complement each other in that one data set implies limits for the other. For example, analysis of sample 1 shows the presence of FeO and CaO (Table 5). Recalculation of these oxides into values for the empirical formulas for tremolite and anthophyllite indicates that sufficient quantities are present to account for the presence of these minerals (Table 4). An appreciable decrease in SiO_2 , which should normally occur, was not observed, because of the occurrence of over 5% quartz content. The Al_2O_3 , Na_2O , and K_2O are reflected by the presence of chlorite (probably the penninite phase). Variations in oxides were also observed in the other samples that contain amphibole minerals (6–8, 11, 12, 15–17, and 21). In these samples, a number of other factors account for the wide variations in oxide percentages: in 6, the presence of chlorite

TABLE 5. Major Oxide Content of 21 Consumer Talcum and Powders^a

Major oxide	Sample no.										
	1	2 ^b	3 ^c	4	5	6	7	8	9	10	11
SiO_2	61.99	0.00	62.68	58.72	61.94	52.95	59.67	71.93	58.68	51.65	49.48
TiO_2	0.10	0.00	0.14	0.04	0.03	0.17	1.40	0.19	0.08	0.71	0.22
Al_2O_3	0.82	1.30	0.37	0.24	0.45	1.16	0.87	15.73	0.58	1.45	2.32
Fe_2O_3	0.00	0.00	0.08	0.04	0.03	0.02	0.18	0.10	0.12	0.09	1.23
FeO	1.51	0.00	0.32	3.03	0.51	0.86	0.84	0.34	3.12	0.34	0.07
MnO	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
MgO	29.60	0.00	29.83	28.25	30.19	29.02	29.23	2.95	29.23	27.90	25.67
CaO	0.40	0.00	0.04	0.10	0.04	3.46	0.90	2.37	0.17	4.75	1.61
Na_2O	0.07	0.00	0.03	0.03	0.05	0.00	0.05	0.48	0.00	0.03	0.42
K_2O	0.02	0.00	0.02	0.02	0.02	0.05	0.05	1.37	0.00	0.00	0.19
P_2O_5	0.01	0.00	0.03	0.03	0.01	0.13	0.14	0.05	0.00	0.05	0.01
Volatiles ^f	5.36	98.70	4.66	5.38	5.51	10.32	5.64	5.25	5.34	9.72	10.41
Total	99.88	100.00	98.20	95.88	98.79	98.14	98.97	100.76	97.32	96.69	91.63

^aWeight percent, recalculated as oxides, following standard petrochemical procedures. The bulk analysis of the powders reflects the combined mineral content after additives were extracted using water, dilute HCl, acetone, benzene, and ether.

^bAnalysis of 2: 98.7% = starch + organics and volatiles; 1.3% = Al_2O_3 (aluminum chlorhydrate?).

^cStandard talc used as matrix for fiber standard dilutions.

sharply reduces the SiO_2 content and elevates the Al_2O_3 content. The presence of the carbonate mineral calcite increases the expected CaO and volatile contents (the latter includes CO_2); in 7, the high TiO_2 is reflected by the presence of the mineral rutile (TiO_2); in 11, the high CaO, moderately high Al_2O_3 , and low SiO_2 contents reflect the presence of calcite, chlorite, and tremolite.

Several of the above samples (numbers 8, 12, and 15) require special evaluation. Sample 8 is extremely high in SiO_2 , Al_2O_3 , Na_2O , and K_2O and extremely low in MgO content. The chemistry indicates that this material was not derived from a talc rock, but rather from one rich in alumina and silica. The mineralogy reflects this, as do the trace metals (see trace metal section). The amphibole minerals in sample 8 are associated with both pyrophyllite [$\text{Al}_4\text{Si}_8\text{O}_{22}(\text{OH})_4$] and quartz, both present in substantial quantities. The mica phase is not phlogopite, but muscovite, accounting for the presence of substantial quantities of K_2O and Na_2O . A plagioclase feldspar was also detected in the mineral phase. Sample 12 is very high in Al_2O_3 but extremely low in SiO_2 , apparently the result of high chlorite content as well as substantial amounts of pyrophyllite. Sample 15 is low in SiO_2 and extremely high in volatile content, reflecting the presence of both carbonate phases and organic additives.

The trace element analyses (Table 6) show distributions that are in accordance with the known behavior of trace elements in minerals. With

TABLE 5 (continued) Major Oxide Content of 21 Consumer Talcum and Powders^a

Sample no.											
12	13	14	15	16	17	18	19	20	21	A ^d	B ^e
47.32	53.83	57.47	44.83	62.26	54.45	59.93	58.54	62.19	56.34	57.34	61.49
0.18	0.11	0.11	0.07	0.06	0.10	0.10	0.18	0.08	0.12	0.21	0.01
9.34	1.74	1.65	0.69	0.45	4.26	0.79	1.11	0.69	1.35	2.30	1.20
0.05	0.03	0.02	0.00	0.18	0.04	0.00	0.00	0.00	0.02	0.11	0.38
1.22	0.70	0.65	0.62	1.04	1.41	0.84	1.38	0.81	1.39	1.05	1.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
29.83	27.14	26.98	23.88	30.00	30.79	30.40	29.83	30.19	27.90	27.44	30.54
0.69	5.49	5.52	3.67	0.13	1.13	0.50	1.13	0.43	1.53	1.69	0.46
0.03	0.07	0.05	0.35	0.09	0.09	0.09	0.00	0.07	0.07	0.10	—
0.05	0.00	0.02	0.07	0.05	0.02	0.02	0.00	0.00	0.00	0.10	—
0.21	0.14	0.13	0.10	0.01	0.04	0.13	0.00	0.13	0.02	0.70	—
10.26	10.81	10.41	21.34	5.92	7.54	5.65	5.94	5.14	9.99	8.03	5.00
99.18	100.06	98.01	95.62	100.19	99.87	98.45	98.21	99.73	98.73	98.20	100.11

^d Average of 20 talc samples.

^e Average of 8 talc analyses in Deer et al. (1962).

^f Volatiles are lost on ignition (total H_2O , CO_2 , organics, and other volatiles).

TABLE 6. Trace Element Content of 21 Consumer Talcum and Powders^a

Trace metals	Sample no.																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Ba	<10	-	<10	<10	<10	<10	<10	50	<10	990	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Ce	<10	-	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cl	210	-	130	135	185	200	140	130	115	125	115	120	430	435	410	165	140	130	110	120	130
Co	35	-	<3	85	<3	<3	<3	<3	88	<3	<3	<3	<3	<3	<3	21	<3	4	<3	<3	<3
Cr	310	-	28	600	16	23	24	<15	820	25	18	24	38	49	41	340	32	30	28	25	42
Cu	<5	-	<5	<5	8	<5	<5	9	<5	<5	<5	<5	5	8	10	13	6	7	6	6	13
Ga	<1	-	4	<1	<1	1	<1	20	<1	1	3	13	2	1	2	2	7	3	2	3	<1
La	<10	-	<10	<10	<10	<10	<10	40	<10	<10	<10	<10	<10	<10	30	<10	<10	10	<10	<10	<10
Nb	7	-	8	8	11	7	9	14	5	7	6	18	7	7	5	5	9	8	9	9	7
Ni	710	-	17	172	27	13	10	<4	2210	34	4	11	10	17	10	460	14	20	28	19	42
Pb	8	-	8	<5	<5	<5	<5	49	7	<5	17	5	7	12	8	6	9	7	8	5	16
Rb	5	-	5	<5	<5	<5	5	45	<5	<5	<5	<5	<5	5	5	5	<5	5	5	5	<5
S	235	-	130	120	2230	440	150	305	155	425	110	280	485	595	535	320	140	160	105	155	1070
Sr	10	-	10	10	10	20	30	160	<10	25	100	<10	15	20	20	<10	15	10	10	10	15
Th	<5	-	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zn	»	-	85	37	18	12	15	20	37	»	»	»	35	11	20	73	27	8	11	3	»
Tr	<10	-	<10	<10	<10	90	10	190	<10	10	10	30	<10	<10	<10	<10	50	<10	<10	<10	<10

^aValues in parts per million. The symbol < indicates the limit of detection of the analytical method. The symbol » indicates concentrations of Zn are greater than 1,000 ppm.

the crystal lattice of a mineral acting as a sorting mechanism for cations, the cations can enter a crystal structure providing they have appropriate size and charge. These phenomena apply to major as well as minor elements. Thus, barium is present in large amounts in sample 8, which has a high K_2O content (1.37%). Since barium and potassium have similar ionic radii, barium is easily admitted into potassium minerals, such as micas and feldspars (both found in 8). Rubidium and strontium are also enriched in sample 8, since these metals also easily substitute for potassium. Gallium is found in large amounts in samples 8, 12, and 17. These samples are also very high in Al_2O_3 . Gallium has the same ionic charge and radius as aluminum and, in fact, is found only in aluminum-bearing minerals.

In four samples (1, 4, 9, and 16) there are significantly higher concentrations of cobalt, chromium, and nickel than found in the other samples. These four samples also have high contents of FeO (Table 5). The association of these four transition metals has been observed before in certain geochemical environments, particularly in ultramafic rocks. Since talcs derived from the metamorphism of serpentines and peridotites (ultramafic rocks) are considerably enriched in FeO (Deer et al., 1962), it is likely that the divalent cations are substituting for iron in the brucite layer of the talc.

DISCUSSION AND CONCLUSIONS

Talc used in the United States represents a wide range of mineralogical substances. Industrial grade talcs are obtained from different rock types of highly variable mineral composition with the result that the mineral talc may actually be a minor constituent. However, it has been stated that consumer talcum products should contain at least 90% of the mineral of the same name and no asbestos fiber (Hildick-Smith, 1976). Review of the literature suggests that at least until 1968, materials that were marketed as cosmetic talcum products did not necessarily conform to these criteria.

Talc mineral may occur in a platy form or in a fibrous form. Talc fiber may occur as a small proportion of the mineral deposit or as a major constituent. Intergrowths of talc with other mineral phases are common. These phases may be simply macroscopic zones adjoining talc mineral or may occur as microscopic intergrowths within the talc. Of the many minerals that may coexist with talc, a number of asbestiform phases commonly occur: tremolite, anthophyllite, and chrysotile have been identified in these deposits. In addition, free silica (quartz) is a frequent constituent. The trace metal content may include elevated levels of nickel, chromium, and cobalt.

There is general agreement between the mineral composition and the major and trace element content of the consumer talcum products. On the

basis of mineral and chemical contents, the type of geological provenance may be ascertained.

Methodology has been developed for quantitative X-ray diffraction determination of anthophyllite, tremolite, serpentine, and quartz in consumer talcums and powders. Important factors in the calibration standard development include selection of talc and reference minerals and the selection of diagnostic X-ray reflections. The sample preparation technique is sensitive and reproducible. Dilution standards are step scanned over diagnostic reflection areas, peak areas are measured, and a set of standard calibration curves is developed by regression analysis. Samples of consumer talcums and powders are prepared and analyzed under identical conditions and compared with the calibration curves, permitting quantitative analysis of these minerals. X-ray diffraction alone cannot distinguish between asbestiform and fragmented forms of anthophyllite and tremolite nor between asbestiform and platy serpentine varieties. Electron microscopic analysis was used to distinguish between these forms.

Mineralogical characterization of 21 consumer talcums and powders showed that 10 contained measurable concentrations of asbestiform tremolite and anthophyllite, and some also contained fragmented forms of these minerals. Two samples contained trace quantities of chrysotile (0.25–0.5%). These observations were confirmed by transmission electron microscopy. The amphibole phases present in these talcum products ranged in amounts from several tenths of a percent to over 14% by weight. Quartz was present in eight consumer talcs in amounts ranging from 1.6 to 35.1% by weight.

Consumer talcum products are for the most part complex mineral assemblages, which confer X-ray sorbing and fluorescing effects that are not equivalent to, and are usually greater than, those of the binary systems used in preparing the dilution standards. In consumer talcum products minerals such as talc, micas, chlorite, calcite, dolomite, and others tend to diminish reflection intensities of asbestiform minerals by sorbing X-rays or by contributing to background noise. Also, repeat runs on some selected specimens have demonstrated greater peak areas due to slight modifications in instrumental settings (e.g., increase in receiving slit width). Therefore, the values for weight percent concentrations given in this report are conservative.

Examination of the same consumer talcum products by both optical and transmission electron microscopy indicates that not all of the materials fall within the definition of fiber or asbestiform. For example, one consumer talcum product that contained more than 7% tremolite was observed to contain both fragmented tremolite grains by optical microscopy and asbestiform fiber with 3:1 or greater length-to-width ratio by transmission electron microscopy. Optical microscopy may provide useful information. However, more complete characterization can be obtained by electron microscopy and selected area electron diffraction. Using electron

microscopy, for example, several samples of consumer talcum products exhibited both free amphibole fiber, discrete from talc grains, and, in addition, numerous small amphibole fibers were visible, apparently inter-layered between talc or chlorite plates (see Fig. 6A).

Preliminary examination of the asbestiform amphiboles by an electron microprobe technique has demonstrated that individual fiber chemistry is identical to those fibers encountered in the IARC Asbestos Standards (Timbrell and Rendall, 1971).

On the basis of the mineralogical and chemical characterization of these products, all formulated prior to June 1973, we conclude that cosmetic grade talc was not used exclusively. The presence in these products of asbestiform anthophyllite and tremolite, chrysotile, and quartz indicates the need for a regulatory standard for cosmetic talc. This standard should be cognizant of talc complexities, mineralogical and chemical in nature, and should provide for adequate analytical protocols to ensure monitoring. We also recommend that evaluation be made to determine possible health hazards associated with the use of these products.

APPENDIX A: DEFINITIONS OF TERMS USED IN TEXT

Asbestos "A name applied to a group of naturally fibrous minerals" (chrysotile, amosite, crocidolite, tremolite, anthophyllite cited by name) (Bureau of Mines, 1968). The term asbestos has also been applied to commercially exploited fibrous clays, including attapulgite and palygorskite (Whittaker, 1968).

Asbestos implies current or possible exploitation, based on the presence of special physical and chemical properties, determined on the bulk sample level. For example, high fiber tensile strength, flexibility, low heat conductivity, high electrical resistance, and chemical inertness are properties of asbestos. Noncommercial varieties of the same mineral may not possess the same qualities on the bulk level. For example, amosite has been considered to be the economically exploited variety of grunerite (Deer et al., 1962). If so, and even this is contested among mineralogists today, large macrocrystals are significantly different physically and structurally. Grunerite fiber is rigid, amosite fiber is flexible; grunerite yields well-defined single X-ray reflections with nonrotational film techniques, amosite yields multiple reflections as if rotated in the X-ray beam; grunerite appears to be a single crystal, amosite splays as if composed of strands. However, when both substances are pulverized, the resultant powder yields submicroscopic fibers, many of which are virtually indistinguishable on the basis of morphology, structure (determined by selected area electron diffraction), and chemistry (determined by an electron probe

technique). Amosite may be considered as an aggregate of unoriented, discrete, grunerite crystals with only the *c* axis in common alignment.

Comminution of such aggregates produces fibers with characteristics identical to those of single crystals of grunerite that have been similarly pulverized. Some workers have suggested that mechanical size reduction of amosite yields fibers with crystal growth surfaces rather than cleavage surfaces. Since amphibole cleavage tends to parallel prominent crystal face planes, such distinctions on the submicroscopic level may disappear. This appears to be the case for tremolite and anthophyllite as well. However, because no methods exist to distinguish between possible differences in fiber surface, we do not refer to anthophyllite and tremolite fibers in these talcums as asbestos. Instead they are referred to as asbestiform. It should be stressed, however, that evidence does not exist that would indicate that fibers with crystal growth surfaces or cleavage surfaces possess lesser or greater biological potential than fibers from commercial asbestos deposits.

Asbestiform "Formed like or resembling asbestos; fibrous; . . . (Bureau of Mines, 1968). The term is used herein for amphiboles (anthophyllite and tremolite) seen on both light and submicroscopic examination, which resemble comminuted asbestos varieties, on the basis of morphology. Essentially, when these fibers are derived from commercial deposits we term them "asbestos" and when analytically identical fibers are found as noncommercial intrusions with the mineral talc, we term them "asbestiform." The use of two terms does not imply differences that can be analytically determined.

Fiber "The smallest single strand of asbestos or other fibrous materials" (Bureau of Mines, 1968). We use this term in a broader sense. For example, chrysotile fibers are called fibrils, possessing unit diameters of about 200–400 Å. Coherent bundles of fibrils are also called fibers. Fiber in the present text is used to denote any elongated single mineral unit visible on the light or electron microscopic level. The Occupational Safety and Health Administration has applied a 3:1 length-to-width ratio to distinguish fiber from mineral fragment.

APPENDIX B: CRYSTAL CHEMISTRY, CRYSTAL STRUCTURE, AND GEOLOGICAL OCCURRENCE OF TALC

Chemistry of Talc

The empirical chemical formula of talc is $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$, but ferrous and ferric oxides, alumina, titania, soda, lime, and oxides of manganese have been reported in quantities up to several percents by

weight. Titanium and aluminum appear to substitute for silicon, whereas iron, nickel, and manganese substitute for magnesium. Alkali metals are not readily accommodated in the structure and evidently occur as interlayer ions or as components of mineral impurities. For example, excess calcium may reflect the presence of the interlayer mineral phase tremolite (Deer et al., 1962; Stemple and Brindley, 1960). One major talc deposit in the eastern United States contains substantial amounts of nickel, as much as 0.2%. Notwithstanding these minor components, talc is essentially (by weight) 32% MgO, 63% SiO₂, and 5% structurally bound water.

Talc Structure and Crystal Habit

The three-layered crystal structure comprises a sheet of octahedrally coordinated Mg(OH)₂ groups (the brucite layer) sandwiched between two planes of tetrahedrally linked SiO₄ groups (silica layers). Apical oxygens of the silica sheets are directed toward the brucite layer and in part replaced by hydroxyl groups, which form a portion of the inner structural unit. Valence balance is accomplished within the structure, so that there is a net zero charge on juxtaposed unit layers at the silica base interfaces.

The basic unit of the talc structure was determined over 40 yr ago (Gruner, 1934; Hendricks, 1938), yet the repeated cell geometry and space group were only recently resolved. X-ray single crystal patterns now indicate talc to be triclinic (Rayner and Brown, 1966; Ross et al., 1968).

In addition to chemical and structural complexities, talc occurs with both plate and fiber habits (Ford, 1957). The development of the fibrous crystal form, with an elongated crystallographic *a*-axis, may be a manifestation of ionic substitution since its refractive index is higher than platy talc (Fleischer and Osborn, 1957; Gruner, 1944). Talc that contains substantial amounts of these elongated forms is referred to in the mineralogical literature as fibrous talc. Similar observations with regard to the mineral brucite have been reported (Liebling and Langer, 1972) in which high iron content in the normally platy brucite is associated with the development of a fibrous habit. It is of interest to note that minnesotaite, considered by some to be an iron-rich form of talc, always occurs with a fibrous, or even a needle-like, habit (Gruner, 1944).

Formation of Talc in the Laboratory of Nature

In closely controlled experimental systems, talc has been synthesized (Bowen and Tuttle, 1949; Yoder, 1952). Bulk chemistry, water fugacity, temperature, and pressure parameters are defined within extremely restricted limits and ranges to produce relatively pure crystallization products. However, in laboratory synthesis, just as in nature, coexisting mineral phases are produced if slight variations in any of the parameters are introduced. These phases include anthophyllite, serpentine, and in some instances tremolite.

Nature of Talc Plates

Electron microscopic examination of talc minerals demonstrates that single talc grains consist of contiguous single crystals, mosaics of dis-oriented crystallites, and intergrowths with other mineral phases, particularly tremolite (Kleinfeld et al., 1973; Stemple and Brindley, 1960; Wright, 1960). Selected area electron diffraction patterns obtained on these objects display, in order, single crystal arrays, Debye-Scherrer rings, and superimposed complex patterns characteristic of intergrown single crystal phases.

Talc and Mineral Intergrowths

Tremolite is one common intergrowth in talc, and it requires relatively little energy thermodynamically to occur. Replacement of magnesium by calcium in the brucite layer may lead to structural as well as chemical modification (Bragg and Claringbull, 1965). Rotation of unit tetrahedra in talc forms double chains from sheets, readily accomplished by substitution of $\text{Mg}(\text{OH})_2$ by $\text{Ca}(\text{OH})_2$. The bulk chemistry is thereby changed from $\text{Mg}_6\text{Si}_8\text{O}_{20}(\text{OH})_4$ to $\text{Ca}_2\text{Mg}_5\text{Si}_8\text{O}_{22}(\text{OH})_2$. The final structural array is remarkably similar in both materials; the crystallographic a -axis of talc is approximately 5.26 Å, which corresponds with the c -crystallographic axis of tremolite (approximately 5.24 Å); the b -axis for talc is approximately 9.10 Å, which is equal to the $b/2$ -axis of tremolite; the c -axis of talc, approximately 18.8 Å, is about equal to twice the a -dimension of tremolite (approximately 18.2 Å). The monoclinic stacking angles, the beta-angle, are within a few degrees of each other.

Intergrowths may form in which amphibole formation is not complete so that a mixed phase exists, referred to mineralogically as "talcoles." These are not as rare as once believed and may even be common in the more complex talc deposits.

APPENDIX C: INDUSTRIAL AND COSMETIC GRADE TALCS

Studies have demonstrated that industrial talc often consists of a variety of minerals, the utilization of which is based on physical properties rather than mineral composition (Hogue and Mallette, 1949; Schulz and Williams, 1942; Thompson, 1974; Wells, 1965).

Early analyses of cosmetic talc also showed a wide range in mineral composition. Of six such products examined in one study, only 6–47% by weight of the inorganic material that constituted the product was the mineral talc; 14–51%, serpentine minerals; 5–77% carbonate minerals; 0–trace, quartz; 0–trace, tremolite; 3–12%, other minerals (Schulz and Williams, 1942).

APPENDIX D: BIOLOGICAL HAZARDS ASSOCIATED WITH TALC EXPOSURE

A fine, diffuse, bilateral, progressive fibrosis was observed among miners and millers of tremolite talc in Georgia (Dreessen, 1933; Dreessen and Dalla Valle, 1935). Siegal et al. (1943) studied a population of workers mining and milling tremolite and anthophyllite-bearing talc deposits in New York state. In addition to the bilateral fibrosis, pleural plaques, similar to those encountered in asbestos workers, were observed. Review of postmortem material in this study indicated that asbestos bodies were present in lung tissue. These findings were also reported in cases of severe pneumoconiosis in tremolite millers by Daymon (1946), and by Porro and Levine (1946).

Millman (1947) reported that exposure to cosmetic-grade talc produced nodular fibrosis in workers. No quartz was detected in the dust. The author concluded that talc itself was capable of producing scarring. The observation was supported in studies by Reichman (1944) and by Wyers (1949) and in a study of talc miners and millers in Italy where exposure to pure talc produced a 10% incidence of pneumoconiosis in workers (Parmeggiani, 1948). Excess deaths attributed to pneumoconiosis have been reported among workers in northern Italy mining talc considered to be free of asbestiform fibers (Rubino et al., 1976).

Some investigators have held that fibrous talcs (not differentiated as talc or asbestos fiber) are biologically more hazardous than platy talcs. For example, in a review of the literature by Porro et al. (1942), Gloyne and Gardner are referred to as considering that the clinical, radiological, and pathological disease states of asbestosis and talcosis are very similar. There are several reports of the occurrence of asbestos bodies in the lung tissue of workers exposed to talc (Daymon, 1946; Hobbs, 1950; Kleinfeld et al., 1973; McLaughlin et al., 1949; Porro et al., 1942).

Several studies suggest that fibrous talcs are more dangerous as a result of the included asbestos fiber. For example, McLaughlin et al. (1949) compared fibers in talc with the proportion of fibers recovered from the lung tissue of an exposed worker. A larger concentration of fibers was found in the tissues as compared with the raw talc. Talc pneumoconiosis was reaffirmed by Kleinfeld and Messite (1960) in their study of the New York state talc workers.

In a study by Kleinfeld et al. (1967) it was demonstrated that talc pneumoconiosis accounted for almost 30% of excess deaths among the talc miners and millers. Most of these were due to the complication of pneumoconiosis, cor pulmonale. However, 21% of the 91 deaths recorded were due to malignant tumors: lung carcinoma, pleural fibrosarcoma, and stomach, colon, rectum, and pancreatic cancers. A peritoneal mesothelioma was reported as well. In addition to these tumors, retroperitoneal sarcoma, hepatoma, and leukemia were also found. Statistical evaluation of

these data indicated that a 3- to 4-fold excess of cancers existed in this group, as compared to a matched control population.

The biological activity of both tremolite and anthophyllite fibers has been known for some time, and both have been cited as asbestos minerals by Merewether (1930) and Noro (1946). Asbestos disease among workers (and others exposed to anthophyllite and tremolite) has been reported (Burilkov and Badajov, 1970; Kiviluoto, 1960; Meurman, 1968; Meurman et al., 1974; Schepers, 1965; Wegelius, 1947; Weiss and Boettner, 1967).

Recent experimental data also indicate that tremolite fibers are biologically active (Graham and Graham, 1967). Some investigators have suggested that inorganic fiber fibrogenicity and carcinogenicity is limited only by its ability to reach the alveolar space (Holt et al., 1965; Pott and Friedrichs, 1972; Pott et al., 1974; Robock and Klosterkötter, 1976; Stanton and Wrench, 1972).

Wagner et al. (1975) reported lung scarring in Wistar rats with pure talc, exposed by inhalation. The severity and extent of the lung scarring was comparable to that produced by chrysotile asbestos under identical experimental conditions. In addition to lung scarring, ingestion of talc was reported to be associated with leiomyosarcoma of the stomach as well as one adenoma and several sarcomas of the uterus. However, the exposure levels were high and the numbers of observed tumors small, so that statistical validation of the carcinogenic potential of pure talc and its relevance to human exposures were not achieved.

There are also extensive data concerning hazards associated with exposure to silica or trace metals, particularly nickel and chromium (National Research Council, 1975). Analytical data are presented here that suggest possible disease potential and the need for investigation in these areas.

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SEP 2 1976

D.R. PETERSON

CONFIDENTIAL

Consumer Talcums and Powders:
Characterization*

FROM THE DESK OF

9/22/76

G. LEE

To: S. P. Falk
L. L. Kaplan
G. Heinze
B. Semple

STRICTLY CONFIDENTIAL

Langer "Talcum Powder Paper"

This is the revised manuscript
which will appear in the Journal
of Toxicology & Environmental
Health, November '76 issue.

It must not be circulated since
this was a private and confidential
disclosure to N. Estrin-CTFA by
the journal editor.

George Lee

Selikoff, I.J., (1)

(1) Bowes, D.R., (2)

(2)

Laboratory
Medicine
of New York
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gow

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grant from the National
Institute of Environmental Health Sciences, ES 00928. One of
us (AML) wishes to acknowledge support under a Career Scientist
Award, National Institute of Environmental Health Sciences, ES
44812.

EXHIBIT

Langer

17

4/3/23

PW

of The City University of New York

ARCHIVES
MOUNT SINAI

To: Dean Thomas C. Chalmers

Date: March 17, 1976

From: Dr. Arthur M. Langer

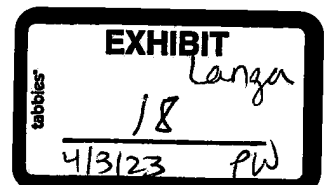
Subject: The ongoing Talc Study in the
Environmental Sciences Laboratory.

Following our telephone conversation of Wednesday, March 17th, I am herein submitting to you, as accurately as memory permits, the involvement of our Laboratory with the analysis of talc-containing consumer products.

In December of 1968, Dr. Selikoff and I were invited to the Food and Drug Administration to participate in a seminar before the Division of Pharmacology and Toxicology. We presented materials under the title "Current studies on pulmonary fibrous mineral microparticles - potential contribution of talc." At the seminar we discussed our studies involving the fiber content of lung tissues obtained from 3,000 consecutive autopsies in New York City; the biological hazards associated with the inhalation of asbestos; preliminary data which suggested that some of these lung fibers were asbestos fibers; the natural contamination of talcum products with fibrous minerals (including asbestos); the potential hazards associated with inhalation of talc dust. If memory serves me correctly this was not the first time this subject matter was broached with FDA. Some members of Food and Drug were present at a meeting a year earlier, in Cincinnati, Ohio, in which the asbestos problem was openly discussed at a governmental meeting. It was because of this meeting, and the ensuing discussions, that we were invited to Washington for the seminar. (See Appendix No. 1.) Talc research, for us, was put on a "back burner" for future study. We continued at intervals to examine consumer products and observed that they contain fibrous minerals which when analyzed demonstrated them to be asbestos.

In August, 1971, our group was invited to a discussion at the Food and Drug Administration concerning the asbestos content of consumer talcs. A number of individuals were present representing various areas of society. Dr. Selikoff spoke on the biological significance of asbestos and I presented some information concerning the analytical methodology required for asbestos analysis. (See Appendix No. 2.) On page 5 of this document, paragraph 4 reflects our findings concerning asbestos contents of Johnson & Johnson talcs.

In September, 1971, we began, in a more formal manner, the study of the asbestos content of consumer talcs. We prepared a study proposal for the Environmental Protection Administration outlining a study for the determination of the fiber contents of consumer talcs sold in New York City. (See Appendix No. 3.) No funds were available for this study and we were so informed. However, we formulated in our own minds the outlines of a consumer talcum study.



March 17, 1976

In February, 1972, our group was invited down to the Food and Drug Administration to discuss a number of problems. Ostensibly, we discussed the occurrence of asbestos in parenteral drugs. It is my belief that at this meeting we again broached the subject of asbestos contamination of consumer talcs. (See Appendix No. 4.)

In late 1972 and early 1973, I was approached by Dr. Morris Kleinfeld, of the N.Y.S. Department of Labor, who had been studying talc miners and millers in New York State. He is a recognized authority in this area and his publications have received wide attention. He and his colleagues were the first to epidemiologically establish the association between fibrous talc exposure and excess human malignancies. He approached me to study the mineral content of talcs mined from the Balmat-Edwards mining area of New York State. I collaborated with him and one of his colleagues and a joint publication resulted from our efforts. (See Appendix No. 5.) During this study we developed the methodology for x-ray diffraction analysis of talc, and the electron beam instrumentation required for the analysis of submicroscopic fibers in talc samples.

During this time, we began to purchase samples of talc products in New York City. We were not funded to do this research so that we had an extremely limited budget for "cash outlay." We requested individual members of our Laboratory to bring in any "talcs that they might have in their medicine cabinets at home" to supply us with some materials. At this time I submitted to the Public Health Service a grant application entitled "Asbestos content of consumer talcum products." (See Appendix No. 6.) We again outlined in very great detail an analytical procedure for the analysis of consumer talcs for their asbestos contents. The methodology for talc analysis was worked out at this time and we believe the research warranted support because of its importance. Unfortunately, although the grant was approved (favorably recommended) the relative priority number was not great enough to have it funded.

We continued with our work concerning the analysis of consumer talcum products. In May of 1973, several of my colleagues and I were invited to a symposium on talc in Washington, D.C. This was sponsored by the Bureau of Mines and pertained to various aspects concerning the biological hazards associated with the talc mining industry. I presented materials concerning the nature of talc mineralogically and reported the occurrence of asbestos fibers in the lung tissues of a workman exposed to talc dust. This circular of the Bureau of Mines has been used by the news media many times and from it many inquiries had been directed to us. (See Appendix No. 7.)

Still without significant research support, other than "stealing time" from other projects, we continued our analyses of consumer talcs. In the spring of 1974, my colleagues and I were invited to a microscopy symposium in New York City to discuss the identification and quantitation of asbestos fiber in a range of media. Dr. Rohl and I have reported results concerning the identification and quantitation of asbestos in talc. (See Appendix No. 8.) These papers were submitted for publication

in the Environmental Health Perspectives. This paper has become a standard methodology in that we have had requests from the Philips Electronics Corporation for reprints to be used in their teaching seminars in Mt. Vernon. This paper represents almost one year of "bench" time. This is one of our basic techniques in the analysis of consumer talcum products.

In order to properly "round out" our studies we invited several of our colleagues in Great Britain to join with us in mutual collaborative efforts. We decided that our studies would be strengthened if we knew more about the bulk chemistry and trace metal contents of these materials. Dr. Donald R. Bowes, Professor of Petrology and Geochemistry from The University, Glasgow, consented to work with us. His laboratory furnishes our studies with complete chemical analyses of materials we send to him. Complete analyses of British consumer talcum products may be found in the paper included in Appendix No. 9. Some ten major oxides and 17 trace metals are routinely analyzed. The samples are run in duplicate and triplicate and if "mismatches" are obtained, the analyses are thrown out and done over again. Dr. Bowes has 20 years of experience in the geochemistry field and his reputation is excellent.

My colleagues and I were invited to present a paper at the British Occupational Hygiene Society's meeting, held in Edinburgh in September of 1975. (See Appendix No. 9.) In the session called "talc" Dr. Pooley and I were listed to present a paper entitled "Chemical, physical and mineralogical characteristics of talcs." The authorship and titles were later changed, in which Dr. Pooley was made senior author and the title was amended to "Mineralogy and chemistry of British talc and consumer talcum products." This paper was withdrawn by Dr. Pooley two days prior to the conference start. We enclose an 18-page paper which was to be presented. The reasons for Dr. Pooley's withdrawal of this paper are many and I shall be happy to discuss these with you in private. He was subjected to personal and professional pressures and industry harassment. We respected Dr. Pooley's wishes at the time of the conference and allowed him to withdraw it. This manuscript is being resubmitted to a different British journal for publication. Dr. Rohl has the correspondence connected with the withdrawal of the paper and the subsequent request for its submission to an appropriate journal in Great Britain.

These documents, and the above statements, more or less outline our interest in talc and consumer talcum products. My colleagues and I have been studying this problem area for a number of years. A number of press releases have appeared over the past several years generally as the result of widespread interest in this subject area. I cannot count the number of times I have been approached by individuals in the journalism field with questions concerning asbestos contents of consumer talcs. Many occasions, both in personal contact and by telephone, have presented themselves in which this subject area was broached. My colleagues find this to be "old hat" not necessarily reflecting that it is unimportant, but rather it is just not new to us.

Dean Thomas C. Chalmers

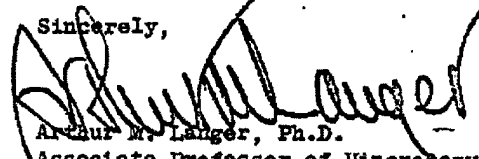
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March 17, 1976

The consumer talcs (United States) have been studied with identical methods as the British talcs. The paper has been accepted for publication in Environmental Research. A revised pre-publication manuscript will be shortly forwarded to your office.

If you have any further questions concerning these materials I shall be very happy to answer them.

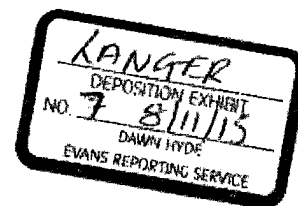
Sincerely,



Arthur M. Langer, Ph.D.
Associate Professor of Mineralogy
Head, Physical Sciences Section

AML:jm
Enc.





Expert Report of Arthur M. Langer, Ph.D.

1. Qualifications

I have studied the occurrence, properties, and human health effects of minerals and mineral commodities for more than 40 years. Among the mineral commodities and particles that I studied were the asbestos minerals, industrial and cosmetic grade talc from many sources, consumer talcum products, silica and titania polymorphs, vermiculite from many sources, amphibole cleavage fragments, the fibrous clays palygorskite, attapulgite, and sepiolite, and wollastonite.

During this time, I developed analytical protocols and instrumental methods for dust analysis appropriate for tissue burden assays, industrial hygiene studies, air pollution studies, and particle characterization.

I obtained my Ph.D. in Geology (Mineralogy) from Columbia University in 1965 and am currently a Professor in the Ph.D. Program in Earth and Environmental Sciences at the Graduate School and University Center of the City University of New York; Director of the Center for Applied Studies of the Environment, Applied Sciences Coordinating Institute, City University of New York; and Research Associate in the Department of Earth and Planetary Sciences of the American Museum of Natural History, New York.

Previously, I was Professor and Director of the Environmental Sciences Laboratory of the Institute of Applied Sciences, Brooklyn College of the City University of New York; Associate Professor at the Center for Polypeptide and Membrane Research, Mount Sinai School of Medicine; Associate Director of the Environmental Sciences Laboratory, an NIEHS Center called The Center for the Study of Biological Effects of Environmental Agents, Mount Sinai School of Medicine; Director of Laboratories, Environmental Sciences Laboratory, Mount Sinai School of Medicine; Head of the Physical Sciences Section, Environmental Sciences Laboratory, Mount Sinai School of Medicine; and Research Associate, Department of Medicine, Mount Sinai Hospital, New York.

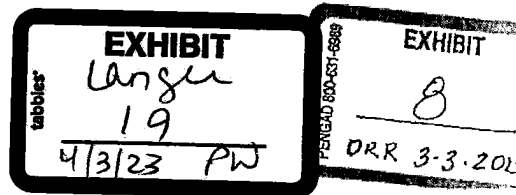
I have written papers on topics of mineralogy, including many focused on asbestos characteristics and identification. More specifically, I have written papers and given presentations directly focused on the identification of asbestos and non-asbestos particles in talc.

I am being compensated \$500/hour for my time working on this matter. My compensation is not dependent on the opinions I offer or the outcome of this litigation.

I have attached a copy of my *curriculum vitae*, which highlights my background, education, and professional experience and activities, as **Exhibit A**.

2. Asbestos

I have over 45 years of academic, laboratory, research, and practical experience with the identification and quantitation of asbestos in a range of media, i.e., in air, water, powders,



numerous industrial and consumer products, and human tissues. At trial, I expect to discuss the development of standard methods for fiber identification and the complications that arise during analysis of particularly complex media, such as talc. I will offer testimony concerning the definitions, development, and identification of asbestos as compared with the non-asbestos counterparts of the same minerals. I will discuss the development of testing protocols and procedures for asbestos identification, including key differences that arise from application of different methods and for different purposes. I will also discuss the critical distinction of testing in an unknown environment versus a presumptive environment where asbestos particles are known to be present. Finally, I will discuss the well-developed protocols and requirements for reliably identifying asbestos, including the lack of scientific significance from the finding of a single, or only a few, elongated particles without a population that meets established criteria for positive identification of asbestos.

3. Talc

The mineral talc is a monoclinic, occasionally triclinic, hydrated magnesium sheet silicate with the ideal formula: $Mg_3Si_2O_5(OH)_4$. Geologically, talc occurs in rock masses often coexisting with other hydrated magnesium silicate mineral species. Some talc deposits can be extremely complex.

Different grades of talc have different qualities and are mined for different commercial purposes. The purest talcs are used for cosmetic and pharmaceutical purposes. It is possible to mine cosmetic grade talc without inadvertently incorporating amphiboles. Cosmetic grade talc has been generally recognized as safe by the United States Food & Drug Administration (FDA), and is widely used in pharmaceutical, cosmetic and food products. Talc from some deposits may be mixed with other minerals and that mixture may be classified as "industrial-grade" talc, which displays different physical and chemical properties as compared to pure talc. These industrial-grade talcs are used, for example, in the manufacture of paint, rubber and other products. Certain talcs with a higher amphibole content (in particular tremolite) were prized by industrial customers for their behavior when fired to form a ceramic body. For example, in the talc deposits of the Gouverneur District of New York State, talc occurs with tremolite in addition to other silicate minerals. That industrial talc was mined for specific characteristics unique to the mixed-mineral materials.

From at least the mid-1970s, it was known that talc, asbestos, and non-asbestos cleavage fragments could be confused during routine microscopic analysis. While generally accepted protocols were developed for the identification of asbestos in talc using polarized light microscopy (PLM), there remains, to this day, no promulgated, generally accepted method for the identification of asbestos in talc using only electron microscopy. PLM is an important technique for distinguishing amongst particles in a bulk powder and remains an effective way to determine whether a sample such as cosmetic talcum powder contains asbestos. By both PLM and electron microscopy, analysis of cosmetic talcum powder for asbestos is complicated by the existence of known interferences and the potential for the misidentification of asbestos. Additionally, analysis of a single, isolated particle may not permit a definitive identification of that particle as asbestos, especially if the source material is uncharacterized or unknown.

4. Evolution of Understanding Regarding Analysis of Talc for Asbestos Particles

My involvement with the analysis of talc for potential contamination with asbestos dates back over 40 years.

In August, 1971, members of the Environmental Sciences Laboratory were invited to a discussion at the FDA concerning the asbestos content of consumer talcum powders. A number of individuals were present representing numerous stakeholders, including materials scientists, regulatory personnel, and industry representatives. I presented information concerning the analytical methodology required for asbestos analysis, including our findings concerning analysis of Johnson & Johnson talcs. Dr. Lou Cralley, of the Occupational Health Program, National Center for Urban and Industrial Health, discussed how his paper, Cralley, et al., "Fibrous and Mineral Content of Cosmetic Talcum Products" *Am. Ind. Hyg. Assoc. J.* 29: 350-54 (1968), had been misconstrued. Specifically, Dr. Cralley reported, at both the 1971 meeting and in subsequent presentations and publications, that he was unable to identify asbestos particles in any of the consumer talc products he analyzed. Dr. Cralley identified fibrous constituents, but their identification was not made.

In September, 1971, my team at Environmental Sciences Laboratory of Mount Sinai School of Medicine began, in a more formal manner, the study of the asbestos content of consumer talcs. We prepared a study proposal for the Environmental Protection Administration (NYC) outlining a study for the determination of the fiber contents of consumer talcs sold in New York City. No funds were available for this study; however, we formulated the outlines of a consumer talcum study.

During late 1972 and early 1973, I collaborated with Dr. Morris Kleinfeld of the New York State Department of Labor to develop a methodology for x-ray diffraction analysis of talc, and the electron beam instrumentation required for the analysis of submicroscopic particles in talc samples. Kleinfeld, et al., "A Study of Workers Exposed to Asbestiform Minerals in Commercial Talc Manufacture", *Environmental Research* 6, 132-143 (1973).

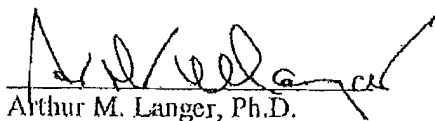
During the early 1970s, my laboratory at Mount Sinai School of Medicine was in near-constant receipt of household and commercial products for asbestos content analysis. These included textile products, personal care products, building materials, and all manner of other consumer goods. At the same time, we began to purchase consumer talcum powder products from retail outlets near Mount Sinai Hospital in New York City. We also analyzed talcs that members of the laboratory staff may have had in their medicine cabinets at home. Lacking any formal funding source for this research, my colleagues and I continued to analyze consumer talc products through the early-1970s. In the spring of 1974, Dr. Arthur Rohl and I were invited to speak at a symposium held by the National Institute of Environmental Health Sciences in Pinchurst, NC, and presented on the identification and quantitation of particles in talc. Rohl & Langer, "Identification and Quantitation of Asbestos in Talc" *Environmental Health Perspectives*, Vol 9, 95-109 (1974); Peer-Reviewed Publications Nos. 23-28 of my *curriculum vitae*.

In 1976, my colleagues and I published a paper reporting that certain consumer talcums and powders contained detectable amounts of tremolite and anthophyllite particles that were "asbestiform." The 1976 paper included analysis of one sample of Colgate-Palmolive Company's Cashmere Bouquet talcum powder. Our conclusion was that these particles displayed certain morphological characteristics suggesting that they could have been asbestos particles, and warranted further analysis to determine whether asbestos was, in fact, present. While the paper reports that we found "asbestiform" particles in a number of samples, we explicitly defined "asbestiform" as "formed like or resembling asbestos." We did not conclude, because we could not, that these "asbestiform" particles were actually asbestos. Our analysis was limited by the state of the technology at the time, which did not permit us to distinguish milled asbestos amphibole from milled non-asbestos amphibole. As we said in the paper, because no methods existed to distinguish between surface differences, we did not refer to the anthophyllite and tremolite particles in these talcums as "asbestos"; instead we referred to the particles as "asbestiform." We suggested that this result warranted additional follow-up analysis. There was no way for us at the time to confirm whether the "asbestiform" particles we found were actually asbestos – and we did not conclude that they were.

In 1979, Dr. Rohl and I published a paper noting that a follow-up analysis "of cosmetic talcums purchased during the period 1975-1978 [was] in progress. Preliminary results suggest that fewer products contain fibrous minerals." Rohl and Langer, "Fibrous Mineral Content of Consumer Talc-Containing Products" in *Dust and Diseases* (1979). The results of this subsequent analysis were never published; however, the results did not show that any of the cosmetic talcum products analyzed contained asbestos particles.

Through the 1970s, more data became available on the nature of asbestos minerals and how to distinguish between asbestos and non-asbestos particles. For example, detailed ultramicroscopic analysis of amphibole asbestos determined there existed a range of crystallographic properties that imparted these amphiboles with unique characteristics that permitted the microscopist to distinguish asbestos particles from non-asbestos particles. These included: the frequency of crystal defects, called twinning, on the angstrom level; the lack of orientation of unit fibrils parallel to the asbestos fiber length (which imparts the fiber or bundle with anomalous optical properties); and the presence of chain-width errors (Wadsley defects). These characteristics imparted the amphibole asbestos fiber with unique crystallographic anomalies which enabled the microscopist to better understand and interpret the information acquired. Distinguishing between amphibole asbestos varieties and elongated, non-asbestos particles became possible. Langer, *et al.*, "Distinguishing Between Amphibole Asbestos Fibers and Elongate Cleavage Fragments of their Non-Asbestos Analogues," in: *Mechanisms in Fibre Carcinogenesis* 253-283 (1991); Langer & Nolan, "Distinguishing Asbestiform Tremolite from Non-Asbestiform Tremolite" (1989).

In addition to the articles and resources referenced herein and on my *curriculum vitae*, and all citations therein, I will provide additional reliance materials upon request.


Arthur M. Langer, Ph.D.

02-13-2015
Date

Asbestos in J&J Baby Powder?**Doctor Admits He May Have Been Mistaken**

NEW BRUNSWICK — Johnson & Johnson officials yesterday denied a story which appeared in The New York Times, alleging that Johnson & Johnson's baby powder might contain asbestos fibers.

The doctor who performed the tests on which the charges were based said the story had been blown entirely out of proportion.

Dr. Arthur Langer of the Mt. Sinai Hospital Environmental Laboratory in New York City told The Home News that he had conducted the tests about 18 months

ago at the request of the city Environmental Protection Administration.

Langer tested one container of Langers baby powder and one of Johnson & Johnson's. "Foolishly I sent them a written report after looking at only two samples," he said.

"The data were very preliminary in nature, and what is more, I may have mistaken long talcum fibers for asbestos fibers. They have similar properties," the doctor said.

He continued, "It annoys the hell out of me—there are a lot more important things than looking for asbestos in talcum powder. For example they should be worrying about asbestos in spray paint and paper mache."

The Mt. Sinai lab has been actively involved in warning the public of the dangers of inhaling asbestos fibers. The primary danger is a long-term risk of contracting a rare kind of lung cancer.

Dr. Irving Selikoff, who heads the laboratory, has been a central figure in the controversy over asbestos fibers floating in the air at the Johns-Manville plant in Monville. Selikoff has diagnosed lung cancers in a number of former workers at that plant.

But Langer said the amount of asbestos he saw in the baby powder was "only a bare trace level." At the current state of medical knowledge, he said, there is no way of knowing if such a small quantity could be harmful.

Johnson & Johnson denied that it has any asbestos at all in its baby powder. A company spokesman, Lawrence Foster, said he has reports from three independent laboratories proving this.

The three labs are McCrone Associates in Chicago,

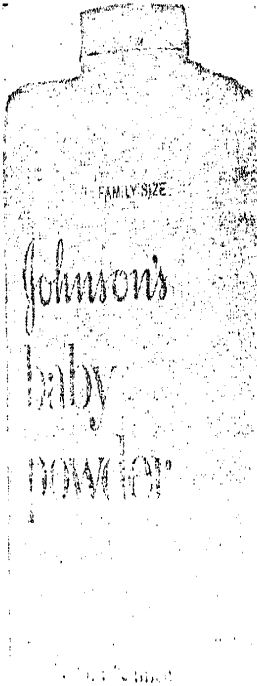
Fred Pool in Great Britain and the University of Colorado School of Mines.

"Whether there was a slight trace of something that Dr. Langer might have interpreted as asbestos is a minor point," Foster said.

"The important point is that he said the Times story was erroneous and out of perspective."

Langer agreed that there is "some controversy over what the levels are. It takes an electron microscope to see these fibers," he added.

"It's no secret to anyone that the type of rock that talcum is in usually contains asbestos," the doctor said. "Some talcum contains lots of asbestos, some very little. The Johnson & Johnson sample happens to be very pure talc."



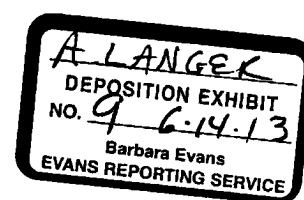
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EXHIBIT

Langer
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4/3/23 PW

PRODUCT NAME	STUDY NUMBER	TOTAL FIBER CONTENT-WEIGHT %
Cashmere Bouquet Body Powder	1	20 (Anthophyllite,tremolite)
Bauer & Black Baby Talc	21	15 (Anthophyllite,tremolite)
Coty Airspun Face Powder	11	11 (Tremolite)
Rosemary Talc	8	11 (Tremolite,anthophyllite)
ZBT Baby Powder	16	8 (Anthophyllite,tremolite)
Faberge Brut Talc	12	5 (Anthophyllite)
Yardley Invisible Talc for Men	6	5 (Tremolite)
Yardley Black Label Body Powder	15	4 (Tremolite,anthophyllite)
Mennon Shave Talc	7	2 (Tremolite)
English Leather After Shave Talc	17	2 (Anthophyllite)



Asbestos Found In Ten Powders

Ten out of 19 body and baby powders tested at Mount Sinai Hospital here were contaminated with asbestos fibers capable of causing a rare form of chest and abdominal cancer, researchers have reported.

Dr. Arthur Rohl, who conducted the tests with Dr. Arthur Langer, said of the findings: "There is no firm evidence on low-level or intermittent exposure, such as from using talcum powder. We don't know for sure what the danger level is."

The researchers said the contamination usually was found in the talc used in the powders. Asbestos fibers can cause mesothelioma, a chest and abdominal cancer, and can also result in the scarring of lung tissue and gastro-intestinal difficulties, Dr. Rohl said.

The researchers said that 10 of the 19 American samples contained from 2 percent to 20 percent asbestos fibers with the highest concentration in ZBT Baby Powder with Baby Oil, Cashmere Bouquet Body Talc, Coty Airspun Face Powder and Rosemary Talc range from 8 percent to 20 percent asbestos fibers.

Bauer & Black Baby Talc, which is no longer on the market, had a 15 percent concentration. Other powders containing less than 5 percent asbestos were Fabergé Brut Talc, Yardley Invisible Talc, Yardley Black Label Baby Powder, Mennen Shave Talc and English Leather After Shave Talc.

The manufacturers that could be reached for comment said that they were convinced that their products were safe and that their own tests had shown no asbestos. Only the manufacturer of Rosemary could not be reached.

The products that the researchers found uncontaminated with asbestos fibers were Ammen's Medicated Powder, Avon Bird of Paradise Beauty Dust, Diaperene Medicated Body Powder, two Johnson's Baby Powders (one made here and one in Britain), Johnson's Medicated Powder, Mennen Bath Talc, Yardley After Shave Powder and Yardley Original Body Powder.

The tests at Mt. Sinai, which Federal health officials described as the country's leading research facility looking into the possible dangers of asbestos, used an electron microscope, which Heinz J. Eirmann, director of cosmetics technology in the Food and Drug Administration, said was too expensive and time-consuming for his agency to use.

The experiments at Mt. Sinai, which Dr. Rohl described as the only significant inquiry on the subject ever held, were financed by a grant from the National Institute of Environmental Health Services and were begun in 1973.

New York Times - 3/10/76

RLY

MEMORANDUM OF MEETING

March 22, 1976

at

Environmental Sciences Laboratory
Mount Sinai School of Medicine
City University of New York

BETWEEN: Members of the Staff of Environmental Sciences Laboratories

Arthur M. Langer
Arthur N. Rohl

Division of Cosmetics Technology, FDA

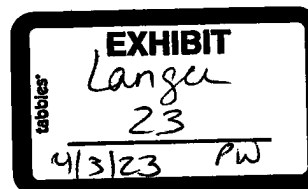
Clifton H. Wilson
Ronald L. Yates

SUBJECT: Analytical Methodology for the Detection and Determination of
Asbestos Minerals in Talc

Upon arriving at the laboratory, Dr. Wilson and Mr. Yates were greeted by Dr. Rohl. He stated that Dr. Langer would be present as soon as possible. Mr. Yates gave Dr. Rohl the cosmetic talc samples that Dr. Langer had agreed to analyze. In turn we requested and received subsamples of the 10 cosmetic talcs in which Dr. Langer reported the presence of tremolite and/or anthophyllite. These are:

1. Body powder, Cashmere-Bouquet
2. Rosemary talc
3. Brut for Men, Faberge
4. Air Spun Face Powder, Coty
5. Baby talc, Bauer and Black
6. Black Label, Yardley
7. After Shave talc, English Leather
8. ZBT Baby Powder
9. Invisible talc, Yardley
10. Shave talc, Mennen

Dr. Langer arrived approximately 30 minutes after our arrival. Mr. Yates presented him with the covering letter concerning the cosmetic talc samples DCST had provided for his analysis.



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Ex23

Dr. Langer, Dr. Rohl, Dr. Wilson and Mr. Yates then discussed the following topics:

Sample Preparation and Instrumental Conditions for Analysis of Talc by x-ray Diffraction. - Dr. Langer stated that he did not believe it possible to prepare a sample for x-ray analysis that had a completely random orientation of the crystal lattice. He did not think that random distribution was important if sample preparation techniques were consistent. Mr. Yates informed Dr. Langer that in the proposed CTFA method, preferred orientation was inevitable because the sample was pressed hydraulically. Dr. Langer thought the technique acceptable if consistent results were obtained. Dr. Langer demonstrated the sample preparation technique used by his group. After preparation was completed, sample was step-scanned in increments of 0.02° through the area of interest until a count of 2000 was obtained at each step. Divergence slits of 4° are frequently, although not always, used. When Dr. Wilson asked Dr. Langer about the possibility of scatter and high background from the use of a 4° slit, Dr. Langer stated that the use of a smaller slit would probably increase resolution and sensitivity. He was somewhat noncommittal about the effect of a 4° slit on quantitative results. Dr. Langer summed up by stating that if good standards are used and sample preparation is reproducible and consistent, reliable analytical results should be obtained. He said that all of the 10 samples found to contain tremolite and anthophyllite by x-ray diffractometry were examined by transmission electron microscopy using selected area diffraction to verify x-ray results. Dr. Langer was somewhat disgusted by the talc industry's attitude. He said the results of his work has been known to the industry for several years but nothing was done until the analytical results became public.

Tremolite. - Dr. Langer stated that tremolite and talc fibers can be easily differentiated using light microscopy. The cleavage of tremolite and anthophyllite is 90° to the crystal axis while talc has an angular cleavage. There is also a difference in refractive index. Tremolite and anthophyllite can be differentiated by the difference in aspect ratio. Dr. Langer demonstrated by preparing a slide of Cashmere Bouquet talc. Under the microscope tremolite was observed as short particles with 90° cleavage. Anthophyllite had the same cleavage but was definitely fibrous, having aspect ratios typically 30 or 40 to 1. Talc fibers appeared to have a cleavage of approximately 60° . Dr. Wilson asked Dr. Langer to examine a sample of tremolite he had brought along. Dr. Wilson said that he had been using the sample as a standard but that x-ray analysis indicated impurities. Dr. Langer examined the sample using

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optical microscopy. He stated it contained anthophyllite, tremolite, quartz and talc. X-ray analysis of the sample indicated talc, anthophyllite and tremolite. He had a microscopist on his staff examine the sample using optical microscopy. His analysis confirmed Dr. Langer's results. Dr. Langer stated that our tremolite standard was very impure and probably originated from New York. He gave Dr. Wilson the address of the Cape Asbestos Co. in London, a firm that could provide samples of Korean tremolite, considered to be the purest available.

Dr. Langer said detectability levels for tremolite was approximately 0.1% by x-ray diffractometry. If tremolite particles had aspect ratios of 3 to 1 or greater they were considered fibrous.

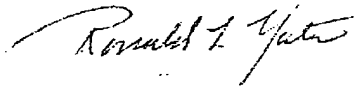
Chrysotile. - According to Dr. Rohl, detectability by x-ray fluorescence was 0.25% depending on size and crystallinity. Dr. Rohl had some photographs taken of chrysotile fibers (fibrils) using transmission electron microscopy (TEM). Photograph showed fibers containing several fibrils and individual fibrils. Aspect ratios were extremely high. When examining talcs by TEM a count of 3-5/grid square is considered background. In two of the 19 commercial cosmetic talcs examined, fiber counts of approximately 24 fibrils/grid square were obtained. Dr. Langer considered this to be quite low and probably not hazardous. In general he did not think that chrysotile was a real problem as far as cosmetic talcs were concerned. He refuted claims made by some that asbestos fibers were not present in the environment due to use of asbestos brake shoes in automobiles. He stated that they have analyzed dust obtained from auto brake drums and have identified asbestos fibers.

Nickel. - In reference to the high amounts of nickel present in some talcs, Dr. Langer said that nickel replaces magnesium in the talc lattice and becomes a nickel hydroxy silicate complex. He is not convinced that nickel is harmless in this form because of its similarity to nickel hydroxide, which has been found to cause rhabdomyosarcomas in rats when injected.

Transmission Electron Microscopy (TEM). - Dr. Rohl demonstrated the use of TEM for the analysis of talcs using previously prepared samples. Using a prepared sample of unknown identity, he pointed out structures typical of talc and tremolite. He also demonstrated that use of selected area diffraction. The crystal to be examined is centered on the screen and the beam is then passed through the area of the crystal desired. The diffraction pattern is displayed on the screen as a series of dots quite similar to a Laue photograph. The pattern can then be compared with those of standards for characterization.

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In general, the Environmental Sciences Laboratory is well equipped for mineralogical analysis having two transmission electron microscopes, two scanning electron microscopes, an x-ray diffractometer, an optical microscope and a differential thermal analyzer.

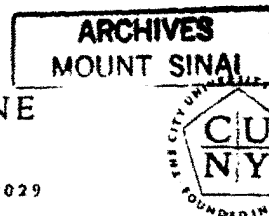
A handwritten signature in cursive script, reading "Ronald L. Yates".

Ronald L. Yates

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MOUNT SINAI SCHOOL OF MEDICINE
of The City University of New York
FIFTH AVENUE AND 100TH STREET • NEW YORK, N.Y. 10029



Department of Community Medicine

March 26, 1976

Miss Marian Burros
The Washington Post
1150 15th Street, N.W.
Washington, D.C. 20071

Dear Miss Burros:

I was astonished by your article in The Washington Post on March 26, 1976, astonished because of the inaccurate stance of the story, and the sly selections used in its preparation. These gave the impression that there was disagreement on my part and on the part of our Laboratory with the position of Dr. Thomas C. Chalmers.

This can only be characterized as a deliberate distortion, not a very difficult task, I presume, on the part of a skilled writer able to make use of omissions. Thus, I specifically stated that I was in agreement with Dr. Chalmers, that I thought his statement was carefully and accurately written. I repeated this to you, so that there be no misunderstanding. Nowhere in your story is this mentioned. And one would be hard put to believe that this is an inadvertent omission. Certainly, the omission serves to provide a "newsworthy" picture of a conflict among scientists, when there is no such disagreement.

A further example of skilled slanting is the use of the phrase "Selikoff acknowledged that the cosmetic industry has "gone ahead quietly and improved the talc..." I didn't "acknowledge," with its connotation of reluctance. Rather, I stated that the cosmetic industry was to be "congratulated" on having improved its product and that credit should be given where due. But this, too, didn't fit your perspective.

We could go on; for example, you questioned me on scientific problems such as differences in Mount Sinai versus FDA techniques, safe levels for asbestos, etc. In the story you place my remarks after your misstatement about my disagreeing with Dr. Chalmers' comments, leaving the impression that he may have said something to the contrary. He didn't - he didn't mention these subjects.

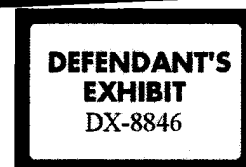
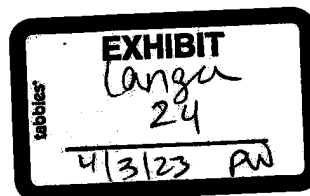
You obviously are a clever writer. It's unfortunate that your skills could not have been put to better use.

Sincerely yours,

Irving J. Selikoff
Irving J. Selikoff M.D.
Professor

IJS:jlr

cc: Managing Editor, Washington Post
Dr. Thomas C. Chalmers
Dr. David Pomrinse



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Talcum Study Clarified by N.Y. Hospital

By Marian Burros
Washington Post Staff Writer

Mount Sinai Medical Center in New York has issued a statement "to correct certain confusions" about reports of research work conducted at the hospital's Department of Environmental Medicine on the asbestos content of some talcum powders.

The Washington Post reported the findings on March 2.

The statement made Wednesday by the center's president, Dr. Thomas C. Chalmers, said:

- The only baby powder tested that was reported to show asbestos represented less than one per cent of the market and the sample was five years old.

- The talcum powders used in the study "had been purchased more than three years ago."

- Recent analyses by the Food and Drug Administration "have not revealed appreciable amounts of asbestos in talcum powder."

Chalmers also said, "The research work was of the highest technical quality and a significant contribution to the field."

Researchers in the Department of Environmental Medicine have taken exception to some parts of Chalmers' statement.

Arthur Rohl, research assistant in the department who worked on the talc study, said most of the powders had been purchased in 1973, but some were purchased as recently as 1975. Asbestos was found in some of the newer samples, he said, though "there was a decline in the amount."

Samples of 10 talcum powders were also purchased in a drug store in the last 10 days and are being studied now, Rohl said. "Fewer of them contain asbestos and those that do have generally lesser amounts."

Dr. Irving J. Selikoff, chairman of the department and a leading authority on occupational diseases, said the apparent discrepancy between FDA's findings and Mount Sinai's is due to a difference in technique. FDA's methods are not sensitive enough to measure asbestos below a certain level, he said. FDA "uses Differential Thermal Analysis (DTA) and optical microscopy. These are not as sensitive as electron microscopy," the method used at Mt. Sinai, Dr. Selikoff said.

FDA's director of cosmetics technology, Heinz J. Eiermann, said the methodology the FDA used to examine 76 cosmetic talcs in 1975 "has certain limita-

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Selikoff acknowledged that the cosmetics industry has "gone ahead quietly and improved the talc. But there is a huge chink in their armor. They were dusting people with asbestos all these years before, so what was put in the lungs before is still there."

"I certainly wouldn't want to be dusted with any asbestos. There is no safe level of asbestos known," Selikoff said.

The Occupational Safety and Health Administration of the Department of Labor addressed the same issue in a proposed amendment to regulations governing the limits of asbestos exposure for asbestos workers. In printing the proposal in the Oct. 9, 1975, Federal Register, OSHA said it recognizes that there is no assurance of a safe exposure for a substance with known carcinogenic properties, in this case asbestos, and thus there should be no detectable concentrations.

Ford Axle Plant Struck by UAW

STERLING HEIGHTS, Mich., March 25 (AP) — About 8,100 United Auto Workers union members have struck the Ford Motor Co. plant here, the sole producer of axles and drive shafts for Ford cars.

A UAW spokesman said the union was well aware a prolonged strike could mean layoffs at other Ford plants. A Ford official declined to estimate how long it might be before the strike could lead to shutdowns elsewhere.

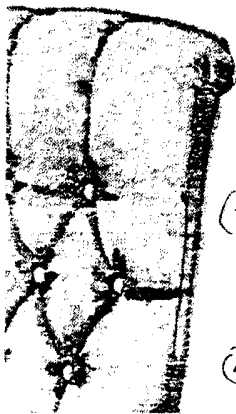
Navy Station Hangar Collapses, Injures 5

CORONADO, Calif., March 25 (AP)—An aircraft hangar under construction collapsed with "a terrific crash" today at North Island Naval Station, a spokesman said.

A base public affairs officer said later that five civilian workmen had been injured, one severely and four slightly.

Ambulances and fire units were sent to the scene at the tip of Coronado Island across San Diego Bay.

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Washington Post Staff Writer

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MOUNT SINAI

New Row On Sinai Talc Data

By MARIAN BUREOS

Washington Post

WASHINGTON—Mt. Sinai Medical Center in New York has issued a statement "to correct certain confusions" about reports of research work conducted at the hospital's Dept. of Environmental Medicine on the asbestos content of some talcum powders.

The Washington Post on March 8 reported the findings, which said that asbestos fibers were discovered in 9 of 19 baby and baby powders studied by the researchers.

Asbestos can cause mesothelioma, a rare form of chest and abdominal cancer, and asbestosis, scarring of lung tissue. In 1972 Dr. William J. Nicholson of Mt. Sinai reported that these diseases caused nearly 40 per cent of the deaths of New York-New Jersey asbestos workers.

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Selikoff also took exception to the statement issued by Mt. Sinai's Pediatrics Dept. that baby talc is safe and useful. He said: "I think they will live to regret it."

Dr. Horace H. Hodes, chairman of the department, is a member of the board of directors of Johnson & Johnson's Institute for Pediatric Service. The board advises Johnson & Johnson on disbursement of its funds for pediatric research. Members of the board receive no remuneration. Hodes declined to discuss his department's statement on the safety of baby talc.

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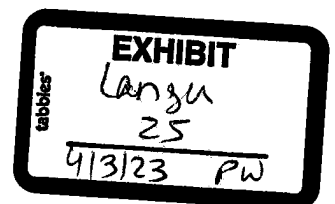
**Draft Comments on the NTP Draft
Report on Carcinogens Background
Document for
Talc Asbestiform and Non-asbestiform.**

John Addison, Arthur M. Langer

November 2000

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Dr. A.M. Langer
Professor & Director
Environmental Sciences Laboratory
Brooklyn College
The City University of New York



Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

John Addison, Arthur M. Langer

November 2000

Introduction

The Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-Asbestiform is a review of the relevant information necessary to the proposed listing of those substances as carcinogens by the National Toxicology Program Board of Scientific Counselors. It was prepared for the NTP by Technology Planning and Management Corporation for discussion. This document is a review some of the mineralogical and other aspects of the Draft Report.

Review

The report gives an entirely wrong impression of the nature of the asbestos issue in the talc industries by implying that there is widespread contamination of talc products by asbestiform minerals, and that therefore talc products should be listed as carcinogens in the Tenth Report on Carcinogens. There is no widespread contamination of talc products by asbestiform minerals. There are substantial regulations in place that preclude that possibility, and industry-wide agreement on the testing of products that is necessary to ensure that the regulations are met.

In general the terminology used by the Draft Report in its assertions is at times confusing, misleading, inappropriate and incorrect. In particular the Draft Report uses the term 'asbestiform' in different ways. In one definition it seems to mean that a mineral so described has all of the properties of asbestos; in another usage it means containing asbestos or asbestiform fibres. It can not be used in both ways. These are precisely the sort of misappropriations of established mineralogical terms that has led to the confusion surrounding asbestos in the past. They should be avoided now.

It is recommended that the practical definition for the physical characteristics of asbestos proposed for use by the American Society for Testing Materials (ASTM 1990), and cited by The Health Effects Institute (HEI 1991), should be used. They refer to *asbestiform* as follows:

"Asbestiform mineral fiber populations generally have the following characteristics when viewed by light microscopy: (1) many particles with aspect ratios ranging from 20:1 to 100:1 or

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

If there is still an argument as to whether 'asbestiform talc' actually exists at all then it is because of the lack of clarity in the definitions used. If 'asbestiform' means 'resembling asbestos' or 'having the morphology of asbestos' (following the ASTM definition), then asbestiform talc does exist as an extremely rare mineralogical curiosity.

In contrast, if 'asbestiform' means 'having all the properties of asbestos' (as in the NTP Report Definition) then asbestiform talc does not exist.

The many other minerals with rare fibrous varieties such as brucite, muscovite etc do not have all the properties of asbestos but they have often been described as asbestiform. These are some of the reasons why the ASTM definition of the term 'asbestiform' is preferred.

The question of whether true asbestiform talc (ASTM definition) would require listing as carcinogenic to humans is not addressed in the report but, given the extreme rarity of talc in the asbestiform habit there would be little need to do so. Exposure to dust from asbestiform talc could only ever be minimal and of short duration, and the exposed population would consist of a handful of mineralogist who, out of curiosity, have collected small samples. Furthermore the implantation experiments by Stanton et al (1981) showed that the mesothelioma potential of talc fibre was zero.

IARC have made the same errors in their documentation. They started correctly by describing the minerals that may be found in some talc deposits, which included *amphibole minerals (asbestiform and non-asbestiform)*. They correctly referred to *asbestiform tremolite* in talcs to which some miners and millers may have been exposed in a very limited number of areas, but then erred in their evaluation by referring to talc containing asbestiform fibres. They had no evidence whatsoever to generalise the evaluation beyond the asbestos minerals and one can only assume that this mistake was the result of insufficient mineralogical information, or that the mineralogical advice was ignored.

Talc containing asbestos may reasonably be concluded to be carcinogenic to humans, but then so would any other mineral product or material containing asbestos. It is absurd to suggest that all mineral products containing asbestos should be listed separately by the NTP, especially since the asbestos minerals are already listed.

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

tremolite/actinolite, anthophyllite, or chrysotile. These are the predominant asbestiform mineral species found in talcs.

Response:- "Asbestiform talc" does not generally refer to talc containing asbestiform tremolite/actinolite, anthophyllite or chrysotile: the term refers to the minerals with the asbestiform habit. We stress that the use of the adjective 'asbestiform' in this case modifies talc, not the minerals that might be present in it.

3 Statement:- *Unlike many chemical substances that are discrete entities definable by a fixed chemical structure, asbestiform fibers comprise a group of materials that are not easily defined. They have a broad range of chemical compositions and crystal structures, sizes, shapes, and properties, and have been described with diverse terminology.*

Response:- Asbestiform fibres are well defined. The list of minerals that may occur as asbestiform fibres is extensive and includes minerals from many disparate groups. However, it is not an easy matter to define them all simply in one blanket phrase or statement. Asbestiform minerals do not form a group in any mineralogical sense other than possessing the same habit, and possession of a common habit emphatically does not place two otherwise unrelated minerals in the same group. For example, asbestiform amphiboles are not in the same mineral group as asbestiform brucite; their unit fibrils are both structurally and chemically dissimilar.

4 Statement:- *The basic properties of minerals usually do not vary with different crystallization habits, but a noteworthy exception is the asbestiform habit.*

Response: The basic properties of the unit fibrils constituting minerals with asbestiform habit are generally the same as those of the minerals in the normal habit. Hardness, specific gravity, refractive indices, colour, chemical composition, basic crystal structure, crystal system etc are all unaffected by the possession of asbestiform habit. However, the bundles of fibrils found in asbestos do exhibit optical properties and the special properties of asbestos (high tensile strength etc.) that are markedly dissimilar to the non-asbestiform crystal forms. It is also clear that the normal varieties of amphiboles possess different toxicological properties, having lower carcinogenic potential than the asbestos varieties.

5 Statement:- *Although talcs can be virtually free of fibrous materials, they also have been*

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

7 Statement:- *Conflicting views have been expressed regarding the extent to which these fibrous constituents are asbestos. Table 1-3 summarizes information about the use of the term "asbestiform talc."*

Response:- Most of the views regarding the extent to which the fibrous components of talc are asbestos or not have in fact been resolved. Most have been found not to be asbestos. In raising *conflicting views* this report seeks to reverse the progress in descriptive mineralogy by re-inventing issues that have mostly been settled, certainly among mineralogists and materials scientists. Furthermore, Table 1-3 does not summarise information about the use of the term "asbestiform talc", it simply lists the asbestos minerals.

8 Statement:- *3.1.3 Summary The results of recent epidemiologic studies of the cancer risks associated with exposure to talc are largely consistent with the data evaluated by IARC in 1987. Occupational studies continue to suggest a moderate increase in lung cancer mortality among workers exposed to talc dust in talc mining and milling operations and in other industrial settings where talc was used, including the rubber and paper industries. Studies of facilities where the talc was known to have contained asbestos or been of fibrous form give the strongest evidence of risk (IARC 1987a, Lamm et al. 1988).*

Response:- Occupational studies do not continue to suggest a moderate increase in lung cancer mortality among workers exposed to talc. The only suggestions of such a risk comes from workers exposed to talc containing small amounts of asbestos. Almost all of the studies carried out on talc alone have shown no increased risk from talc. The authors of the report have consistently sought reasons to dismiss those studies finding no excess cancers while accepting as valid any study, however flawed, finding excess cancer.

9 Statement:- *Some studies of workers exposed to talc also identified other potentially carcinogenic occupational agents in the workplace. Talc miners in Vermont and Norway were potentially exposed to radon daughters in addition to talc dust; hardrock miners may also have been exposed to silica. Both agents are associated with increased risk of lung cancer and classified as carcinogenic by the IARC and the NTP, but the studies considered here did not adjust for these exposures.*

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

carcinogenicity of non-asbestiform talc in female rats based on an increased incidence of alveolar or bronchiolar adenoma and carcinoma of the lung (NTP 1993).

Response:-There is evidence from the original report on this inhalation study that the talc used actually contained significant amounts of tremolite (as reported to the study authors by McCrone Research, Chicago). If so then there could well have been asbestos present and the study could not inform as to the carcinogenicity of 'non-asbestiform talc'. Furthermore, the exposure regimes were such that the value of the study in informing about the possible carcinogenicity of talc is seriously undermined.

13 Statement:- 4.2 Asbestiform talc

The IARC reviewed the carcinogenic potential of asbestiform substances via various routes in various species up to 1987. The studies reviewed used Italian talc and commercial talc (IARC 1987a). The IARC also reviewed studies in which asbestiform fibers or different forms of asbestos (amosite, anthophyllite, crocidolite, chrysotile), without regard to mineralogy, were used (IARC 1977, 1987b). For evaluation of the carcinogenicity of asbestiform talc, asbestos is considered a reasonable surrogate, in part, because asbestos is the generic term for all naturally occurring fibers of mineral silicates of the serpentine and amphibole series (IARC 1977)

Response:- For the reasons discussed earlier in reference to the use of the term asbestiform it is clear that asbestos is not a reasonable surrogate in the evaluation of carcinogenicity for 'asbestiform talc'. Asbestos is emphatically not the generic term for all naturally occurring fibres of mineral silicates of the serpentine and amphibole series.

14 Statement:- 4.3 Summary. *Inhaled non-asbestiform talc was associated with increased incidences of benign or malignant pheochromocytoma of the adrenal gland in male and female rats and with an increased incidence of alveolar or bronchiolar adenoma and carcinoma of the lung in female rats.*

Response:-For reasons given above this study might not be used to inform as to the carcinogenicity of 'non-asbestiform talc'.

15 Statement:- *Italian and commercial talc (both presumably containing asbestiform fibers) did not significantly increase the incidences of tumors in rats when given orally or via intrapleural*

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

Response: This section is entirely based on the effects of asbestos minerals and does not inform as to the effects of asbestiform fibres.

19 Statement:- *6.3 Summary The current data indicate that inhaled talc containing asbestiform fibers induces effects in the lungs that are essentially identical to those associated with asbestosis. Asbestiform minerals may induce cancer by directly or indirectly interacting with DNA or may act as a tumor promoter*

Response:- In both of these statements the correct terms should be asbestos rather than asbestiform.

Concluding Comments

The report is mineralogically superficial and uninformed and cannot be used to gauge the value of the studies or their conclusions. It contains numerous errors and omissions. Too many of the references are listed as 'cited in' a second reference, giving the strong impression that the authors did not read and evaluate the original. Too often has a mineralogical statement been referenced to a physician (e.g. Morgan 1990) or a committee with no mineralogical expertise. The net result is that the report as it exists today should be withdrawn. The NTP is strongly advised to rely on the current listing for the asbestos minerals to provide protection against any commercial or industrial material containing asbestos, and to consider talc as a mineral alone. It may be difficult to find positive carcinogenicity studies for talc alone but that may only mean that talc per se is not carcinogenic to humans and should not be listed as such by the NTP.

Appendix

A number of other errors that may be of lesser significance to the substance of the Draft Report are included here because they further demonstrate that the report represents a very weak basis for the proposed listing of talc in the Report on Carcinogens

A1 Statement:- *Talc ($Mg_3Si_4O_{10}[OH]_2$, mol. wt 379.26, CASRN 14807-96-6) is a white to grayish-white, very fine crystalline powder (unctuous) consisting of natural hydrous magnesium silicate.*

Response:- The description given is oversimplified. Talc is not just a white to greyish-white,

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

A4 Statement:- *Some minerals have different names depending on whether they are asbestiform or non-asbestiform (e.g., the non-asbestiform of chrysotile is antigorite) (Morgan 1990).*

Response:- It is true that some minerals have been given different names for their asbestiform or normal crystal habits, (crocidolite and riebeckite, amosite and grunerite) but antigorite is not the non-asbestiform of chrysotile: chrysotile, lizardite and antigorite are different minerals within the serpentine mineral group, each with different crystal structures. Antigorite has a fibrous analogue called picrolite that fractures to produce crude columnar cleavage fragment fibres; these fibres are not asbestos.

A5 Statement:- *"Asbestiform habit" refers to the unusual crystallization habit of a mineral in which the crystals are thin, hair-like fibers. Historically, the definition of the asbestiform habit was based primarily on appearance, and the properties were only implied. At present, the definition of asbestiform habit often is augmented to include a statement on the properties of asbestiform fibers: shape; enhanced strength, flexibility, and durability; diameter-dependent strength; and unique surfaces. The fibers of asbestos are good examples of the asbestiform habit.*

Response:- These and many of the following statements were taken, word for word, from the 1984 National Research Council document Asbestiform Fibers Nonoccupational Health Risks pp28-30. This report was somewhat erratic in its use of the terms asbestiform and asbestos. Interestingly the NRC document is not included in the list of references of the Draft Report which is unusual given the extent to which it is copied.

The better definition of the term asbestiform (HEI) carries no implications of enhanced strength, durability etc. and there has been no general historical implication of these properties. The properties of enhanced strength, flexibility, durability, diameter-dependent strength and unique surfaces are uniquely displayed by the true asbestos minerals. Asbestiform brucite or gypsum do not possess these properties but they are still correctly referred to as asbestiform: they are never to be referred to as asbestos.

A6 Statement:- *"Acicular crystals" are crystals that are extremely long and thin and have a small diameter (an acicular crystal is a special type of prismatic crystal). However, small-diameter crystals with a high aspect ratio may be asbestiform if they are strong and flexible.*

Comments on the NTP Draft Report on Carcinogens Background Document for Talc Asbestiform and Non-asbestiform.

amosite or crocidolite (the tiger-eye of lapidarists) is a good example of a mineral with a fibrous appearance but with inseparable fibres. However, the strength and flexibility of a fibre is not the determinant of whether it is described as asbestiform or acicular. Fibrous brucite can be accurately described as asbestiform even though it does not exhibit high tensile strength.

A9 Statement:- *Talc is derived by alteration of mineral rocks after exposure to specific temperatures, pressures, and circulating liquid solutions or by the thermal metamorphism of silicon dolomites.*

Response:- This statement is both mineralogically and petrologically incorrect. All rocks and minerals are formed under more or less specific conditions of temperature, pressure and circulating fluids. The geological nomenclature is incorrect. Perhaps the authors mean that some talc deposits are formed from the thermal metamorphism of siliceous dolomite. Most talc deposits are formed during the retrograde metamorphism of ultrabasic rocks in the course of orogenesis.

A10 Statement:- **2.3 Analysis**

Response:- The whole of this section shows again that the authors have little understanding of the analytical methods used in occupational hygiene monitoring or in analytical testing. It is superficial, confused and oversimplified, consisting mostly of a list of NIOSH standards with snippets of information reproduced to confer a dubious authority.

A11 Statement:- **Table 2-3. Occupational airborne concentrations of talc dust**

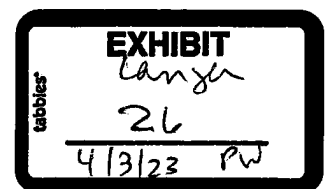
Response:- The table is incorrect. Concentrations in the header are expressed as $\mu\text{g}/\text{m}^3$ while the actual concentrations are mg/m^3 .

References

Dement, J.M. and R.D. Zumwalde. 1979. Occupational exposure to talc containing asbestiform minerals. In *Dusts and disease: proceedings of the conference on occupational exposures to fibrous and particulate dust and their extension into the environment*. R. Lemen and J.M. Dement, editors. Pathotox Publishers, Inc., Washington, DC. 287-305.

Comments on **Asbestos and Other Minerals**

Roadmap for Scientific Research
by
RP Nolan, AM Langer & E Rubin



Is there anything new in the roadmap?

- NIOSH's focus on expanding the definition of asbestos to include other fiber-types and cleavage fragments has a long history.

Others have addressed this issue

- CPSC – 2-4% Tremolite Asbestos in Children's Play Sand (1986) NEJM.
- 2-4% of the tremolite was blocky and only about 0.01% was fibrous but not asbestos.
- Scientific evidence was insufficient to regulate the cleavage fragments as asbestos.
- CPSC's Chair likened calling "cleavage fragments asbestos to hollering fire in a crowded theater."

OSHA had a Rule Making(1992)

NIOSH proposed a policy to OSHA almost identical to that found in the roadmap.

OSHA decided non-asbestos amphibole minerals should not be regulated as asbestos.

OSHA's Points

- No evidentiary basis to support the cleavage fragments (having the same morphology as asbestos) present a hazard similar to asbestos.
- Populations of cleavage fragments and asbestos can be distinguished.
- For most mineral deposit asbestos and nonasbestiform habit are distinguishable.

OSHA on Definitions

- Recommended non-asbestiform fibers should be defined using common mineralogical usage.
- OSHA does not recognize NIOSH's efforts to define asbestos – policy and analytical component.
- In the roadmap NIOSH discusses science but is developing definition based on policy needs?

NIOSH Definition of Asbestos

- Regulatory Definition –both policy and analytical components.
- NIOSH and other federal agencies have no scientific basis for developing mineral definitions.
- Mineralogist and others have developed the science used to identify minerals.

OSHA found the following

Mineral fiber should be regulated based on using mineralogical criteria to define them rejecting NIOSH's position that similarity in morphology is an acceptable criteria for inclusion in the asbestos standard.

Libby, Montana

Health Effects at
Libby are Asbestos-Related.

Libby fibers identified predominantly as winchite and richterite as well as tremolite asbestos. Roadmap quoting Meeker et al. (2003)

Libby Asbestos

Our analysis by analytical transmission electron microscopy found at least half of the asbestiform fibers from the vermiculite mine were in the tremolite-actinolite series and could be regulated asbestos.

Libby fibers provide no information about cleavage fragments. Nolan et al. (1991)

Fibrous Erionite

- The inhalation of fibrous erionite (0.6 million fiber/milliliter hours) by rats produced 96.6% mesothelioma and no lung cancers. Crocidolite (in the same experiment at 6 million fibers/milliliter hours) produced no mesotheliomas and 3.6% lung cancer. The two fiber-types had size distribution that were almost identical.
- We know of no human mesothelioma in the US associated with exposure to fibrous erionite.

Fibrous Talc

- Stanton et al. 1981 produced 100% tumor probability with two tremolite asbestos samples with 1380 and 692 fibers per microgram with ≤ 0.25 microns and ≥ 8 micron. A similar dose of fibrous talc (1995 fibers per microgram with ≤ 0.25 microns and ≥ 8 micron) produce no tumors.

Unified Fiber Theory

- From the experimental studies already in the literature indicate that morphology and biopersistence are not the keys to explaining fiber carcinogenesis.
- Both erionite and fibrous talc are thought to be biopersistent. Yet one is a powerful animal and human carcinogen and the other is not.

Expanding the Definition of Asbestos

- Hodgson and Darnton (2000) produced asbestos fiber-type specific risk assessments for human mesothelioma where the chrysotile: amosite : crocidolite increased in the carcinogenicity by 1:100:500.
- Do these three fiber-types belong in the same standard?

The Roadmap Comments on the continued use of Asbestos

- Worldwide amosite and crocidolite asbestos are no longer in commerce.
- Chrysotile asbestos continues to be used and contrary to NIOSH opinion about the low cost others may be impressed by the low health hazard associated with the controlled use of this asbestos fiber-type.

Asbestosis and Mesothelioma in the United States

- The NIOSH Roadmap claims 1,400 asbestosis death each year. Has been increasing since 1968.
- Indicates in Figure 4 there were over 4,000 mesothelioma in the US in 2004 and in the text below reports the number as 2,657 mesothelioma in 2004.

ARTHUR M. LANGER

December 14, 2005

Mr. William C. Ford
Senior Vice President
National Stone, Sand & Gravel Association
1605 King Street
Alexandria, Virginia 22314

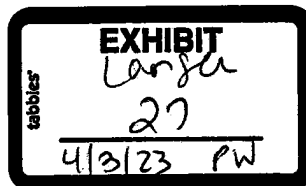
Dear Mr. Ford:

I have read the R. J. Lee Group (RJLG) critique of EPA's El Dorado Hills, Naturally Occurring Asbestos Multimedia Exposure Assessment and Site Inspection Report Interim Final (EPA-EDH) study. The RJLG critique was detailed, couched in solid mineralogical science, and one that I was in agreement with. The conclusion that I drew from reading both the original EPA-EDH study and the RJLG critique was that the El Dorado Hills study must either be repeated or the current report reinterpreted based on mineralogical science. As it stands now, it misrepresents and misinforms. Frankly, it must be considered flawed and its limitations recognized.

One of the more striking flaws discussed in RJLG's report concerns the misidentification of "tremolite-actinolite" fragments in El Dorado air samples. Lee and colleagues noted that the aluminum content of many of the particles identified as actinolite exceeded 0.5 Al atoms per formula unit (pfu). Based on current nomenclature of amphiboles (Leake et al., 1997), these would be classified as common hornblende cleavage fragments. I know of no report in the world literature that describes the occurrence of hornblende asbestos. Dr. Wiley, with her colleague Jennifer Verkouteren, recently published on the chemistry of minerals in the tremolite-actinolite series and found for all asbestiform varieties the aluminum content never exceeded 0.3 Al atoms pfu.

Further, the aspect ratio (length : width) of these fragments, as well as particles analyzed in the soil samples, display values that push them well into the cleavage fragment category. About 95% of the amphibole fragments greater than 5 microns in length display width values greater or equal to 0.5 microns. Dr. Wiley's work is also instructive in this regard; these fit into the prismatic cleavage fragment classification rather than asbestos. None of the fragments found in soil was described as possessing any of the asbestiform habit character, e.g., polyfilamentous nature. The identification of amphibole asbestos "fibers" in both air and soil in the EPA-EDH study is therefore grossly exaggerated and its characterization of the amphibole particles as asbestos is in large part wrong. The RJLG critique correctly identified these flaws.

The US EPA should consult with their geology experts on the importance of



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distinguishing among these silicate minerals. For example, hornblende is a common rock-forming silicate mineral in both igneous and metamorphic rocks and any policy or regulatory action based on ambiguous identification criteria would have serious repercussions. Tremolite-actinolite is found in schists and gneisses, contact metamorphic terrains, metamorphic limestone, and is found as replacement minerals in, e.g., pyroxenes. It is also ubiquitous. Their presence distinction and identification is but one important issue; their morphological habit is another. The form of the mineral must be determined with certainty, or a narrowly defined problem might enlarge to become a major national one.

The EPA-EDH study should have incorporated among the discussion and results statements regarding what their data mean in terms of hazard or risk to various segments of the population in El Dorado County. What did the “fibrous” fragments on the air filters mean in terms of hazard? The issue of biological activity among the fiber types, the activity of cleavage fragments as compared to fibrils of amphibole asbestos minerals, importance of fiber length and mesothelioma risk, the absence of chrysotile in the El Dorado soil samples and paucity of its presence in air samples, are critical issues. There is much to define here. The EPA should follow the existing policy of OSHA and not be concerned with cleavage fragments.

Many of the elongated particles noted on the air filters and present in the soil samples are, regardless of composition, cleavage fragments. Although some are greater than 5 microns in length (~ 2 % are) their average aspect ratio is unlike any asbestos population I have measured in my laboratory or have seen in published literature. Further, the selected area electron diffraction patterns reported by EPA, as well as those in RJLG’s document, indicate that the amphibole particles were cleavage fragments. The indexed selected area electron diffraction patterns recorded and indexed are not commonly found on standard amphibole asbestos fibrils. Differences in planes of separation of asbestos and non-asbestos analogues allow their diffraction studies to be used to distinguish between the two. I published, with my colleagues Dr. Nolan and John Addison, an overview of these criteria.

Parenthetically, I have examined two tremolite asbestos samples obtained from the El Dorado area. These two displayed all the characteristics of asbestiform fibers: by polarized light microscopy they were found to form polyfilamentous fiber bundles, unit fibrils in the fiber bundles were just at or below the resolution of the light microscope, the polyfilamentous fiber bundles exhibited both anomalous and only two indices of refraction (described by Dr. Wiley in an EPA 1979 report concerning asbestos in school buildings, authorship included Drs. Rohl and Langer,), and parallel extinction was exhibited by fiber bundles (tremolite is monoclinic and single crystals and cleavage fragments exhibit angular extinction) when viewed between crossed Nicols employing polarized light microscopy. These amphibole asbestos fiber bundles behaved optically like orthorhombic minerals. The US EPA published these optical differences of asbestos fibers and non-asbestiform cleavage fragments in 1979.

By transmission electron microscopy the tremolite asbestos fibrils lay predominantly on the (100) twin plane rather than the common {110} monoclinic amphibole cleavage plane, and electron diffraction pattern analysis indicates this preferred orientation and the prevalence of low order reflections. Tremolite asbestos does exist in El Dorado County. However, non-asbestiform tremolite and other amphiboles exist as well, and their morphological habits form prismatic cleavage fragments when crushed. Every effort must be made to distinguish between the two. The RJLG critique correctly identified this shortcoming.

I am not convinced that soil analysis or air assays for the presence or absence of asbestiform fibers is the first step in identification of a potential asbestos problem. Drs. Ross, Nord and I recently wrote to the MSHA Docket Officer regarding the proposed changes to their asbestos standard. We stated that the first step in identification of asbestos in a mineral deposit is an on site geological survey. The question to be answered is whether or not asbestos is present in an outcropping. El Dorado County has asbestos in defined areas and these are the areas that should be explored first. Additionally, the investigation should bear in mind the critical importance of defining identity and habit of the minerals present.

The RJLG critique of the EPA-EDH study, concerning amphibole mineral particles in the environment is sound and based on well-documented mineralogical studies. The EPA-EDH study contains critical flaws resulting in an overwhelming number of false-positive identifications of asbestos in the air and soil. As a result, the EPA-EDH study cannot, and should not, be used for policy development or regulatory action. It must be reconsidered.

The RJLG criticism of the EPA-EDH study should be viewed as a constructive critique. I don't believe that it was meant to embarrass or demean the agency, its staff, or its consultants. I believe it offered an honest effort to provide insight into the inherent complexities of the mineralogy issues discussed in the EDH study.

Sincerely,

Arthur M. Langer Ph.D.

DRP

Johnson & Johnson

MAJ Lee

RECEIVED

MAR 30 1976

D.R. PETTERSON

BABY PRODUCTS COMPANY

NEW BRUNSWICK, N. J. 08903

March 26, 1976

Dr. Thomas C. Chalmers
Mount Sinai Medical Center
Guggenheim Pavilion, 8th Floor
Fifth Avenue
New York, N. Y. 10029

Dear Dr. Chalmers:

Attached is a copy of the Washington Post's treatment of your press release in this morning's paper. It also was carried in its entirety by the Washington Post Wire Service, which goes to 340 newspapers nationally.

The article falls far short of our mutual goal of reassuring consumers about the safety of present day talcum powders. In fact, statements attributed to Dr. Selikoff and his staff, allegedly commenting on your press release, served only to perpetuate and increase public anxiety.

Dr. Selikoff's inflammatory remarks have once again been "supported" with references to data not published or reviewed with other experts. (Once again there is confusion about simple facts, like whether there are 6 or 10 recently purchased samples, and whether some of the original 19 samples were purchased more recently than 1973.) Dr. Selikoff and staff continue to treat their findings as facts, ignoring Dr. Pooley's results, dismissing FDA results, promulgating the no dose-response thesis, implicitly attributing the effects of chrysotile to tremolite, etc.

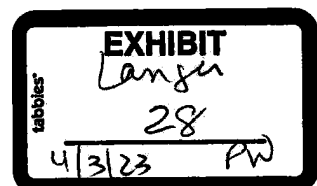
I am particularly disturbed by Dr. Selikoff's "chink in their armor" remark. If the chink exists in fact, it clearly has potential for alarming the consumer, embarrassing the industry, and publicizing Dr. Selikoff, but its potential for any constructive effect appears nil.

Very truly yours,

Don Johnston
D. D. Johnston
President

Attachment

P.S. After finishing this letter, I learned that the New York Post today quotes some additional intemperate remarks by Dr. Selikoff, taking exception to the characterization of baby powders as useful and safe.



J&J-0149939

JNJ 000304381

Johnson & Johnson

March 31, 1976

Subject: MEETING WITH JOHNSON & JOHNSON PERSONNEL AND THE
MT. SINAI SCHOOL OF MEDICINE

TO: FOR THE RECORD

On Monday, March 22, 1976, a meeting was held with Dr. Thomas C. Chalmers, President of the Mt. Sinai School of Medicine, Dr. S. D. Pomrinse of the Medical School, and Mr. Samuel Rovner, Director of Personnel Relations for Mt. Sinai. Johnson & Johnson was represented by Mr. D. D. Johnston, Mr. J.E. Burke, Dr. D. Petterson, Mr. L. Foster and Dr. G. Hildick-Smith. The object of the meeting was to review with the Mt. Sinai Medical School management the need for a statement from them correcting the record in the press to indicate that baby talc is safe, the samples of talc assayed by the Selikoff group were at least 3 years old and that nickel-containing talc was not a health hazard.

Initially, Dr. Chalmers, who had clearly given a lot of thought to the issue, suggested that it might be wisest if all parties forgot the whole incident and that nothing would be gained by obtaining a retraction from the Mt. Sinai Medical School. It was pointed out that a follow-up story in the media and press would have less impact than the initial story. Johnson & Johnson representatives however, clearly expressed their desire to have a retraction statement to not only allay the fears of many anxious parents but to correct the record concerning the safety of baby talc and the fact that Mt. Sinai scientists had failed to report that the samples studied were at least three years old.

The Mt. Sinai group indicated that over the weekend the Selikoff group had been studying 6 new samples of talc and had reported that all of them contained minimal amounts of asbestos. The Mt. Sinai management thought that this information should be in the retraction statement, but the Johnson & Johnson group assured the Mt. Sinai management that such a statement should be avoided in case the analysis by the Selikoff group was in error.

It was pointed out to the Mt. Sinai management that the Selikoff group had published in the papers about the presence of asbestos in talcs in 1971 and had been forced to retract their statement as it was erroneous. It was also pointed out that Dr. Langer was a co-author of a paper to be presented at the Edinburgh meeting in the fall of 1975 on the asbestos



content of English and U. S. talcs but that Dr. Pooley, the co-author, had not presented the paper as the data developed by Pooley differed greatly from the Langer data in that the Pooley data showed only 4 talcs containing asbestos as opposed to 9 reported by Langer. The Mt. Sinai management professed not to be aware of the difference in the Pooley/Langer data and was somewhat surprised to see the information when it was presented to them.

A discussion took place concerning the content of a retraction statement. An agreement was reached on the content of such a statement. Dr. Chalmers indicated that he would write a covering note for this statement and that it would be released to the news media. The Mt. Sinai management reluctantly agreed to release a statement to correct the record on talc published in the news media. The meeting was an amicable one.

A handwritten signature in dark ink, appearing to read 'G. Hildick-Smith', with a stylized, looping flourish extending upwards and to the right.

G. Hildick-Smith

GHS/tm

Johnson & Johnson

March 31, 1976

Subject: TELEPHONE CALL FROM DR. HODES

TO: FOR THE RECORD

RECEIVED
APR 2 1976

D.D. PETERSON

The Show

At 3:30 PM, March 26, 1976, Dr. Hodes called to inform us that the N. Y. POST had an article resulting apparently from an interview with Dr. Selikoff. The article intimated that Dr. Selikoff disagreed with Dr. Hodes, (Chairman of the Department of Pediatrics) in relation to the safety of talc and that "they would live to regret their statement". Dr. Hodes considered this a personal attack on his integrity and intended to have the matter corrected. He indicated that perhaps Dr. Selikoff would "live to regret his actions". Dr. Hodes indicated that he believed that Dr. Selikoff had approved the retraction statement given the press by Dr. Chalmers and was very concerned about Dr. Selikoff's change in attitude towards the safety of talc.

*yes, this
was confirmed
by Dr. Chalmers
Selikoff stated
that Dr. Hodes stated
the interview
was he had made*

Gavin Hildick-Smith

CHS/tm

cc: Dr. D. Petterson
Mr. D. Johnston
Mr. L. Foster

cc: [initials]

tabbies	EXHIBIT
	Langer
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	4/3/23 PW

J&J-0150014

ARCHIVES
MOUNT SINAI

March 30, 1976

Mr. D. D. Johnston
Johnson & Johnson
New Brunswick, N. J. 08903

Dear Mr. Johnston:

I was terribly distressed, when I returned from Canada, to read the articles in the Washington and New York Posts. I had been confident that the press release with which Dr. Selikoff had agreed, and my talking to the various faculty members involved had ended the matter. I did not count on the apparent skill of Ms. Burros.

Upon my return, I found that Dr. Selikoff had already sent a letter to Ms. Burros and I quote from that letter:

".....I specifically stated that I was in agreement with Dr. Chalmers, that I thought his statement was carefully and accurately written. I repeated this to you, so that there be no misunderstanding. Nowhere in your story is this mentioned."

I honestly believe that he and Dr. Rohl were tricked. I had spent a half-hour talking to Ms. Burros from Canada and found myself constantly dodging various roundabout ways to get me to make a compromising statement.

I sincerely apologize for our apparent inability to coordinate our responses to the press in such a way as to allay undue public anxiety. Please be assured that any further releases of unpublished material or comments to the press will be properly cleared. With regard to this episode, I see nothing to be gained by further attempts to set the record straight. An irresponsible press always has the last word.

DEFENDANT'S
EXHIBIT
DX-8847

Sincerely,

Thomas C. Chalmers, M.D.
President and Dean

EXHIBIT

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SUPERIOR COURT OF CALIFORNIA
COUNTY OF ALAMEDA

ANTHONY HERNANDEZ VALADEZ,)
Plaintiff,)
v.) CASE NO. 22CV012759
JOHNSON & JOHNSON, et al.,)
Defendants.)

VIDEOTAPED DEPOSITION OF ARTHUR M. LANGER, Ph.D.
Williamsburg, Virginia
Monday, April 3, 2023
9:56 a.m.
Pages 1 - 249

Reported by: Penny C. Wile, RMR-CRR
Job No. AW5806091

1 Videotaped deposition of ARTHUR M. LANGER, Ph.D., 2 held at: 3 4 5 6 WILLIAMSBURG LODGE 7 310 S. England Street 8 Williamsburg, VA 23185 9 10 11 12 Pursuant to agreement, before Penny C. Wile, 13 Registered Merit Reporter, Certified Realtime Reporter, 14 and Notary Public for the Commonwealth of Virginia. 15 16 17 18 19 20 21 22 23 24 25 Page 2	1 A P P E A R A N C E S 2 3 ON BEHALF OF THE DEFENDANTS ALBERTSONS COMPANIES, INC., 4 ALBERTSONS COMPANIES, INC. sii/pae/et LUCKY STORES, 5 INC., LUCKY STORES, INC., SAFEWAY, INC., SAVE MART 6 SUPERMARKETS, SAVE MART SUPERMARKETS sii/pae/et LUCKY 7 STORES, INC., TARGET CORPORATION, WALMART, INC.: 8 MITCHELL CHARCHALIS, ESQUIRE 9 BARNES & THORNBURG, LLP 10 2029 Century Park East, Suite 300 11 Los Angeles, CA, 90067 12 (310)284-3880 13 mcharchalis@btlaw.com 14 (Via Videoconference) 15 16 17 Also present: Jeremy Belcher, Videographer 18 19 20 21 22 23 24 25 Page 4
1 A P P E A R A N C E S 2 3 ON BEHALF OF THE PLAINTIFF: 4 JOSEPH D. SATTERLEY, ESQUIRE 5 KAZAN, McCLAIN, SATTERLEY & GREENWOOD, PLC 6 55 Harrison Street, Suite 400 7 Oakland, CA 94607 8 (510)302-1000 9 jsatterley@kazanlaw.com 10 11 ON BEHALF OF THE DEFENDANTS JOHNSON & JOHNSON, LTL 12 MANAGEMENT, LLC ssi/pae/et JOHNSON & JOHNSON BABY 13 PRODUCTS COMPANY, LTL MANAGEMENT, LLC sii/pae/et JOHNSON 14 & JOHNSON CONSUMER, INC.: 15 MATTHEW K. ASHBY, ESQUIRE 16 KING & SPALDING 17 633 West 5th Street 18 Los Angeles, CA 90071 19 (213)443-4345 20 mashby@kslaw.com 21 22 23 24 25 Page 3	1 C O N T E N T S 2 3 EXAMINATION OF ARTHUR M. LANGER, Ph.D. PAGE 4 By Mr. Satterley 9 5 By Mr. Ashby 77 6 By Mr. Satterley 213 7 By Mr. Ashby 236 8 By Mr. Satterley 241 9 10 11 12 E X H I B I T S 13 (Attached to the transcript) 14 NO. DESCRIPTION PAGE 15 Exhibit A Deposition notice 9 16 Exhibit 1 Photograph 13 17 Exhibit 2 Photograph 20 18 Exhibit 3 Photograph 22 19 Exhibit 4 Photograph 24 20 Exhibit 5 Photograph 26 21 Exhibit 6 Photograph 27 22 Exhibit 7 Photograph 30 23 Exhibit 8 Photograph 32 24 Exhibit 9 Fibrous and Mineral Content of Cosmetic 25 Talcum Products; Cralley, et al. 32 Page 5

1	EXHIBITS			1	EXHIBITS		
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3	NO. DESCRIPTION PAGE			3	NO. DESCRIPTION PAGE		
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1	EXHIBITS			1	PROCEEDINGS		
2	(Attached to the transcript)			2	THE VIDEOGRAPHER: We are now on the video 09:56:00		
3	NO. DESCRIPTION PAGE			3	record. Today's date is April 3rd, 2023, and the time 09:56:01		
4	Exhibit 20 Article: Doctor Admits He May Have			4	is 9:56 a.m. Today's witness is Arthur Langer. Counsel 09:56:05		
5	Been Mistaken 93			5	have agreed to waive the usual videographer's 09:56:09		
6	Exhibit 21 Key 114			6	introduction. 09:56:12		
7	Exhibit 22 Asbestos Found in Ten Powders 136			7	Will counsel please introduce themselves, 09:56:12		
8	Exhibit 23 Memorandum of Meeting, March 22, 1976 152			8	starting with plaintiff's counsel, and the court 09:56:14		
9	Exhibit 24 March 26, 1976 letter to Marian Burros			9	reporter will please swear in the witness? 09:56:14		
10	from Dr. Selikoff 161			10	MR. SATTERLEY: Good morning. Joe 09:56:16		
11	Exhibit 25 Draft Comments on the NTP Draft Report			11	Satterley on behalf of Anthony Hernandez Valadez. 09:56:17		
12	on Carcinogens Background Document for			12	MR. ASHBY: Good morning. Matthew Ashby 09:56:21		
13	Talc Asbestiform and Non-asbestiform,			13	for Johnson & Johnson and LTL. 09:56:22		
14	November 2000 175			14	MR. CHARCHALIS: Good morning. Mitchell 09:56:26		
15	Exhibit 26 Comments on Asbestos and Other			15	Charchalis on behalf of the retailer defendants. 09:56:28		
16	Minerals, Roadmap for Scientific			16	MR. SATTERLEY: If you could swear the 09:56:32		
17	Research 179			17	witness. 09:56:33		
18	Exhibit 27 December 14, 2005 letter to Mr. Ford			18	(Exhibit A was marked and		
19	from Dr. Langer 201			19	attached to the transcript.)		
20	Exhibit 28 March 28, 1976 letter to Dr. Chalmers			20			
21	from D. D. Johnston 219			21	ARTHUR M. LANGER, Ph.D.,		
22	Exhibit 29 Notes, March 31, 1976: Meeting with			22	having been sworn, testified as follows:		
23	Johnson & Johnson Personnel and the			23	EXAMINATION BY COUNSEL FOR THE PLAINTIFF: 09:56:42		
24	Mt. Sinai School of Medicine 224			24	BY MR. SATTERLEY: 09:56:42		
25				25	Q. Good morning. Introduce yourself to the 09:56:43		
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1 jury. 09:56:45 2 A. I am Arthur M. Langer, L-A-N-G-E-R. My 09:56:46 3 current status is professor emeritus. The title, of 09:56:56 4 course, is long and lengthy, as a professor emeritus of 09:57:00 5 the doctoral program in earth and environmental sciences 09:57:04 6 at the graduate school of City University of New York. 09:57:09 7 So I'm retired. That's a long term for retirement. 09:57:16 8 Q. We're here in a case for Anthony Hernandez 09:57:19 9 Valadez involving his exposure to Johnson & Johnson. 09:57:22 10 Have I asked you to tell us a little bit about your 09:57:25 11 history with regards to Johnson & Johnson? 09:57:28 12 A. Johnson & Johnson specifically. Johnson & 09:57:32 13 Johnson was a -- a producer of a talcum powder available 09:57:41 14 to the general public. When I first started at Mount 09:57:47 15 Sinai, as the Mount Sinai Hospital, in 1965 I became 09:57:55 16 interested in the study of baby powders, just generic 09:58:01 17 baby powders. As a result of our study at Mount Sinai 09:58:06 18 on the occurrence of objects called asbestos bodies in 09:58:13 19 the lungs of people in the general population coming to 09:58:19 20 autopsy in New York City, the asbestos body was a marker 09:58:26 21 for -- following the exposure to asbestos dust in the 09:58:34 22 workplace and used as an index of exposure. 09:58:40 23 It was an interesting marker indicating 09:58:48 24 that the agent responsible for scarring of the pulmonary 09:58:52 25 tissues, the lung tissues, was the fiber itself. We 09:59:02 Page 10	1 include Johnson & Johnson? Well, it just happened. 10:01:28 2 Q. Sure. 10:01:31 3 A. But there were lots of other powders that 10:01:32 4 we studied. 10:01:35 5 Q. So -- 10:01:39 6 MR. ASHBY: Just let me ob -- object as 10:01:40 7 nonresponsive. Object -- 10:01:42 8 BY MR. SATTERLEY: 10:01:43 9 Q. So we're going to talk specifically about 10:01:43 10 Johnson & Johnson in more detail, and we're going to 10:01:45 11 talk about your history. And I've marked as exhibits 10:01:47 12 some photographs. 10:01:50 13 And before I get to the photographs, did 10:01:50 14 you in 1971 identify chrysotile asbestos in Johnson's 10:01:52 15 Baby Powder? 10:02:01 16 A. Yes. 10:02:01 17 Q. Did -- 10:02:04 18 A. Yes. 10:02:04 19 Q. Did you meet a Dr. Gavin Hildick-Smith in 10:02:05 20 1971? 10:02:08 21 A. Approximate at that time, yes. 10:02:10 22 Q. And did you advise -- oh, did you 10:02:12 23 understand he -- he -- Dr. Gavin Hildick-Smith to be 10:02:15 24 with Johnson & Johnson? 10:02:19 25 A. Yes. 10:02:19 Page 12
1 found in a study of 3,000 consecutive autopsies in New 09:59:09 2 York City that a number of these individuals who came to 09:59:13 3 autopsy had what appeared to be asbestos bodies in their 09:59:16 4 tissues. 09:59:21 5 We could not determine where their 09:59:25 6 exposures to these mineral fibers occurred. We were 09:59:29 7 interested in the source of either asbestos or 09:59:35 8 elongated -- today we refer to them as elongated mineral 09:59:41 9 particles. We were seeking sources of fiber, of mineral 09:59:47 10 fiber, to explain why these objects were present in 09:59:57 11 these tissues and no other exposure could be -- could 10:00:02 12 account for these objects. 10:00:10 13 I at that time as a mineralogist suggested 10:00:14 14 that there were other mineral products that contain 10:00:19 15 fibers that may form these bodies. They were later 10:00:28 16 called ferruginous bodies because these objects were 10:00:34 17 coated with an iron protein material. 10:00:38 18 And one of the products which was commonly 10:00:41 19 used by persons in the general population were powders, 10:00:44 20 talcum powders. And so you asked specifically for 10:00:51 21 Johnson & Johnson. The -- one of the canisters that we 10:00:56 22 originally studied was a -- a Johnson & Johnson Baby 10:01:04 23 Powder, but the -- the study was a study of a generic 10:01:09 24 group of materials marketed as powders, talcum powders. 10:01:15 25 So you -- your -- your question is did we 10:01:26 Page 11	1 Q. And did you advise him that you found 10:02:20 2 chrysotile asbestos in Johnson's Baby Powder? 10:02:23 3 A. Oh, you're using the word advise. I -- I 10:02:25 4 told him at a -- a seminar that these were my findings, 10:02:28 5 yes. 10:02:36 6 Q. And we'll talk about -- oh, did you later 10:02:36 7 in the '70s look at more Johnson & Johnson Baby Powder? 10:02:39 8 A. Yes. 10:02:43 9 Q. Okay. We'll talk about that in more 10:02:43 10 detail. 10:02:45 11 Let's go to the photographs. 10:02:45 12 (Exhibit 1 was marked and 10:02:45 13 attached to the transcript.) 10:02:45 14 BY MR. SATTERLEY: 10:02:45 15 Q. Exhibit 1, I've -- I've handed to Johnson 10:02:49 16 & Johnson's attorney, these -- these photographs. 10:02:51 17 Let's -- let's talk about them. If you could flip them 10:02:52 18 around and show the camera and -- and -- and -- and tell 10:02:54 19 us all who -- and right over here, Dr. Langer. 10:02:57 20 A. Oh, hello. 10:03:02 21 Q. Okay. All right. So who's in these -- 10:03:02 22 who's in Exhibit 1? Who's -- who's represented here? 10:03:05 23 A. Okay. May I? There are four seated 10:03:08 24 figures and two standing figures. The figure 10:03:16 25 immediately on the left side of the photograph seated is 10:03:19 Page 13

1 Dr. Mortimer Bader, B-A-D-E-R. Morty Bader was in the 10:03:25 2 Department of Medicine, Mount Sinai Hospital, later in 10:03:32 3 the Department of Medicine, Mount Sinai School of 10:03:35 4 Medicine. Morty Bader developed the pulmonary function 10:03:38 5 laboratory in the Department of Medicine. 10:03:44 6 Morty Bader was the senior author in 10:03:48 7 the -- of the study of asbestos-exposed workers in 10:03:56 8 Patterson, New Jersey at the facility called Unarco. 10:03:59 9 And it was he and Irving Selikoff and a number of others 10:04:04 10 in the Department of Medicine that defined asbestosis as 10:04:08 11 a pulmonary alveolar block syndrome, which was a major 10:04:15 12 contribution at that time. 10:04:21 13 The disease, the scarring of the lungs, 10:04:23 14 was in a pattern which was not like a -- silicosis, but 10:04:26 15 the -- the asbestosis was, I suppose you could use the 10:04:34 16 word, more sinister in that the scarring was minimal, 10:04:39 17 but it occurred at the exchange of gases from oxygen and 10:04:44 18 carbon dioxide, an alveolar capillary block, which the 10:04:51 19 scar tissue was at that narrow, small tissue of a -- a 10:05:01 20 -- a single cell. 10:05:10 21 Q. And who's next to him? 10:05:11 22 A. Next to him, in the center basically, is 10:05:12 23 Kyler Hammond. 10:05:19 24 Q. And -- and who is Kyler Hammond? 10:05:20 25 A. Kyler Hammond was involved in the 10:05:22 Page 14	1 was chief pharmacologist for IG Farben in Germany. He 10:07:37 2 was brought out of what -- I think of Dachau by Hoffman 10:07:43 3 LaRoche. They took him over to Canada and then down to 10:07:52 4 Nutley, New Jersey where he worked on isoniazid and 10:07:59 5 developed that compound at the same time Waksman did for 10:08:04 6 the treatment of tuberculosis. 10:08:07 7 Q. Who's standing? 10:08:09 8 A. Standing on the left side, a biologist, 10:08:10 9 Dr. Victor Baden. He and I worked and -- worked 10:08:15 10 together in the study of asbestos bodies and fibers in 10:08:22 11 the lungs of persons in New York City. 10:08:26 12 And this young guy standing to the 10:08:33 13 absolute right is what I looked like -- what I looked 10:08:35 14 like long ago. 10:08:39 15 Q. This is early in your career? 10:08:40 16 A. Very early in my career, yes. This is 10:08:41 17 about 1960, maybe '67. 10:08:44 18 Q. So you're a mineralogist? 10:08:47 19 A. I am trained, yes, in mineralogy. I was 10:08:50 20 trained at Columbia University. I have a master's and a 10:08:54 21 Ph.D. from Columbia University. I studied various 10:08:58 22 mineralogical issues. 10:09:04 23 I was recruited by Irving Selikoff in 1965 10:09:06 24 to join his newly formed unit, Environmental Sciences 10:09:11 25 Lab -- actually, it was Environmental Medicine. This 10:09:17 Page 16
1 development of the design of the insulation workers, the 10:05:28 2 study by Irving Selikoff and colleagues. Kyler Hammond 10:05:32 3 was the vice president of statistics and epidemiology at 10:05:37 4 the American Cancer Society. He was a statistician, an 10:05:42 5 epidemiologist. And it was his studies with Irving 10:05:48 6 Selikoff that defined the -- the hazards associated with 10:05:55 7 asbestos-containing products. 10:06:02 8 Q. And is Selikoff, Dr. Selikoff, sitting 10:06:04 9 next to Dr. Hammond? 10:06:07 10 A. Next to Kyler Hammond is Irving Selikoff. 10:06:08 11 Irving Selikoff, of course, of -- an American icon in 10:06:12 12 occupational medicine. Irv studied -- actually, his 10:06:17 13 major contribution to the study of asbestos workers and 10:06:24 14 their diseases -- his major contribution was -- the 10:06:29 15 initial studies of asbestos diseases was carried out 10:06:39 16 among miners and millers and factory workers engaged in 10:06:43 17 the -- in the fabrication of products. But Irving 10:06:52 18 brought the products into the workplace and extended it 10:06:56 19 beyond the workplace, to family members and the general 10:07:04 20 environment. Irving, of course, made his name with the 10:07:07 21 application of isoniazid and the winning of the Alaska 10:07:16 22 Award for Clinical Trials. That was approximately 1953 10:07:21 23 or '4. 10:07:25 24 Sitting next to Irving Selikoff is Robert 10:07:27 25 Schnitzer. Robert Schnitzer, pharmacologist, M.D. He 10:07:32 Page 15	1 predated the Environmental Sciences Laboratory. He 10:09:20 2 recruited me. He was interested in having a 10:09:25 3 mineralogist as part of his -- part of his team to 10:09:34 4 explain and explore the mineral issues associated with 10:09:40 5 the diseases observed following the inhalation of 10:09:48 6 colloidal particles in atmospheres. 10:09:53 7 Q. As a mineralogist did you publish with 10:09:56 8 Dr. Selikoff? 10:09:59 9 A. Many papers, yes. 10:10:00 10 Q. And we'll -- and we'll talk about some of 10:10:01 11 those a little bit later. 10:10:03 12 With regards to your work with 10:10:05 13 Dr. Selikoff and these other scientists at Mount Sinai 10:10:08 14 in the 1960s, did both you and Dr. Selikoff become 10:10:11 15 interested in talc issues? 10:10:14 16 A. Yes, of course. 10:10:18 17 Q. Who is -- well, yeah, who's Dr. Lewis 10:10:19 18 Cralley? 10:10:22 19 A. Lew Cralley was the -- the head of the 10:10:23 20 occupational -- the -- it's occupation -- well, the 10:10:30 21 specific name, occupational health, or the -- yes, the 10:10:35 22 occupational health unit within the Public Health 10:10:42 23 Service with the laboratories in Cincinnati, Ohio. 10:10:50 24 Lew Cralley was very important at that time because his 10:10:55 25 group -- this is Jeremiah Lynch and Howard Ayer. They 10:11:01 Page 17

1 were -- they were studying the unit of the metric used 10:11:09 2 to measure dust in the workplace for asbestos. The unit 10:11:17 3 at the time -- this is in the early '60s. The unit at 10:11:24 4 the time were million particles per cubic foot of air. 10:11:30 5 But the British, studying the very same 10:11:36 6 problem, found that the disease asbestosis did not 10:11:39 7 correlate very well with million particles per cubic 10:11:43 8 foot. If it's asbestos, asbestos disease, it is the 10:11:46 9 asbestos fiber concentration in the aerosol which is 10:11:53 10 important. So in order for the occupational health unit 10:11:59 11 to establish some kind of standard -- 1965-1966 the 10:12:03 12 national standard for asbestos was -- 10:12:17 13 Q. Well, let me stop you there, Dr. Langer. 10:12:18 14 I apologize. On Dr. Cralley what I wanted to ask you 10:12:20 15 about, did you interact with him with regards to talc 10:12:23 16 issues in the -- in the 1960s? 10:12:25 17 A. Oh, yes, of course. Yes. Yes. Yes. 10:12:27 18 I -- that was the predicate. That was the -- the 10:12:29 19 preliminary introduction. 10:12:30 20 Q. How -- how did -- 10:12:31 21 A. Sure I knew Lew Cralley. 10:12:32 22 Q. How -- how did -- how did you get involved 10:12:34 23 with Dr. Cralley with regards to talc issues? 10:12:36 24 A. We -- we. Irving Selikoff, Kyler Hammond, 10:12:40 25 occasionally others, and I visited the -- the unit, the 10:12:47 Page 18	1 nevertheless, we shared our information with them. We 10:14:35 2 said, Gee, there are 3,000 people with these objects 10:14:41 3 called asbestos bodies; where are they being exposed and 10:14:46 4 to what. So we shared our concern regarding consumer 10:14:49 5 products, which included talcum powder. 10:14:54 6 He, on the other hand, went beyond this. 10:14:58 7 His paper in 1968, he presented again at the 10:15:02 8 Johannesburg International Pneumoconiosis Conference in 10:15:06 9 1969, and he said, Yeah, here are electron 10:15:12 10 photomicrographs and -- of the 20-whatever-odd sources 10:15:15 11 of fiber. The people in the general public among those, 10:15:21 12 he has a couple of electron micrographs showing fibers 10:15:29 13 from talc, talcum powder. 10:15:34 14 Q. And we'll get -- I think I'm going to mark 10:15:37 15 his paper in a little bit. 10:15:40 16 (Exhibit 2 was marked and 10:15:40 17 attached to the transcript.) 10:15:40 18 BY MR. SATTERLEY: 10:15:40 19 Q. Let's go to Exhibit 2, the pho -- the next 10:15:42 20 photograph we have. Who -- who is in Exhibit 2 there? 10:15:44 21 A. Exhibit 2. Well, that's my co-author -- 10:15:46 22 author. That is Arthur Rohl. Arthur Rohl. 10:15:50 23 Q. And was he a mineralogist as -- 10:15:55 24 A. He was a mineralogist. He was at Columbia 10:15:57 25 at the same time I was there. 10:16:00 Page 20
1 laboratory, in Cincinnati, Ohio. We would fly down and 10:12:55 2 have meetings with them. We were interested in the 10:13:00 3 asbestos standard. We were interested in what they were 10:13:07 4 doing in the workplace. We saw their electron 10:13:09 5 microscopy unit that they were setting up. And we spoke 10:13:18 6 with, of course, Ayer and Lynch. And we were -- we gave 10:13:20 7 seminars. We actually had presentations. If -- if we 10:13:34 8 were to go into Cincinnati, Ohio, we would give updates 10:13:37 9 on our studies and the literature. And so we would do 10:13:41 10 that. And as we spoke, we spoke about the nature of the 10:13:43 11 asbestos bodies. 10:13:54 12 Q. Uh-huh. 10:13:54 13 A. And we were unsure of the cores of the 10:13:55 14 asbestos bodies. We have all kinds of instrument 10:13:58 15 packages -- 10:14:02 16 Q. Uh-huh. 10:14:02 17 A. -- to look at the -- at the stuff that we 10:14:02 18 recovered from lungs. 10:14:04 19 In terms of Lew Cralley, we broached the 10:14:05 20 subject of consumer talcum products as sources of fiber. 10:14:16 21 He had a -- 10:14:21 22 Q. And when was this? Approximately what 10:14:21 23 timeframe are we talking about here? 10:14:23 24 A. 1966. May -- maybe '67 as late. But 10:14:26 25 '66 -- '60 -- it may even be earlier. Late '65. But 10:14:30 Page 19	1 Q. Did you and he publish papers together? 10:16:02 2 A. Yes, we published a number of papers 10:16:04 3 together. 10:16:07 4 Q. Was he a good mineralogist? 10:16:07 5 A. Terrific. Smart guy. Smart. 10:16:09 6 Q. As a mineralogist did you and Dr. Rohl 10:16:12 7 study geology as well? 10:16:15 8 A. Yes, of course. Yes. 10:16:16 9 Q. Explain the -- the connection between 10:16:18 10 geology and mineralogy. 10:16:20 11 A. Mineralogy is a subdiscipline within 10:16:27 12 geology. If you're interested in fossils you're a 10:16:29 13 paleontologist. If you're interested in dinosaurs 10:16:33 14 you're a vertebrate paleontologist. If you're 10:16:36 15 interested in the structure of the earth and the -- the 10:16:38 16 physics of the earth you're a geophysicist. Chemistry, 10:16:41 17 you're a geochemist, bup, bup, bup, bup. And 10:16:44 18 petrologist -- I -- I studied at Columbia petrology, 10:16:51 19 which is the origin of rocks and rock systems and the 10:16:54 20 minerals that constitute different kinds of mineralogic 10:16:58 21 units, and from that I went into mineralogy. 10:17:05 22 Q. Did you and Dr. Rohl publish on the 10:17:07 23 mineral assemblages that are found in talc products? 10:17:09 24 A. Very interesting. Very important. 10:17:13 25 Talc itself -- the origin of talc in 10:17:17 Page 21

1 nature in terms of the -- the temperatures, the 10:17:20	1 and Kyler Hammond sort of chaired that conference? 10:20:18
2 pressures, water content, and the processes by which 10:17:31	2 A. That con -- the major conference, 10:20:21
3 minerals form, inevitably -- I'm saying it's inevitable 10:17:35	3 Biological Effects of Asbestos, Volume 132, held in New 10:20:28
4 that certain other minerals occur with talc. These may 10:17:45	4 York City in October 1964. The -- the publication was 10:20:34
5 be serpentine minerals, lizardite -- that's a platy -- a 10:17:53	5 the 31st of December 1965, which means that the 10:20:42
6 platy mineral. Lizardite. Antigorite, another platy 10:17:57	6 conference proceedings of 1964 would not have been 10:20:48
7 peculiar mineral. The serpentine mineral, which 10:18:03	7 distributed to the general consuming public until early 10:20:54
8 includes chrysotile which is asbestos. And could 10:18:07	8 1965. 10:21:02
9 include various carbonate minerals; calcite, dolomite, 10:18:07	9 Q. Was that a big conference in New York 10:21:06
10 and so on. Micas, which is sheet silicates. 10:18:22	10 City? 10:21:08
11 And I think you are correct that there are 10:18:26	11 A. It was a -- a benchmark. It was a 10:21:08
12 mineral assemblages that occur with talc. And, of 10:18:29	12 benchmark. In fact, it -- it involved both sides of the 10:21:12
13 course, it is the processing of the talc, the 10:18:37	13 asbestos issue because even then, in 1964, there were 10:21:18
14 beneficiation, the milling of the material, that is used 10:18:40	14 sides, there were viewpoints, there were contingencies 10:21:28
15 to separate talc from other minerals. 10:18:46	15 that stood in opposition. One side was industry and the 10:21:34
16 Q. Well -- 10:18:51	16 other side, generally so, academics. 10:21:41
17 MR. ASHBY: Just object. Non-responsive. 10:18:51	17 Q. Let's keep going through these 10:21:47
18 Move to strike. 10:18:53	18 photographs. I love these photographs. The next one I 10:21:48
19 BY MR. SATTERLEY: 10:18:53	19 think I marked as Exhibit 4. And I appreciate you 10:21:49
20 Q. And we'll -- and we'll go through that in 10:18:54	20 sharing these photographs with me. 10:21:51
21 a little more detail. Let's go to Exhibit 3? 10:18:58	21 (Exhibit 4 was marked and 10:21:51
22 (Exhibit 3 was marked and 10:18:58	22 attached to the transcript.) 10:21:51
23 attached to the transcript.) 10:19:01	23 BY MR. SATTERLEY: 10:21:51
24 MR. CHARCHALIS: Sorry, Joe. I just want 10:19:01	24 Q. This is one of my favorites. What is this 10:21:53
25 to join in that objection. And, Joe, do you -- do you 10:19:02	25 one? 10:21:55
Page 22	Page 24
1 have a problem if we do one objection -- 10:19:04	1 A. I am seated at -- 10:21:55
2 MR. SATTERLEY: Sure. 10:19:04	2 Q. You can flip it around for the camera. 10:21:58
3 MR. CHARCHALIS: One objection for all, so 10:19:07	3 A. Oh. I'm sorry. Okay. 10:22:00
4 I don't cut you guys off? 10:19:08	4 Q. Oh, I think you -- you -- did you skip 10:22:02
5 MR. SATTERLEY: Sure. No problem. You 10:19:09	5 past this one (indicating)? 10:22:04
6 can join -- I -- I assume you're going to join in every 10:19:10	6 A. Yeah. No. No, I did not. But I think I 10:22:06
7 of Matt's objections. 10:19:13	7 may have skipped past this one (indicating). 10:22:09
8 MR. CHARCHALIS: Thank you. 10:19:14	8 Q. Okay. We'll -- we'll come back to them 10:22:11
9 MR. ASHBY: Very few that I make. 10:19:14	9 all. 10:22:13
10 MR. SATTERLEY: Okay. 10:19:17	10 A. Okay. 10:22:14
11 BY MR. SATTERLEY: 10:19:17	11 Q. Okay. And go ahead. 10:22:17
12 Q. So let's go to Exhibit 3. 10:19:18	12 MR. ASHBY: Which exhibit is this one now? 10:22:19
13 What is Exhibit -- who's in Exhibit 3? 10:19:19	13 THE WITNESS: This is Exhibit 4. 10:22:22
14 A. In Exhibit 3 is -- Irving Selikoff is 10:19:20	14 MR. ASHBY: Okay. 10:22:24
15 seated there in front of a light box looking at a -- 10:19:23	15 BY MR. SATTERLEY: 10:22:24
16 a -- chest x-rays. The standing gentleman is Jack 10:19:26	16 Q. This -- this is -- they got out of order a 10:22:24
17 Churg. Jacob Churg, of course, is one of the co-authors 10:19:33	17 little bit. The Exhibit 4 is you're at the -- is that 10:22:26
18 on many of the papers with Irving Selikoff. In fact, 10:19:37	18 you at the microscope? 10:22:29
19 Selikoff, Churg, and Hammond are the -- the three 10:19:42	19 A. Yes. I'm seated at a -- a JEOL, Japanese 10:22:30
20 principals defining asbestos exposure following product 10:19:46	20 Electron Optical Laboratory, model 100CX -- boy, that 10:22:36
21 use and product application, installation, among workers 10:19:57	21 was a good scope -- interfaced with a Tracor Northern 10:22:42
22 that are not miners and millers and are not factory 10:20:02	22 Energy-Dispersive X-Ray Spectrometry system, which means 10:22:45
23 workers. These are outside of the bounds. They -- 10:20:06	23 that one could obtain photographic images of an object 10:22:52
24 Q. Was there a big conference in New York 10:20:13	24 one is -- was viewing on the EM, electron microscope, 10:23:01
25 City in the mid '60s where Jacob Churg and Dr. Selikoff 10:20:14	25 screen. 10:23:06
Page 23	Page 25

1 One could change controls to focus in the 10:23:08	1 occasionally had lighter moments. And Irving and I are 10:25:48
2 back focal plane of an -- of an image, focus on the 10:23:15	2 standing in his conference room, his office. And he had 10:25:55
3 diffracted electrons that were -- that were generated in 10:23:19	3 a large blackboard in there. And I was explain -- I had 10:26:01
4 the -- in the crystalline particle I was scanning. And, 10:23:26	4 explained to him the -- the nature of isolating -- on 10:26:06
5 of course, I could focus a beam on the particle and 10:23:32	5 the basis of chemistry of isolating amosite from 10:26:13
6 generate the chemical signal. So I could determine the 10:23:36	6 crocidolite, from anthophyllite, from chrysotile, and so 10:26:17
7 morphology, the structure, and the chemistry of the 10:23:42	7 on and so forth. And I had gone through this whole 10:26:23
8 particle I was looking at. 10:23:45	8 rigmarole. And Irv was very kind and attentive but 10:26:31
9 Q. And when the jury hears the term 10:23:47	9 didn't know what in the hell I was talking about. 10:26:37
10 transmission electron microscope, is that what you're 10:23:50	10 Q. So you were explaining the different fiber 10:26:39
11 sitting in front of? 10:23:53	11 types of asbestos, whether it be anthophyllite -- 10:26:40
12 A. Yes, exactly. 10:23:54	12 A. How I could distinguish them and why they 10:26:43
13 Q. And is -- in your experience as a 10:23:55	13 had -- if you note on that board, there are these 10:26:46
14 mineralogist did you utilize this device on a regular 10:23:58	14 circles. These circles (indicating). 10:26:49
15 basis? 10:24:02	15 Q. Uh-huh. 10:26:57
16 A. Yes. Routine, yes. 10:24:02	16 A. Those circles defined a whole field 10:26:57
17 Q. And -- and -- and was this a good piece of 10:24:04	17 because individual particles had certain variation, 10:27:00
18 equipment to evaluate a talcum powder for the presence 10:24:08	18 especially if you had bundles, bundles of -- of fibrils. 10:27:05
19 of fibrous mater -- materials? 10:24:12	19 It incorporated small amounts of other minerals. And so 10:27:11
20 A. Any materials, yes. 10:24:13	20 there were fields that defined anthophyllite, fields 10:27:21
21 Q. Okay. Let's keep going. We've got a 10:24:15	21 that defined amosite. That has a little more iron or a 10:27:24
22 whole bunch of photographs here. 10:24:17	22 little more silica, bup, bup. Crocidolite, sodium 10:27:28
23 (Exhibit 5 was marked and 10:24:17	23 fluctuated. 10:27:32
24 attached to the transcript.) 10:24:17	24 But Irv and I -- I explained all this. 10:27:34
25 BY MR. SATTERLEY: 10:24:17	25 And I had said something to the effect about 10:27:38
Page 26	Page 28
1 Q. Exhibit 5, what -- is this another 10:24:19	1 Johns-Manville. I'm sure it was negative. And the -- 10:27:40
2 photograph of you? 10:24:21	2 we had a -- a laugh. 10:27:47
3 A. This is another photograph of me sitting 10:24:22	3 We were a favorite topic of the -- what 10:27:52
4 at the electron microscope console. 10:24:24	4 department was it? It -- we had a -- a department in -- 10:27:59
5 Q. And is this in the laboratory there in -- 10:24:28	5 at Mount Sinai that was -- that coordinated public 10:28:01
6 in New York City? 10:24:34	6 relations. And so there was an annual report. Well, 10:28:08
7 A. This would be in the -- it's probably in 10:24:35	7 they photographed us in about 10 annual reports. And 10:28:12
8 the second facility. We had several facilities at Mount 10:24:42	8 Irv and I would have a good laugh over it. Yeah. 10:28:18
9 Sinai. We started off in the surgical pavilion. We 10:24:48	9 Q. So you were -- as a mineralogist and 10:28:21
10 then had laboratories constructed in the north building. 10:24:52	10 someone who worked on the transmission electron 10:28:24
11 And this photograph was taken in the Nathan Cummings 10:24:57	11 microscope, you were the person that explained to 10:28:27
12 Basic Science Building. So there were several 10:25:07	12 Dr. Selikoff the various chemical makeup of the fibers? 10:28:29
13 facilities, which explains lots of -- I've been asked 10:25:09	13 A. That's right. 10:28:34
14 what I've done with various documents. We moved three 10:25:20	14 Q. And that's what you're doing here? 10:28:34
15 times, and I tried to get rid of stuff that was just 10:25:23	15 A. Yes. 10:28:36
16 taking up space. 10:25:26	16 Q. Okay. 10:28:37
17 (Exhibit 6 was marked and 10:25:26	17 A. How you could distinguish. Because on the 10:28:38
18 attached to the transcript.) 10:25:26	18 EM -- on the TEM screen, the viewing screen, you saw an 10:28:40
19 By MR. SATTERLEY: 10:25:26	19 object that was opaque or linear. And if -- if you 10:28:46
20 Q. The next one is now my favorite one I was 10:25:32	20 diffracted you would see it was an amphibole structure, 10:28:53
21 talking about earlier. And -- and -- and this is 10:25:34	21 but you wanted to distinguish among the amphibole fiber 10:28:57
22 Exhibit -- is this 6 now, Exhibit 6? 10:25:36	22 types; amosite, crocidolite, anthophyllite, tremolite, 10:29:01
23 A. This is Exhibit 6. 10:25:39	23 actinolite. You wanted to distinguish among the 10:29:07
24 Q. And tell me about this photograph. 10:25:40	24 amphiboles, and so we did that on the basis of the 10:29:10
25 A. Well, this -- Irving Selikoff and I 10:25:44	25 chemistry. 10:29:13
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1	Q. I see. Great. Great.	10:29:14	1	(Exhibit 8 was marked and	10:31:38
2	A. So it was very -- very important.	10:29:15	2	attached to the transcript.)	10:31:38
3	Q. Let's go to the next photograph, Exhibit	10:29:21	3	BY MR. SATTERLEY:	10:31:39
4	7.	10:29:23	4	Q. And one more photograph right behind -- I	10:31:39
5	(Exhibit 7 was marked and	10:29:23	5	think there's one more. And it may be Exhibit 8.	10:31:41
6	attached to the transcript.)	10:29:23	6	A. My -- my favorite colleague, if you can	10:31:46
7	BY MR. SATTERLEY:	10:29:23	7	believe it. My favorite colleague. That's Robert	10:31:49
8	Q. Who's in this photograph, and where are	10:29:23	8	Schnitzer. Robert Schnitzer had a fascinating personal	10:31:53
9	you guys located?	10:29:24	9	history. Robert Schnitzer, as I said, developed	10:31:57
10	A. This photograph was taken at a meeting in	10:29:26	10	isoniazic -- isoniazic -- isonicotinic acid derivative,	10:32:08
11	Bochum -- Bochum, Germany.	10:29:33	11	he rendered it less toxic, and has been credited for the	10:32:12
12	Q. In Germany?	10:29:35	12	invention of one of the first anti-tuberculosis drugs,	10:32:23
13	A. Yeah. The Ruhr Valley.	10:29:36	13	chemotherapeutic drugs, used worldwide. Of course,	10:32:32
14	Q. And who -- who's here, and -- and what are	10:29:41	14	there's -- the one that is frequently touted is	10:32:38
15	you guys doing?	10:29:42	15	Waksman's study of certain antibiotics in the treatment	10:32:41
16	A. What are we doing? Left to right	10:29:43	16	of tuberculosis. But Robert Schnitzer, wonderful man.	10:32:47
17	standing, I am over here in the extreme left.	10:29:45	17	Wonderful man. It was an honor to know him.	10:32:55
18	Now, I hate to say this, but the woman	10:29:51	18	Q. We talked earlier about Dr. Cralley.	10:33:08
19	immediately to my left is a physician from Israel, and I	10:29:55	19	We'll mark as Exhibit 9 -- if you'd hand that to counsel	10:33:14
20	forgot her name. I -- I really apologize. However,	10:30:03	20	there.	10:33:22
21	next to her is Ruth Lillis.	10:30:05	21	(Exhibit 9 was marked and	10:33:22
22	Q. Who's Ruth Lillis?	10:30:08	22	attached to the transcript.)	10:33:22
23	A. Ruth Lillis was a member of our group.	10:30:10	23	BY MR. SATTERLEY:	10:33:22
24	She -- she and her husband Mike, also a physician, left	10:30:13	24	Q. This is Exhibit 9. Is this the paper that	10:33:22
25	Romania and never looked back. She attended a	10:30:22	25	you mentioned was published in 1968 by Cralley and	10:33:24
	Page 30			Page 32	
1	conference and sought asylum.	10:30:24	1	others regarding the fibrous and mineral content of	10:33:28
2	Next to Ruth Lillis is Yehuda Lerman, an	10:30:28	2	cosmetic talc products?	10:33:34
3	Israeli physician who studied with us.	10:30:37	3	A. Yes.	10:33:35
4	Next to Yehuda, with the mustache, that is	10:30:37	4	Q. And if you'd flip over to page 3, or	10:33:35
5	Alf Fischbein. And Alf did many studies with us.	10:30:41	5	the -- actually to page 352 -- it's the third page --	10:33:38
6	And next to Alf, this young guy over here	10:30:43	6	does it have photomicrographs?	10:33:42
7	on the end, that's Ned Holstein, or Edwin Holstein as	10:30:46	7	A. Yes.	10:33:44
8	you call.	10:30:51	8	Q. Explain to the folks on the jury, what is	10:33:44
9	We were all -- it was the nature of our	10:30:54	9	a photomicrograph?	10:33:46
10	group -- we were doing so many things, many exciting and	10:30:56	10	A. A photomicrograph. This is the way a	10:33:49
11	important things, which demanded that we send a whole	10:31:01	11	transmission electron microscope works. A beam of	10:33:56
12	group of people because everyone was working on	10:31:06	12	electrons are generated at a source. The beam of	10:34:05
13	important aspects. At this time Ruth and Alf, for	10:31:11	13	electrons scatters, so there is a system, a lens	10:34:12
14	example, were doing the family member study of the	10:31:15	14	system -- now, it's not a glass lens like you have a --	10:34:19
15	Unarco workers.	10:31:19	15	a lens in a pair of eyeglasses, but, rather, it is a	10:34:22
16	Q. The take-home exposure type?	10:31:22	16	device in which there are coils through which you pass	10:34:27
17	A. Take-home exposure, yes.	10:31:23	17	currents. And the current has an electromagnetic field.	10:34:33
18	Q. Okay. Are you the only mineralogist in	10:31:25	18	And so as these electrons that are generated pass	10:34:41
19	this picture?	10:31:27	19	through these coils they're stretched. And they are	10:34:46
20	A. Yes.	10:31:28	20	stretched, and there is no distortion of the -- of --	10:34:52
21	Q. Okay.	10:31:28	21	the field density.	10:34:58
22	A. In fact, I chaired the session on	10:31:28	22	And this is passed through -- it's focused	10:35:02
23	silicosis, Mechanisms of Silica Interaction with Cells,	10:31:30	23	on a particle, an objective lens. Passes through a	10:35:05
24	Cell Membranes.	10:31:36	24	solid substance in a specimen stage. And the -- the	10:35:10
25	It was a good meeting.	10:31:38	25	image is an image in which electrons are stopped or	10:35:18
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1 electrons pass through. When electrons stop the image 10:35:24	1 a -- for example, a talc or whether it was an -- 10:37:41
2 is dark. When the im -- image -- when the electrons are 10:35:29	2 A. Yes. 10:37:41
3 passed through the image is light. And these are 10:35:35	3 Q. -- amphibole? 10:37:47
4 dropped down on a -- a -- a zinc sulfide screen. 10:35:43	4 A. Yes. 10:37:48
5 Q. Uh-huh. 10:35:43	5 Q. Okay. 10:37:49
6 A. And it's phosphorescent. And the -- the 10:35:47	6 A. Yes. 10:37:49
7 particle is defined by shades of light and dark. 10:35:55	7 Q. And so was -- in your view, was 10:37:49
8 Q. Is it -- is -- is it sometimes referred to 10:35:59	8 Dr. Cralley's paper, was it an important, good paper? 10:37:50
9 as morphology, the appearance of the structure? 10:36:01	9 A. Well, it was -- it was a good caution 10:37:53
10 A. The appearance of the structure tells you 10:36:04	10 light. In other words, we used to say this. We used to 10:37:56
11 the form. 10:36:09	11 lecture to the first-year medical students. You have an 10:38:05
12 Q. If you could hold -- 10:36:09	12 observation. And you say, gee, that's an interesting 10:38:15
13 (Speaking simultaneously) 10:36:09	13 observation; it's worth a case report. Someone works in 10:38:18
14 If you just could hold the -- 10:36:10	14 an asbestos factory and develops shortness of breath. 10:38:24
15 A. Yeah. 10:36:10	15 Well, that's -- that's an interesting observation. 10:38:32
16 Q. Hold -- hold the photomicrograph up and -- 10:36:12	16 That's a caution light. You don't know 10:38:37
17 on page 352 so the folks on the jury can see what we're 10:36:14	17 whether it's an odd case or whether it is systematic and 10:38:40
18 talking about. 10:36:20	18 indicative of a significant issue. So you study it. It 10:38:46
19 And did you and Dr. Rohl in some of your 10:36:20	19 goes caution light, case report, then you do a study. 10:38:53
20 publications have photomicrographs to show what the -- 10:36:22	20 And you say, Well, we've done a case control study, 10:39:00
21 A. Exactly. 10:36:25	21 we've looked at a population of people exposed to this 10:39:03
22 Q. -- shapes -- shapes are? 10:36:26	22 agent, to this substance, this dust, and we've got a 10:39:07
23 A. Yes. 10:36:27	23 bunch of people of the same age, the same sex/gender, 10:39:11
24 Q. Okay. And are we -- are you able to see 10:36:27	24 the same -- and the characteristics match the exposed 10:39:16
25 from this that there are different shapes and different 10:36:29	25 group of people. And you say, what is the outcome? 10:39:22
Page 34	Page 36
1 morphology of different particles there? 10:36:31	1 These people, the exposed people, have 10:39:28
2 A. Yes. And if you -- there is a caption 10:36:34	2 pulmonary function decrements. The people who are not 10:39:31
3 under -- okay. Photomicrographs of talcum -- bup, bup, 10:36:37	3 exposed, they don't. So there's a red light. And you 10:39:36
4 bup, bup... 10:36:45	4 say, Wait a minute. We've got to do this in detail. 10:39:41
5 Q. Specimen? 10:36:45	5 We've got to measure the dust in the workplace. We have 10:39:44
6 A. Yes. Now, you see, there are some that 10:36:46	6 to see who smokes cigarettes and who doesn't. We have 10:39:48
7 are irregular. 10:36:50	7 to do an A, B, C, D. 10:39:52
8 Q. Uh-huh. 10:36:51	8 So you go through. And you've got that -- 10:39:55
9 A. Some that are elongated. Some that are 10:36:52	9 that caution light, the red light, the -- the detailed 10:39:57
10 sticking out of other particles. So the question is -- 10:36:55	10 studies. 10:39:59
11 you see the particles. You see an outline (indicating). 10:37:01	11 In terms of this paper, he's saying, Oh, 10:40:01
12 You see an outline of particles. But in order to 10:37:07	12 yeah, there are these interesting particles in here. We 10:40:05
13 identify what it is you're looking at you have to 10:37:10	13 ought to -- we ought to study this. 10:40:08
14 perform diffraction. What's the structure? And 10:37:15	14 He did a more detailed study in the U -- 10:40:12
15 chemistry acquisition. What is the chemistry? 10:37:22	15 the Johannesburg meeting in 1969 where he showed really 10:40:17
16 Q. Is -- is diffraction the same thing I've 10:37:24	16 obvious photomicrographs of fiber. 10:40:24
17 heard as selected area electron diffraction -- 10:37:28	17 Q. Involving talcum powder? 10:40:29
18 A. Yes. 10:37:28	18 A. In -- in talcum powder, not in -- 10:40:30
19 Q. -- SAED? 10:37:30	19 Q. And we'll get to your papers in a little 10:40:32
20 A. Yes. 10:37:30	20 bit, but -- but -- well, I'll wait until we get to your 10:40:35
21 Q. And is -- are you trying to fig -- figure 10:37:30	21 papers. But there's -- there's certainly published 10:40:38
22 out the crystalline structure? 10:37:32	22 literature back in the '40s and '50s from folks looking 10:40:41
23 A. Yes. 10:37:33	23 at talcum powder issues, correct? 10:40:44
24 Q. Okay. And when you and Dr. Rohl and other 10:37:34	24 A. Well, you're saying talcum. The original 10:40:46
25 folks did this, did you report the -- whether it was 10:37:38	25 talc papers were talc studies of industrial talcs, 10:40:49
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1 industrial talcs. 10:40:56	1 A. Yeah. Bill Henderson worked, I think, out 10:44:20
2 Q. Uh-huh. 10:40:59	2 of Pooley's laboratory. And then he -- he was supported 10:44:24
3 A. You were absolutely correct when one of 10:41:00	3 by the Tenovus Institue and Foundation. And he explored 10:44:34
4 the first questions you asked about talc you asked about 10:41:04	4 these various -- these various issues concerning mineral 10:44:36
5 the assemblage of talc. Absolutely correct. 10:41:09	5 particles from talc and ovarian and cervical carcinoma. 10:44:42
6 Now, there were talcs that were used in 10:41:15	6 Q. This is published March of 1971, and it's 10:44:48
7 industry as fillers in paint, as materials melted to 10:41:19	7 got photomicrographs in it, correct? 10:44:53
8 make a ceramic body. And it goes on and on. The 10:41:25	8 A. Yes. 10:44:56
9 industrial grade talc could be a lot of different 10:41:29	9 Q. And are you familiar with this? 10:44:56
10 things -- 10:41:33	10 A. With -- with the paper, yes, of course. 10:44:58
11 Q. Uh-huh. 10:41:34	11 Q. You saw it back at the time, back in 1971? 10:45:00
12 A. -- a lot of interesting mixtures in which 10:41:35	12 A. Yes, I did. 10:45:02
13 the mineral talc is a very minor component as compared 10:41:38	13 Q. And does it have photomicrographs showing 10:45:03
14 to everything else that's present. 10:41:46	14 the presence of talc? 10:45:08
15 Q. So there is more accessory minerals in 10:41:47	15 A. Yes. 10:45:09
16 industrial talc than in the cosmetics? 10:41:50	16 Q. And does it describe the presence of talc 10:45:09
17 A. It could be. When you say accessory, 10:41:53	17 in relationship to cancer? 10:45:14
18 we're talking talcs that may be 40, 50, 60 percent 10:41:56	18 A. He describes that -- part of that, yes. 10:45:16
19 tremolite, which is an interesting mineral, and the talc 10:42:03	19 Q. And did -- did J&J in 1971 ask you to 10:45:19
20 component is only 20 percent. So that industrial-grade 10:42:07	20 specifically look at some of the Tenovus samples? 10:45:30
21 talc is actually a mixture of other things as well. 10:42:14	21 (Exhibit 11 was marked and 10:45:30
22 So when you talk about an assemblage of 10:42:21	22 attached to the transcript.) 10:45:30
23 particles, consumer talcum as we reported it -- consumer 10:42:27	23 BY MR. SATTERLEY: 10:45:30
24 talcum conveys an impression that it's talc the mineral. 10:42:33	24 Q. Let me show you Exhibit 11 here. 10:45:37
25 Industrial-grade talc could be anything. It could be 10:42:37	25 A. Yeah. I think that we're -- we're dealing 10:45:39
Page 38	Page 40
1 crushed rock. It's used to dust the steel mandrels in a 10:42:41	1 with -- I was probably approached by Gavin Smith. 10:45:42
2 rubber factory. It could be the -- the talc that is 10:42:49	2 Q. That's Exhibit 11? 10:45:47
3 used in -- the talc that is used in tire manufacturing. 10:42:52	3 A. Gavin Smith. Yeah. 10:45:48
4 So there are -- 10:43:03	4 Q. It indicates there was a meeting with you, 10:45:50
5 Q. Well, let me switch gears for a second and 10:43:04	5 Dr. Langer, July the 9th, 1971. And if you can just 10:45:52
6 ask you about -- because we'll come back to that when we 10:43:05	6 take a look at that. 10:45:59
7 get to your paper -- Tenovus. What is the Tenovus 10:43:08	7 A. Yeah. 10:46:08
8 Institute or the Tenovus Group? 10:43:12	8 Q. And is this the meeting that you had with 10:46:08
9 A. The Tenovus Group, as it sounds, the 10 of 10:43:14	9 Dr. Gavin Hildick-Smith where you identified chrysotile 10:46:10
10 us -- the Tenovus Group was a group of bookmakers in 10:43:19	10 asbestos both in Johnson's Baby Powder and in samp -- 10:46:13
11 Great Britain, actually in Wales, I think, was the 10:43:28	11 and in the tissue samples? 10:46:18
12 center. The Tenovus Institute, composed of 10 10:43:32	12 A. Yeah. These are -- 10:46:20
13 bookmakers who lost a friend, a bookmaker, through 10:43:38	13 MR. ASHBY: Assumes facts. Assumes facts. 10:46:20
14 cancer, and they got together to form this foundation 10:43:43	14 Lacks foundation. 10:46:21
15 called the Tenovus, T-E-N-U-V-U-S (sic). Tenovus, 10:43:50	15 BY MR. SATTERLEY: 10:46:22
16 U-V-U-S (sic). 10:43:50	16 Q. Do you recall that, Dr. Langer? You met 10:46:22
17 (Exhibit 10 was marked and 10:43:50	17 with Dr. Hildick-Smith in 1971, correct? 10:46:24
18 attached to the transcript.) 10:43:50	18 A. Yes. 10:46:27
19 BY MR. SATTERLEY: 10:43:50	19 Q. And J&J produced this document from their 10:46:27
20 Q. And I'm going to hand you Exhibit 10. And 10:44:02	20 business records? 10:46:30
21 this is a -- a paper by Henderson. And were -- did you 10:44:06	21 MR. ASHBY: Lacks foundation. 10:46:32
22 know Henderson? 10:44:12	22 BY MR. SATTERLEY: 10:46:33
23 A. Yes. Bill Henderson. 10:44:13	23 Q. And they've admitted it in request for 10:46:33
24 Q. And was he an electron microscopist like 10:44:15	24 admissions. 10:46:36
25 you? 10:44:20	25 A. That's an interesting report. I mean, 10:46:49
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1	there are details in here that, frankly, I'd forgotten,	10:46:51
2	but...	10:46:54
3	Q. Now that you've had a chance to -- to read	10:46:54
4	the portions of the report, does it refresh your	10:46:56
5	recollection regarding identification of chrysotile and	10:46:59
6	telling Dr. Smith about that, Dr. Hildick-Smith?	10:47:02
7	A. I'll tell you what is interesting to me.	10:47:06
8	I described to him the thermal behavior of the fiber of	10:47:10
9	chrysotile which -- the thermal behavior, the heat	10:47:17
10	generated by -- at the sample by the electron beam. And	10:47:26
11	I said, this mineral is not stable. This is chrysotile	10:47:30
12	asbestos. It's not stable, but the heat generated by	10:47:35
13	the electron beam produces effects that help you	10:47:39
14	identify what you're looking at because chrysotile is	10:47:48
15	not as stable as people think of asbestos, but, rather,	10:47:51
16	it degrades in the beam.	10:47:56
17	An electron beam passing through a	10:48:02
18	substance generates a number of events. It may pass	10:48:03
19	through without any contact with an atom. It may bang	10:48:08
20	on an atom and cause it to generate a -- a chemical	10:48:14
21	signal. It may gen -- it may fall on an array of atoms	10:48:18
22	in the substance and generate a pattern of reflection	10:48:26
23	called a selected area electron diffraction pattern. It	10:48:34
24	may also, because of the heat, undergo deformation. So	10:48:37
25	I -- I attempted to explain all of this.	10:48:44
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1	MR. SATTERLEY: Let me mark as Exhibit 12,	10:48:49
2	then, in 1971 a letter, November 10th, and ask you to	10:48:51
3	flip to the second page.	10:49:00
4	(Exhibit 12 was marked and	10:49:00
5	attached to the transcript.)	10:49:00
6	BY MR. SATTERLEY:	10:49:00
7	Q. And is that your signature?	10:49:01
8	A. That's me.	10:49:09
9	Q. And are you writing that on Mount Sinai	10:49:09
10	School of Medicine letterhead?	10:49:15
11	A. Yes.	10:49:15
12	Q. And are you advising Johnson & Johnson's	10:49:15
13	director of clinical research, Dr. Gavin Hildick-Smith,	10:49:18
14	of your findings with regards to the tests that they	10:49:23
15	asked you to do?	10:49:28
16	A. Yes.	10:49:29
17	Q. And did you indicate that chrysotile	10:49:29
18	asbestos was in fact found?	10:49:35
19	A. Yes.	10:49:38
20	MR. ASHBY: Just object as vague and	10:49:38
21	ambiguous. As found in what?	10:49:40
22	BY MR. SATTERLEY:	10:49:46
23	Q. Well, you found it both in -- in -- in the	10:49:46
24	product and in tissue, human tissue, correct?	10:49:48
25	A. Yes.	10:49:51
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1	MR. SATTERLEY: All right. So let's go to	10:49:54
2	Exhibit 13, four days later.	10:49:55
3	(Exhibit 13 was marked and	10:49:55
4	attached to the transcript.)	10:49:59
5	BY MR. SATTERLEY:	10:49:59
6	Q. And is this a letter written to you in	10:49:59
7	response for a -- and -- by Gavin Hildick-Smith, M.D.,	10:50:03
8	director of clinical research at Johnson & Johnson?	10:50:11
9	A. Yes.	10:50:15
10	Q. And on the second page he writes, this	10:50:22
11	Johnson & Johnson doctor, on the -- the second	10:50:26
12	paragraph, We were interested to learn from your	10:50:27
13	analysis of our talc samples and the fact that you had	10:50:31
14	observed trace amounts of chrysotile asbestos in amounts	10:50:35
15	you estimated to be less than .01 percent.	10:50:38
16	Do you see that?	10:50:43
17	A. Yep.	10:50:44
18	Q. So that -- does that verify that -- what	10:50:44
19	you already told us under oath, that you told them there	10:50:47
20	was chrysotile asbestos in their product?	10:50:50
21	A. Yes, of course.	10:50:52
22	Q. And then you -- he goes on to write, We of	10:50:53
23	course -- we are of course somewhat surprised to learn	10:50:56
24	that you found chrysotile asbestos as other independent	10:50:59
25	workers have not so far reported such findings to us.	10:51:03
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1	My question to you is, did Dr. Gavin	10:51:08
2	Hildick-Smith at this time, 1971, did he tell you about	10:51:11
3	the work of a Dr. Hutcheson at the University of	10:51:16
4	Minnesota Space Center?	10:51:22
5	A. No.	10:51:23
6	MR. ASHBY: Ob -- object. Objection.	10:51:24
7	Foundation. And colloquy.	10:51:25
8	BY MR. SATTERLEY:	10:51:27
9	Q. Did he tell you about any of the other	10:51:28
10	folks that likewise found chrysotile asbestos in	10:51:31
11	Johnson's Baby Powder that they knew internally to be	10:51:34
12	case?	10:51:38
13	MR. ASHBY: Objection. Argumentative.	10:51:38
14	Lacks foundation. Assumes facts.	10:51:38
15	THE WITNESS: No.	10:51:44
16	BY MR. SATTERLEY:	10:51:44
17	Q. Did -- did he tell you about any of the	10:51:44
18	amphibole products that they found in Johnson's Baby	10:51:46
19	Powder by the various laboratories in the '50s or the	10:51:51
20	'60s or early '70s?	10:51:55
21	MR. ASHBY: Objection. Lacks foundation.	10:51:56
22	Calls for speculation. Assumes facts.	10:51:57
23	THE WITNESS: No.	10:52:00
24	BY MR. SATTERLEY:	10:52:00
25	Q. Okay. Did you know, for example, that	10:52:00
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1 Johnson & Johnson had privately contracted with a lab 10:52:02
2 called Battelle in Ohio? Back in 1970 did you know that 10:52:08
3 they had actually looked at their talcum powder products 10:52:10
4 and determined there were amphibole -- fibrous 10:52:13
5 amphiboles present from the 1950s forward? 10:52:15
6 MR. ASHBY: Objection. 10:52:18
7 BY MR. SATTERLEY: 10:52:18
8 Q. Did you know that? 10:52:18
9 MR. ASHBY: Same objections. 10:52:19
10 THE WITNESS: No. 10:52:21
11 BY MR. SATTERLEY: 10:52:21
12 Q. Now I want to talk about your paper that 10:52:22
13 you published in the symposium on electron microscopy 10:52:31
14 and microfibers. 10:52:35
15 Okay. I forgot what exhibit number we're 10:52:37
16 up to. Did -- was that 13 or 12? 10:52:40
17 THE REPORTER: 13. 10:52:40
18 THE WITNESS: The last one was 13. 10:52:45
19 MR. SATTERLEY: All right. So we're going 10:52:47
20 to go with 14. 10:52:48
21 (Exhibit 14 was marked and 10:52:48
22 attached to the transcript.) 10:52:48
23 MR. ASHBY: The last one was 13? 10:52:57
24 MR. SATTERLEY: I think the last one was 10:52:57
25 13. This is 14. 10:52:59

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1 Right? 10:52:59
2 THE REPORTER: Uh-huh. 10:53:02
3 MR. SATTERLEY: Is that right? 10:53:02
4 THE REPORTER: Uh-huh. 10:53:02
5 MR. SATTERLEY: Yep. Okay. Good. We're 10:53:03
6 on the same page on exhibit numbers. 10:53:03
7 BY MR. SATTERLEY: 10:53:06
8 Q. Is this a paper that was published in a 10:53:06
9 monograph based upon a symposium on the microscopy of 10:53:08
10 microfibers? 10:53:15
11 A. Yes. 10:53:15
12 Q. And did you and Dr. Rohl and others 10:53:15
13 present at this symposium? 10:53:21
14 A. Yes. 10:53:23
15 Q. And did you publish the tech -- techniques 10:53:23
16 to identify fibers in talc? 10:53:28
17 A. Yes. That was our status at that time. 10:53:30
18 Correct. 10:53:35
19 Q. And I'm not going to go through the entire 10:53:35
20 paper. But did you consider this to be a good paper? 10:53:39
21 A. Yeah. I thought -- yeah. I thought it 10:53:41
22 was well considered. I mean, it's just not an 10:53:44
23 enumeration of techniques but, rather, why we did 10:53:47
24 certain things and explained in greater detail and so 10:53:51
25 on. 10:53:55

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1 Q. And -- and did you explain the various 10:53:56
2 techniques, but did you state that the transmission 10:53:58
3 electron microscopy with the selected area electron 10:54:02
4 diffraction and the chemistry analysis was the best 10:54:08
5 technique? 10:54:10
6 A. Absolutely. 10:54:11
7 Q. And throughout your entire career is that 10:54:13
8 technique the best technique to find asbestos fibers in 10:54:15
9 talc products? 10:54:18
10 MR. ASHBY: Overbroad. 10:54:19
11 THE WITNESS: It's still state of the art. 10:54:21
12 BY MR. SATTERLEY: 10:54:24
13 Q. All right. And this is 1976, right? 10:54:24
14 A. Yes. 10:54:27
15 Q. Okay. I'm going to mark as Exhibit 15 a 10:54:27
16 section of that paper that you -- you write... 10:54:29
17 (Exhibit 15 was marked and 10:54:29
18 attached to the transcript.) 10:54:29
19 BY MR. SATTERLEY: 10:54:29
20 Q. I've highlighted it here. It says, Talc 10:54:35
21 rock as mined may therefore contain platy talc minerals, 10:54:39
22 talc fibers, asbestiform anthophyllite, tremolite, 10:54:44
23 hexagonite -- 10:54:50
24 A. Hexagonite. 10:54:50
25 Q. Heganite (sic)? 10:54:51

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1 A. Hexagonite. 10:54:52
2 Q. Okay. And what -- how do you pronounce 10:54:54
3 the next one? 10:54:56
4 A. Tirodite. 10:54:56
5 Q. Tirodite. And the fibrous serpentine 10:54:57
6 mineral chrysotile. 10:55:01
7 Was that something you published at the 10:55:02
8 FDA symposium in 1976? 10:55:05
9 A. Yes, that was. 10:55:09
10 Q. And then speaking of mineral assemblages, 10:55:09
11 the next sentence is particularly important. You say, 10:55:12
12 Numerous other minerals such as chlorite minerals -- let 10:55:17
13 me stop there. 10:55:20
14 Chlorite -- is aluminum silicate and 10:55:22
15 chlorite similar? 10:55:25
16 A. A chlorite mineral -- there's a group of 10:55:25
17 minerals which are platy, like sheets of paper in a 10:55:28
18 book, that are constituents of -- they're -- they're 10:55:33
19 part of a rock-forming assemblage of generally 10:55:40
20 metamorphic rocks, so rocks that undergo heat, pressure, 10:55:46
21 and other events, which become a -- a member, a 10:55:52
22 component member, of a metamorphic rock. Chlorites tend 10:55:59
23 to be -- they're sheet silicates. They're platy 10:56:06
24 silicates, mica-like. 10:56:11
25 Q. And then you say the carbonite materials, 10:56:12

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1	pyrophyllite --	10:56:16	1	Q. For example, on -- if you would take a	10:59:07
2	A. Pyrophyllite.	10:56:16	2	look at the -- the description of the photographs, he	10:59:12
3	Q. -- pyrophyllite, feldspar, micas, and	10:56:18	3	describes fibrils protruding from a fiber body?	10:59:17
4	quartz also occur naturally with talc?	10:56:22	4	A. Yes.	10:59:21
5	A. Yes.	10:56:23	5	Q. And that's photograph B. Do you see B at	10:59:23
6	Q. Is that something you published back in	10:56:23	6	the top?	10:59:26
7	1976?	10:56:26	7	A. Yes.	10:59:27
8	A. Yes. I mean, it's frequently mentioned	10:56:27	8	Q. And does that, in your view, fairly and	10:59:28
9	because talc tends to be a complex assemblage of	10:56:32	9	accurately represent a fibril protruding from a fiber	10:59:31
10	minerals reflecting earth processes basically.	10:56:37	10	body?	10:59:35
11	Q. Now, you published -- you and Dr. Rohl	10:56:41	11	A. Yes.	10:59:36
12	published in 1974 on talcs, correct?	10:56:49	12	Q. And you describe also fibers protruding	10:59:36
13	A. Yes.	10:56:52	13	from the interior of talc plates. And you -- that's	10:59:43
14	Q. All right. And that was -- was that more	10:56:52	14	photograph F there. Do you see that?	10:59:48
15	on industrial talc in '74?	10:56:54	15	A. Yes.	10:59:50
16	A. '74. Well, it was talc in general.	10:56:56	16	Q. And so the photograph -- the one at the	10:59:50
17	Q. That was a talc in general?	10:57:02	17	bottom on the right-hand side, is that the --	10:59:52
18	A. Yeah.	10:57:04	18	demonstrating fibers coming out of talc plates?	10:59:56
19	Q. I -- I'll take that. I apologize for	10:57:04	19	A. Well, that's what we're reporting. Yes.	11:00:00
20	misstating.	10:57:08	20	Yeah.	11:00:03
21	Let me go to Exhibit 16.	10:57:09	21	Q. And then you say, All of these morphologic	11:00:03
22	(Exhibit 16 was marked and	10:57:09	22	variations and forms A through E have been described in	11:00:11
23	attached to the transcript.)	10:57:14	23	anthophyllite and tremolite asbestos samples.	11:00:14
24	BY MR. SATTERLEY:	10:57:14	24	Did you write that?	11:00:17
25	Q. And Exhibit 16, what is this?	10:57:14	25	A. Yes.	11:00:18
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1	A. This is a -- I believe it is a -- one of	10:57:24	1	Q. Okay. Flip over to page 270. Are there	11:00:18
2	the hallmark papers for that time period on -- again, we	10:57:30	2	more photographs -- photomicrographs on page 270?	11:00:28
3	were indicating that large portions of the general	10:57:38	3	A. Yes.	11:00:32
4	population not exposed to an industrial mineral called	10:57:42	4	Q. And if you could flip it around so the	11:00:32
5	asbestos but, rather, exposure to a commonly available	10:57:49	5	camera could see these photographs.	11:00:38
6	and -- available consumer products which contain mineral	10:58:02	6	And -- and -- and just so the jury may be	11:00:40
7	fiber. And so we were talking basically about consumer	10:58:05	7	interested, are -- next to the photographs of the actual	11:00:41
8	talcum and powders because not all consumer powders were	10:58:09	8	images are there the diffraction patterns that you speak	11:00:44
9	talc. They contained other materials or were	10:58:16	9	of?	11:00:47
10	substantially made of other materials.	10:58:20	10	A. Yes.	11:00:48
11	Q. And in this paper did you and the	10:58:24	11	Q. And do the diffraction patterns help	11:00:48
12	co-authors publish photographs, microphot --	10:58:30	12	distinguish between talc versus amphibole?	11:00:51
13	photomicrographs of some of the materials you found in	10:58:33	13	A. Yes.	11:00:55
14	consumer talcum powder products?	10:58:37	14	Q. All right. And -- and the description	11:00:56
15	A. Yes. Many photographs, yes.	10:58:39	15	of -- that you have below, you describe when something	11:01:00
16	Q. And if you could flip over to page 268.	10:58:40	16	is a platy talc versus a talc fiber?	11:01:04
17	A. Yes.	10:58:45	17	A. Yes.	11:01:08
18	Q. On 268, figure 3, are those	10:58:46	18	Q. And, for example, photograph A, that's a	11:01:08
19	photomicrographs of vari -- transmission electron	10:58:49	19	talc plate, right?	11:01:11
20	photomicrographs? If you can just -- the paper is in	10:58:54	20	A. Yes.	11:01:12
21	the way -- pull -- pull -- yeah. There we go.	10:58:57	21	Q. All right. And then if we go down to	11:01:13
22	A. (Indicating)	10:58:59	22	photograph B, is that a talc fiber above a plate?	11:01:16
23	Q. And these are the -- and do you describe	10:59:00	23	You've got it marked TF. Does that stand for talc	11:01:22
24	in there what's called fibers and fibrils?	10:59:02	24	fiber?	11:01:25
25	A. Yes.	10:59:07	25	A. Yes.	11:01:26
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1 Q. And then if we go all the way down to D, 11:01:26
2 does D -- it says the amphibole fiber was diffracted 11:01:30
3 only on one of the protruding unit fibrils. 11:01:36
4 A. Yes. 11:01:40
5 Q. If -- if you could just explain that. 11:01:40
6 A. Well, one of the -- one of the limitations 11:01:43
7 of this technique is for thickness of the particle. And 11:01:49
8 if the particle is -- exceeds in thickness a certain 11:01:55
9 value the diffraction pattern is -- cannot be projected 11:02:03
10 on the screen. So not all of the particles will 11:02:08
11 diffract. So it -- it is only one or two that stick out 11:02:16
12 of a fiber that would permit the acquisition of the 11:02:23
13 pattern. 11:02:26
14 Q. And so in this photograph at the bottom on 11:02:28
15 D, the little things that are sticking out are those 11:02:32
16 individual fibrils coming out from the mineral? 11:02:36
17 A. Well, I'm looking at the pattern. And, 11:02:41
18 frankly, that diffraction pattern is awful because it -- 11:02:45
19 Q. Bad photocopy? 11:02:49
20 A. No. Actually, it is the exposure 11:02:50
21 intensity of the -- on the diffraction pattern should 11:02:56
22 have been cut down and should have been taken over a -- 11:03:01
23 a shorter period of time since you accumulate the 11:03:06
24 pattern over a period of several seconds to make an 11:03:10
25 impression on that photographic plate, a record on the 11:03:16

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1 photographic plate. 11:03:22
2 The most important reflections are those 11:03:28
3 closest to the center of the beam. And that's been 11:03:31
4 washed out by the overexposure. So the other patterns 11:03:34
5 are pretty good, but -- 11:03:41
6 Q. But you described the -- D as individual 11:03:43
7 fibrils coming out from the mineral, correct? 11:03:45
8 A. Yeah. There was only one that showed a -- 11:03:47
9 a pattern that was interpretable, so... 11:03:49
10 Q. Okay. Now, did you know -- you can set 11:03:53
11 the paper to the side. 11:04:02
12 Did you know at the time the paper was 11:04:03
13 being prepared -- did you know a fellow named Norm 11:04:05
14 Estrin? 11:04:12
15 A. Yes. 11:04:12
16 Q. And who is Norm Estrin? 11:04:13
17 A. Norman Estrin was the president of the 11:04:17
18 Cosmetic, Toiletry & Fragrance Association. 11:04:18
19 Q. Back in the early '70s when you identified 11:04:21
20 chrysotile asbestos in Johnson Baby Powder, did the CTFA 11:04:24
21 individuals try to suggest that you were identifying a 11:04:30
22 product called sodium sequestrate (sic)? 11:04:34
23 A. Sodium sesquicarbonate. 11:04:37
24 MR. ASHBY: I'll -- I'll -- I'll just 11:04:40
25 object. 11:04:41

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1 BY MR. SATTERLEY: 11:04:41
2 Q. Do you -- 11:04:41
3 MR. ASHBY: It misstates -- 11:04:41
4 BY MR. SATTERLEY: 11:04:42
5 Q. Did that occur? 11:04:42
6 A. Yes. 11:04:43
7 Q. Okay. And did -- did you stand by your 11:04:43
8 findings that you found chrysotile asbestos and it 11:04:46
9 wasn't sodium sequestrate (sic)? 11:04:49
10 A. I was not prepared to argue the point at 11:04:53
11 an open meeting. I just sat, and I -- whatever he said, 11:04:59
12 God bless you, and you publish that somewhere and then 11:05:11
13 we can talk about it. 11:05:14
14 Q. Did Norm Estrin ever publish that? 11:05:15
15 A. No, of course not. 11:05:17
16 Q. Okay. Now, did you know -- the '76 paper, 11:05:18
17 did you know that Norm Estrin -- I'm going to show you 11:05:21
18 Exhibit 17. 11:05:24
19 (Exhibit 17 was marked and 11:05:25
20 attached to the transcript.) 11:05:25
21 BY MR. SATTERLEY: 11:05:27
22 Q. -- had confidentially provided a draft of 11:05:27
23 your paper to Johnson & Johnson? 11:05:32
24 MR. ASHBY: Objection. Argumentative. 11:05:33
25 Lacks foundation. 11:05:35

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1 THE WITNESS: No. 11:05:36
2 BY MR. SATTERLEY: 11:05:36
3 Q. Back -- back in the '70 time -- '76 11:05:36
4 timeframe -- 11:05:39
5 A. No. 11:05:41
6 Q. -- no one shared with you the fact that 11:05:41
7 they -- it had been circulated? 11:05:43
8 And -- and who was the -- do you remember 11:05:47
9 the -- the editor of the journal? Was it Mehlman? 11:05:51
10 A. Yeah. Myron Mehlman. 11:05:56
11 Q. And who is Myron Mehlman? 11:05:58
12 A. Myron Mehlman was the -- Myron came out of 11:06:01
13 one of the oil companies. But he used to visit our 11:06:13
14 laboratory. He was on friendly terms with Irving 11:06:16
15 Selikoff. Myron Mehlman, one of the major oil 11:06:18
16 companies, the toxicology or -- I'm blocking on it. 11:06:23
17 Myron was the editor of the Journal of Environmental 11:06:30
18 Toxicol -- whatever, whatever the journal name was, that 11:06:34
19 he published it. 11:06:37
20 Q. But he -- he was the journal -- journal 11:06:42
21 editor? 11:06:44
22 A. Yes. He was the journal editor, yes. 11:06:44
23 Q. Back -- back in the timeframe 1976, 11:06:47
24 were -- did he or anybody else educate you on what 11:06:50
25 changes were made to your draft paper by either J&J or 11:06:54

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1 the Cosmetic, Toiletry & Fragrance Association? 11:07:00	1 generated our own funding base and source. 11:10:09
2 MR. ASHBY: Lacks foundation. Assumes 11:07:04	2 The -- the nature of the -- the nature of 11:10:22
3 facts. Misstates. 11:07:06	3 the field was such that you would apply for a support 11:10:25
4 THE WITNESS: No. 11:07:07	4 focusing on a specific issue, but as you explored that 11:10:34
5 (Exhibit 18 was marked and 11:07:07	5 issue it took you to other areas. It was like I'm 11:10:40
6 attached to the transcript.) 11:07:07	6 interested in the asbestos body content of 3,000 people 11:10:52
7 BY MR. SATTERLEY: 11:07:07	7 who died in New York City. I'm interested in the fibers 11:10:54
8 Q. Now, Exhibit 18 is a March 17, 1976, 11:07:08	8 in their lungs. I'm going to explore -- not just 11:11:01
9 memorandum from you to -- 11:07:24	9 present the data on what I'm finding, but I'm going to 11:11:09
10 A. Tom Chalmers. 11:07:29	10 explore other areas in terms of the source of fiber. So 11:11:11
11 Q. -- Dean Thomas C. Chalmers. Is that your 11:07:31	11 you go from a funding core, asbestos bodies, and you 11:11:16
12 signature on the fourth page? 11:07:34	12 start to look at talc. 11:11:23
13 A. Yes. 11:07:40	13 Q. Uh-huh. 11:11:24
14 Q. And were you made aware of the fact that 11:07:41	14 A. So you use time and money and effort. You 11:11:25
15 Johnson & Johnson had -- had complained to the Dean of 11:07:48	15 have to buy photographic plates, disposables, for our 11:11:34
16 Mount Sinai about you and Dr. Selikoff? 11:07:53	16 studies. You have to send out -- maybe hire a new 11:11:37
17 MR. ASHBY: Objection. Calls for 11:07:57	17 technician to run the microscope because you cannot scan 11:11:45
18 speculation. Lacks foundation. Misstates. 11:07:59	18 sitting in an electron microscope console eight hours a 11:11:49
19 Argumentative. 11:07:59	19 day five days a week. It's -- it's -- it's not made for 11:11:53
20 THE WITNESS: Not at that time, but it 11:08:07	20 humans to do. You need -- 11:11:59
21 became clear over a passage of time that this had 11:08:08	21 Q. If you could turn to page 2, at the very 11:12:01
22 happened. 11:08:12	22 bottom, you write, Still -- I'll wait until you flip the 11:12:03
23 BY MR. SATTERLEY: 11:08:12	23 page. The last paragraph. Still without significant 11:12:09
24 Q. And were you in -- in March of 1976, 11:08:13	24 research support other than "stealing time" from other 11:12:13
25 following a conversation with Dr. Chalmers, reported to 11:08:18	25 projects, we continue our analysis of consumer talc. 11:12:18
Page 58	Page 60
1 Dr. Chalmers your and Dr. Selikoff's involvement with 11:08:23	1 A. That's right. 11:12:23
2 regards to talc issues and talc studies at the 11:08:28	2 Q. Is -- is -- this was a scientific interest 11:12:24
3 environmental science laboratory? 11:08:32	3 of you and Dr. Selikoff, but you didn't have the 11:12:25
4 A. Yes. 11:08:34	4 resources by a grant to focus on it; is that fair? 11:12:27
5 Q. And does this sort a give a history, sort 11:08:34	5 A. That is absolutely correct. 11:12:32
6 of an overview, and you go all the way back to the late 11:08:38	6 Q. Okay. The next part that I want to ask 11:12:33
7 '60s describing what you and Dr. Selikoff had been 11:08:41	7 you about is on the third page, on the second full 11:12:35
8 doing? 11:08:48	8 paragraph of my colleagues and I. 11:12:43
9 A. Yes. 11:08:48	9 A. Yes. 11:12:45
10 Q. And does this, I guess, accurately reflect 11:08:49	10 Q. And I just want to ask you about the 11:12:46
11 your involvement in talc issues from -- from the late 11:08:53	11 Edinburgh situation. Tell -- tell the folks on the jury 11:12:51
12 '60s to 1976? 11:08:57	12 about the Edinburgh paper and what -- what happened in 11:12:54
13 A. Yeah. It's -- generally. It doesn't have 11:08:59	13 Edinburgh. 11:12:57
14 every detail, but there's a general -- a general outline 11:09:05	14 A. Edinburgh, as you know, is in Scotland. 11:12:59
15 of our involvement and -- our involvement and the 11:09:11	15 This was another international meeting. I was invited 11:13:02
16 conveying of information to various federal agencies, 11:09:20	16 to some other conference somewhere else. Art Rohl was 11:13:08
17 yes. 11:09:24	17 going to go over and represent our laboratory. We had 11:13:13
18 Q. And I -- I see in this -- you talk about 11:09:25	18 written a paper in collaboration with Fred Pooley. Fred 11:13:16
19 cash outlays and -- and financial considerations. How 11:09:30	19 Pooley was in the Department of Mineral Exploitation, 11:13:21
20 did that impact your -- your and Dr. Selikoff's ability 11:09:34	20 the University College Cardiff in the UK. 11:13:26
21 to conduct research with regards to talc issues? 11:09:38	21 Pooley did the electron microscopy for 11:13:31
22 A. Well, this is -- this is an interesting 11:09:44	22 Chris Wagner and their asbestos studies in Wales, the 11:13:36
23 subject. The fact of the matter was we were funded on 11:09:48	23 UK. Chris Wagner, the -- has been given the credit for 11:13:42
24 specific projects. In other words, we were not 11:09:56	24 the establishment of the association between exposure to 11:13:48
25 supported by hard funds from the institution. We 11:10:02	25 crocidolite asbestos and mesothelioma. 11:13:52
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1 Well, we wrote a paper with Fred Pooley. 11:13:58 2 We had an analysis of 30-some-odd products. Fred Pooley 11:14:01 3 was the senior author. Fred Pooley decided -- he 11:14:06 4 decided. He withdrew the paper from presentation. 11:14:13 5 However, there are pre-prints -- pre-printed papers were 11:14:19 6 the norm at international meetings so that the attendees 11:14:25 7 could follow the presentation in detail. 11:14:33 8 I have somewhere in my files -- I promise 11:14:38 9 you I'm going to get you a copy of that paper -- the 11:14:41 10 Edinburgh paper. And the Edinburgh paper was withdrawn 11:14:48 11 from presentation by Fred Pooley. I agreed to it. Fred 11:14:56 12 indicated he was under pressure from whatever mineral 11:15:01 13 groups, whatever mineral commodity people, whatever 11:15:05 14 manufacturer or whatever, were -- was pressured to 11:15:11 15 withdraw the paper from the conference. 11:15:16 16 Q. And just so the record is clear, I asked 11:15:20 17 you if you had a copy of it. You said you'll look for 11:15:23 18 it. But you haven't -- 11:15:26 19 A. I will. I will. I will. 11:15:27 20 Q. You -- you haven't been able to find it 11:15:28 21 yet, right? 11:15:29 22 A. I -- I -- I promise you. 11:15:30 23 Q. Okay. All right. But -- but with regards 11:15:31 24 to the -- the -- that event, you described that to 11:15:33 25 Dr. Chalmers in March of 1976 in your memo, correct? 11:15:40 Page 62	1 A. I don't think so. But whatever was 11:16:53 2 present in that talc sample it was pretty good talc. 11:16:57 3 And it -- and it didn't impress me as one that hadn't 11:17:02 4 been milled and beneficiated properly. 11:17:08 5 Q. Let me ask you a question differently. 11:17:12 6 You -- you said in '71 you found chrysotile asbestos in 11:17:15 7 Johnson's Baby Powder. In '75-'76 timeframe did you 11:17:18 8 also find chrysotile asbestos in Johnson's Baby Powder? 11:17:24 9 A. It -- it -- that was a trace amount. I'm 11:17:27 10 saying .01. .01 is one particle in 10,000, which would 11:17:28 11 be a trace -- it's not a trace -- a -- a -- a trace 11:17:34 12 amount. 11:17:40 13 Q. Now, with regards to amphibole, you never 11:17:40 14 found amphibole asbestos in Johnson Baby Powder, 11:17:43 15 correct? 11:17:46 16 A. Correct. 11:17:46 17 Q. All right. And you never utilized what's 11:17:47 18 called the heavy liquid separation method to look for 11:17:49 19 amphiboles, correct? 11:17:52 20 A. I never -- no. 11:17:53 21 Q. Okay. And, by the way, back in 1971 when 11:17:55 22 Dr. Gavin Hildick-Smith -- and you told him about the 11:18:02 23 chrysotile asbestos, did -- did you want to publish 11:18:09 24 those findings in '71? 11:18:13 25 A. '71. I'm thinking of the first 11:18:21 Page 64
1 A. Correct. 11:15:46 2 Q. And does your memo fairly and accurately 11:15:46 3 set forth your involvement with talc in that timeframe? 11:15:49 4 A. Yes. 11:15:52 5 Q. Okay. Now, subsequent to that did you 11:15:53 6 become aware that Dr. Chalmers had issued a retraction 11:15:58 7 about the presence of asbestos in -- in talcum powder 11:16:03 8 products? 11:16:06 9 A. That's my understanding, yes. 11:16:07 10 Q. Okay. Were you invited to the meeting 11:16:08 11 between the CEO of Johnson & Johnson and the president 11:16:10 12 of Johnson & Johnson and Dr. Chalmers? 11:16:14 13 A. No. 11:16:17 14 Q. Okay. At -- at that timeframe, in 1976, 11:16:17 15 had Johnson & Johnson provided a Johnson Baby Powder 11:16:22 16 sample for you to test? 11:16:26 17 A. Yes. There were several. Yeah. 11:16:27 18 Q. And did you test those? 11:16:29 19 A. Yes, I did. 11:16:30 20 Q. And did you find chrysotile asbestos? 11:16:30 21 A. I'm thinking a sample 344 as the number, 11:16:34 22 that was a pretty good talc. Did I find a trace amount 11:16:39 23 of chrysotile? I am uncertain, as I sit here now, to 11:16:43 24 make a definitive statement. 11:16:49 25 Q. Well, let me ask -- 11:16:52 Page 63	1 publication. I mean, we were talking about it. We were 11:18:23 2 publishing on asbestos bodies or asbestos fibers in 11:18:25 3 ambient air, and we were talking about asbestos fibers 11:18:29 4 in the lungs of people dying in New York City. We had a 11:18:33 5 number of projects ongoing. 1971, no. 11:18:38 6 Q. Did -- did Johnson & Johnson, Dr. Gavin 11:18:51 7 Hildick-Smith, ever offer a sponsorship so that you 11:18:54 8 could publish on your findings? 11:18:58 9 MR. ASHBY: Calls for speculation. Lacks 11:19:00 10 foundation. 11:19:01 11 THE WITNESS: I don't think so. 11:19:03 12 BY MR. SATTERLEY: 11:19:05 13 Q. With regards to 2017, did an individual -- 11:19:11 14 a group of individuals come to see you, attorneys for 11:19:16 15 Johnson & Johnson, here at -- at this same place we are 11:19:20 16 at today, at this lodge? 11:19:23 17 A. Yes. 11:19:24 18 Q. And who -- who came to see you? 11:19:24 19 A. Mr. Bicks. 11:19:28 20 Q. Okay. 11:19:34 21 A. In -- in the company of -- he was in the 11:19:36 22 company -- I think Roland Holland was there. And down 11:19:38 23 the road -- down the road in Norfolk... 11:19:46 24 Q. Bruce Bishop? 11:19:51 25 A. Bruce, yes. 11:19:52 Page 65

1 Q. Okay. Was there four or five lawyers for 11:19:52 2 J&J that came to visit you? 11:19:54 3 MR. ASHBY: Calls for speculation. Lacks 11:19:56 4 foundation. 11:19:58 5 THE WITNESS: One, two, three, four. One 11:19:59 6 of Bruce Bishop's colleagues also. I'd say four. 11:20:01 7 BY MR. SATTERLEY: 11:20:05 8 Q. And -- and did that meeting last for 11:20:06 9 three-quarters of a day? 11:20:08 10 A. Possibly, yes. 11:20:10 11 Q. And -- and did Mr. Bicks sort of lead that 11:20:13 12 discussion? 11:20:15 13 A. Yes. 11:20:16 14 Q. And was he a pretty smart guy? 11:20:16 15 A. Smart, nice guy. 11:20:19 16 Q. Nice guy? 11:20:20 17 A. Yeah. 11:20:22 18 Q. And let me show you Exhibit 18 and ask 11:20:22 19 you, is that a photo of Mr. Bicks? 11:20:28 20 A. It appears so. 11:20:30 21 Q. And did you tell Mr. Bicks and the other 11:20:36 22 attorneys for J&J at that time in -- in 2017 that you 11:20:37 23 stood by your position that you found asbestos in -- in 11:20:42 24 baby powder? 11:20:43 25 A. Yes. 11:20:44 Page 66	1 concluded that there was no asbestos in any of the talc. 11:21:44 2 And it was front page news. 100 U.S. newspapers carried 11:21:51 3 a corrected story that looked at all of this and said we 11:21:57 4 were wrong in 1971. We've looked at this, and there's 11:22:03 5 no asbestos in Johnson & Johnson's powder." 11:22:09 6 MR. ASHBY: All right. I'll just object 11:22:12 7 to the use of the video. It lacks foundation. Calls 11:22:13 8 for speculation. And it's not being used to refresh 11:22:17 9 recollection. 11:22:20 10 MR. SATTERLEY: Your object -- objection 11:22:21 11 is noted. 11:22:22 12 BY MR. SATTERLEY: 11:22:23 13 Q. Let me ask you, Dr. Langer, did you -- in 11:22:23 14 2017, did you understand that this individual, 11:22:26 15 Mr. Bicks, was working for Johnson & Johnson? 11:22:32 16 MR. ASHBY: I'll just object. 11:22:34 17 THE WITNESS: Yes. 11:22:35 18 BY MR. SATTERLEY: 11:22:35 19 Q. And you understood he was an attorney for 11:22:35 20 Johnson & Johnson? 11:22:37 21 MR. ASHBY: Object. 11:22:40 22 THE WITNESS: Yes. 11:22:41 23 BY MR. SATTERLEY: 11:22:41 24 Q. Did you ever tell him that we were wrong, 11:22:41 25 there was no asbestos in Johnson Baby Powder? 11:22:43 Page 68
1 Q. And did you -- subsequent to that were you 11:20:45 2 interviewed by Reuters and the New York Times on this 11:20:53 3 topic? 11:20:56 4 A. I don't think so, no. 11:20:57 5 Q. Did Reut -- in 2018, later, a year or so 11:20:58 6 later? 11:21:04 7 A. Someone from the New York Times. That -- 11:21:04 8 that would have been telephone. 11:21:06 9 Q. Yeah. Telephonic. 11:21:07 10 A. Yeah. 11:21:09 11 Q. And -- and did you stand by your 11:21:10 12 position -- 11:21:12 13 A. Yes. 11:21:12 14 Q. -- that there was asbestos in baby powder? 11:21:13 15 A. Yes. 11:21:15 16 Q. And let me show you a video. And I'll 11:21:16 17 provide a copy on a flash drive. Let me just turn this 11:21:24 18 around and see if you can see that. 11:21:29 19 THE VIDEOGRAPHER: Is this to be shown 11:21:33 20 right now? 11:21:34 21 MR. SATTERLEY: No, no, no. This is for 11:21:35 22 him. 11:21:36 23 (The video was played as follows:) 11:21:36 24 "At the end, the FDA and Mount Sinai 11:21:38 25 Hospital, which is where Dr. Langer is from, they all 11:21:40 Page 67	1 MR. ASHBY: Objection. Lacks foundation. 11:22:46 2 Calls for speculation. Argumentive. 11:22:48 3 THE WITNESS: Let's assume for the 11:22:52 4 moment -- 11:22:54 5 BY MR. SATTERLEY: 11:22:54 6 Q. Well, let me ask -- ask you to answer -- 11:22:55 7 A. Let me -- 11:22:55 8 Q. -- the question first. 11:22:56 9 Did you tell him that there was no 11:22:57 10 asbestos in baby powder? 11:22:58 11 MR. ASHBY: Same objection. 11:23:01 12 MR. CHARCHALIS: Mr. -- Mr. Satterley, if 11:23:04 13 you could please let the witness complete his answer 11:23:05 14 when he starts to give one. You can't cut him off. 11:23:08 15 BY MR. SATTERLEY: 11:23:10 16 Q. Go ahead, Dr. Langer. Did you tell him 11:23:10 17 that you were wrong? 11:23:12 18 A. Yes. I'm -- I'm just being kind to 11:23:12 19 Mr. Bicks. 11:23:14 20 Q. Uh-huh. 11:23:14 21 A. I -- I can be kind. 11:23:14 22 Q. Uh-huh. 11:23:14 23 A. There were many samples that we discussed. 11:23:16 24 And in terms of the original reports concerning the 11:23:22 25 chrysotile fibers identified in the talcs, including 11:23:28 Page 69

1 J&J, that remained. 11:23:34	1 BY MR. SATTERLEY: 11:32:11
2 Q. You stood by that? 11:23:37	2 Q. Did you ever write an article -- publish 11:32:11
3 A. I stood by that. 11:23:38	3 an article saying you were wrong about Johnson & Johnson 11:32:14
4 Q. And did you tell Mr. Bicks that? 11:23:39	4 having chrysotile asbestos? 11:32:17
5 MR. ASHBY: Objection. 11:23:41	5 A. No. 11:32:18
6 THE WITNESS: Yes. I'm just saying over 11:23:43	6 MR. ASHBY: Let me just get my objection 11:32:19
7 three-quarters of a -- a day could he have been confused 11:23:45	7 to the -- to the use of the video. It's improper. And 11:32:20
8 about some other report, some other no, we were wrong 11:23:48	8 then object to the question as argumentative. 11:32:23
9 about that, it's possible that we were wrong about 11:23:55	9 MR. SATTERLEY: You -- yeah. You can have 11:32:26
10 something. 11:23:58	10 an objection. You already stated the objection. You 11:32:28
11 BY MR. SATTERLEY: 11:23:58	11 can have another one. 11:32:30
12 Q. Let me show you another -- 11:23:58	12 BY MR. SATTERLEY: 11:32:30
13 THE VIDEOGRAPHER: I need to change the 11:24:00	13 Q. Let me ask the question again. Did you 11:32:30
14 media real quick. 11:24:01	14 ever write an article that said you had a false positive 11:32:33
15 MR. SATTERLEY: Okay. 11:24:01	15 and there's no asbestos in Johnson's Baby Powder? 11:32:36
16 THE VIDEOGRAPHER: All right. The time is 11:24:03	16 A. No. 11:32:39
17 11:24. This is the end of media number one, and we are 11:24:04	17 Q. One more video. 11:32:40
18 off the record. 11:24:08	18 (The video was played as follows:) 11:32:40
19 THE WITNESS: Oh, perfect. Perfect. 11:24:09	19 "Let me give you another example of what 11:32:53
20 (A recess was taken.) 11:24:11	20 you need to watch out for. You heard about Dr. Langer. 11:32:56
21 THE VIDEOGRAPHER: All right. The time is 11:30:53	21 And he tested a bunch of different products. I think 11:33:02
22 11:31. This is the beginning of media number two, and 11:31:00	22 the plaintiff told you that. His test showed asbestos. 11:33:05
23 we are back on the video record. 11:31:04	23 At the end of the day you're going to see that 11:33:09
24 BY MR. SATTERLEY: 11:31:06	24 Dr. Langer of Mount Sinai Medical Center found Johnson & 11:33:12
25 Q. Dr. Langer, are you ready to continue? 11:31:07	25 Johnson products did not have asbestos. That's what 11:33:16
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1 A. Yes, I am. 11:31:08	1 you're going to see him acknowledge. No asbestos 11:33:17
2 Q. Just a few more questions and I'll turn 11:31:09	2 contamination." 11:33:20
3 you over to the attorneys for J&J and LTL. 11:31:11	3 MR. ASHBY: Again, objection to the use of 11:33:22
4 Did you know a Bill Ashton? 11:31:15	4 the video. It's improper. 11:33:23
5 A. Yes. 11:31:18	5 BY MR. SATTERLEY: 11:33:25
6 Q. And who is Bill Ashton? 11:31:18	6 Q. In the meeting with those four or five 11:33:25
7 A. He was a mineralogist. I believe he was 11:31:21	7 lawyers in 2017, did you tell them that Johnson & 11:33:26
8 employed by Johnson & Johnson. 11:31:23	8 Johnson -- that you retracted your findings, that you 11:33:33
9 Q. And did you come to meet him through 11:31:24	9 did not find any asbestos? 11:33:37
10 scientific meetings and -- and -- 11:31:29	10 MR. ASHBY: Objection. Compound. 11:33:38
11 A. Occasionally. Meetings, yes. 11:31:31	11 Misstates. 11:33:39
12 Q. Back to the -- a video that I showed you a 11:31:33	12 THE WITNESS: No. 11:33:40
13 minute -- I showed you one of Mr. Bicks. Now I want to 11:31:37	13 BY MR. SATTERLEY: 11:33:42
14 show you one of another -- that -- that was 2018 of 11:31:39	14 Q. As a -- a geologist and a mineralogist, 11:33:49
15 Mr. Bicks. Now, this one is in 2019. 11:31:43	15 does talc and asbestos grow together in the earth? 11:33:52
16 MR. ASHBY: Object. 11:31:45	16 MR. ASHBY: Objection. Overbroad. 11:33:57
17 MR. SATTERLEY: You can have an objection. 11:31:47	17 THE WITNESS: They can. 11:33:58
18 (The video was played as follows:) 11:31:47	18 BY MR. SATTERLEY: 11:33:58
19 "Dr. Langer and Dr. Rubin, who we talked 11:31:50	19 Q. And have you published upon that? 11:33:58
20 about with Dr. Egilman, also did testing and found that 11:31:52	20 A. Yes. 11:34:00
21 they're not false positives. Langer actually wrote an 11:31:58	21 Q. And as a mineralogist, someone who has 11:34:00
22 article despite the fact that Dr. Egilman said that he 11:31:59	22 spent a -- a career looking under the transmission 11:34:06
23 found asbestos in Johnson's Baby Powder and said, I may 11:32:02	23 electron mic -- microscope, have you found fibrous 11:34:09
24 have been mistaken. Long talcum fibers or asbestos 11:32:06	24 amphiboles in talcum powder products repeatedly? 11:34:12
25 fibers, they have similar properties." 11:32:09	25 A. Occasionally. No. Occasionally. 11:34:16
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1 Q. And with regards to -- I know you said you 11:34:18	1 MR. ASHBY: Well, I don't even know -- 11:37:39
2 were emeritus now. You have not recently, in the last 11:34:25	2 which ones -- which ones are we talking about, the Bicks 11:37:41
3 several years, analyzed talcum powder for the presence 11:34:27	3 one -- 11:37:43
4 of asbestos, correct? 11:34:32	4 MR. SATTERLEY: Yeah. 11:37:43
5 A. Correct. 11:34:33	5 MR. ASHBY: And what else? 11:37:43
6 Q. Okay. And you're not -- you've not been 11:34:33	6 MR. SATTERLEY: Just -- and -- and 18 11:37:44
7 hired by -- since 2017 when these attorneys came to see 11:34:36	7 is -- his letter to Chalmers is 18. 11:37:45
8 you, they didn't hire you to be -- to evaluate any 11:34:40	8 MR. ASHBY: Oh, I had that marked as 17. 11:37:50
9 particular case, correct? 11:34:44	9 MR. SATTERLEY: That's 18. No. 17 is the 11:37:52
10 A. Correct. 11:34:45	10 confidential -- strictly confidential. 11:37:54
11 Q. And they certainly didn't hire you to 11:34:45	11 MR. ASHBY: Oh, that's 17? 11:37:57
12 evaluate this case, correct, Mr. Valadez? 11:34:47	12 MR. SATTERLEY: So why don't we call it 11:37:58
13 A. No. 11:34:51	13 18a so that -- because I mentioned 18 on the record? 11:38:00
14 Q. Okay. And -- and none of these attorneys 11:34:52	14 MR. ASHBY: Is Bicks' picture? 11:38:03
15 for Johnson & Johnson asked you to evaluate the risks 11:34:53	15 MR. SATTERLEY: Yeah. 11:38:06
16 that -- the risks to -- of -- of asbestos in Johnson's 11:34:59	16 MR. ASHBY: Okay. What are we on, 19? 11:38:08
17 Baby Powder -- 11:35:04	17 Those videos are -- 11:38:10
18 MR. ASHBY: Assumes facts. 11:35:04	18 MR. SATTERLEY: Yeah. Yeah. 19. Sorry 11:38:12
19 BY MR. SATTERLEY: 11:35:06	19 about that. 11:38:13
20 Q. -- at any point in time? 11:35:06	20 (A discussion took place off the record.) 11:38:15
21 THE WITNESS: No. 11:35:10	21 (Exhibit 18a was marked and 11:38:15
22 MR. ASHBY: Assumes facts. 11:35:10	22 attached to the transcript.) 11:40:09
23 MR. SATTERLEY: Dr. Langer, I appreciate 11:35:10	23 THE VIDEOGRAPHER: All right. The time is 11:40:09
24 all your testimony here today. I'm not going to have 11:35:11	24 11:40, and we are back on the video record. 11:40:10
25 any further questions right now. After the attorneys 11:35:14	25 11:40:10
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1 ask you questions, I may come back and ask you 11:35:16	1 EXAMINATION BY COUNSEL FOR THE DEFENDANTS JOHNSON & 11:40:10
2 additional questions. 11:35:18	2 JOHNSON AND LTL MANAGEMENT, LLC: 11:40:10
3 THE WITNESS: Fine. 11:35:19	3 BY MR. ASHBY: 11:40:10
4 MR. SATTERLEY: Let's go off the record 11:35:19	4 Q. Good -- I guess we're still in the 11:40:16
5 just so we can switch seats. Okay? 11:35:20	5 morning. Good morning -- good afternoon, 11:40:18
6 THE WITNESS: Sure. 11:35:23	6 Dr. Langer. My name's Matt Ashby. Nice to meet you. 11:40:19
7 MR. ASHBY: All right. 11:35:24	7 A. Nice to meet you. 11:40:22
8 MR. SATTERLEY: Let me just get my stuff. 11:35:26	8 Q. We met in the hallway, but you and I had 11:40:23
9 THE VIDEOGRAPHER: The time is 11:35. 11:35:29	9 never met previously to -- to today, correct? 11:40:26
10 We're going off the record. 11:35:31	10 A. Yes. That is correct. 11:40:28
11 (A recess was taken.) 11:35:33	11 Q. As you understand, I represent Johnson & 11:40:29
12 THE VIDEOGRAPHER: It's 11:36 a.m. We're 11:36:46	12 Johnson and LTL in the case that Mr. Satterley's 11:40:32
13 back on the video record. 11:36:49	13 brought. Do you understand today that your deposition 11:40:35
14 MR. SATTERLEY: Oh, no, no, we're not on 11:36:53	14 is being taken at the request of Mr. Satterley and his 11:40:38
15 the video record. 11:36:54	15 client? 11:40:41
16 THE VIDEOGRAPHER: Oh. Well, okay. Just 11:36:54	16 A. Yes. 11:40:41
17 back on the record. I got it. 11:36:54	17 Q. Okay. Johnson & Johnson didn't have 11:40:42
18 MR. SATTERLEY: Yeah. 11:36:54	18 anything to do with scheduling your deposition today; is 11:40:44
19 MR. ASHBY: What's the other, 18? 11:36:54	19 that right, as far as you know? 11:40:46
20 MR. SATTERLEY: Let -- let's change the -- 11:37:30	20 A. As far as I know. 11:40:47
21 let's go on the record and -- you're right. You're -- 11:37:30	21 Q. Johnson & Johnson is not paying you for 11:40:49
22 you're correct. Let's change the -- 11:37:30	22 your testimony today; is that correct? 11:40:52
23 MR. ASHBY: The 18? 11:37:30	23 A. As far as I know. 11:40:53
24 MR. SATTERLEY: -- 18 to -- let's just do 11:37:32	24 Q. Is Mr. -- is Mr. Satterley paying you for 11:40:54
25 19, or should we do 18a? 11:37:35	25 your testimony today? 11:40:56
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1	A. Not -- not that I know of, no.	11:40:58	1	Q. Uh-huh.	11:43:54
2	Q. And prior to today you have met with	11:41:00	2	A. Yeah.	11:43:55
3	Mr. Satterley a few times to discuss what you would	11:41:05	3	Q. Okay. All right. Let's just dive into	11:43:55
4	testify about today; is that true?	11:41:08	4	it.	11:44:00
5	A. Yes.	11:41:10	5	So I -- I'm going to have a couple of	11:44:01
6	Q. Okay. And how many times did you meet	11:41:11	6	questions for you today. Certainly I'm going to ask you	11:44:03
7	with Mr. Satterley?	11:41:12	7	about Johnson & Johnson and baby powder. I'm going to	11:44:05
8	A. Several times.	11:41:13	8	ask you some things about some statements you've made	11:44:08
9	Q. Okay. How many -- how much time do you	11:41:14	9	publicly and some statements you've made in your	11:44:10
10	think you and Mr. Satterley spent together in preparing	11:41:16	10	research or maybe even at symposiums and things like	11:44:12
11	for the testimony you would give today?	11:41:20	11	that.	11:44:17
12	A. I -- the bulk of the time, of course, was	11:41:25	12	Q. Great.	11:44:17
13	spent at the -- at the meetings. However, Mr. Satterley	11:41:30	13	So we'll cover as much as we can. I don't	11:44:17
14	sent me a package of documents raising issues concerning	11:41:38	14	intend to spend a lot of time with you, but what I'm	11:44:20
15	our analytical results and the analysis techniques and	11:41:49	15	hoping you'll do is just give me your best testimony and	11:44:23
16	the characterization of talc and particles within talc,	11:41:55	16	how -- how you best remember things. Can you do that	11:44:26
17	and he asked me to read these documents and to answer	11:42:00	17	for me?	11:44:29
18	the critiques raised by the defendant experts.	11:42:05	18	A. And be pithy.	11:44:30
19	And I read the documents. I was very	11:42:16	19	Q. Especially pithy. That's all anybody	11:44:31
20	interested in their criticisms of our techniques. And	11:42:20	20	wants.	11:44:33
21	a great deal -- a great deal of time. I have time, as	11:42:28	21	A. Okay.	11:44:33
22	you can imagine. It may have consumed maybe eight	11:42:33	22	Q. All right. Do you recall -- just as a	11:44:35
23	hours, maybe nine hours.	11:42:40	23	starting point, you recall that you were deposed in 2021	11:44:38
24	Q. And -- and did you submit an invoice or a	11:42:42	24	in relation to Johnson & Johnson and many of the things	11:44:42
25	bill to Mr. Satterley for payment for the time that you	11:42:47	25	that you testified about here today, right?	11:44:46
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1	spent doing this?	11:42:50	1	A. Essentially.	11:44:47
2	A. No.	11:42:50	2	Q. Okay. All right, Dr. Langer. You had	11:44:48
3	Q. Do you expect to be paid by Mr. Satterley	11:42:51	3	great respect for the researchers at J&J; is that true?	11:44:53
4	or -- or his firm for the time you spent reviewing those	11:42:53	4	A. Yes. Yeah.	11:44:56
5	materials?	11:42:56	5	Q. You believe the researchers at J&J were	11:44:58
6	A. Well, as a percipient witness, no, I can't	11:42:56	6	rigorous and acted in good faith?	11:45:00
7	submit a statement, so...	11:43:00	7	A. I'm assuming so.	11:45:03
8	Q. Okay. And Mr. Satterley's not offered to	11:43:02	8	Q. You have no -- what you told us in 2021	11:45:05
9	pay you for your time spent doing that; is that true?	11:43:06	9	was that you had no reason to disagree with that, that	11:45:11
10	A. I haven't heard anything from him.	11:43:09	10	the researchers at J&J were rigorous and acted in good	11:45:14
11	Q. Okay. So do you still have in your	11:43:12	11	faith?	11:45:17
12	possession the materials that Mr. Satterley sent you?	11:43:18	12	A. I have no reason to disagree with that,	11:45:17
13	A. Yes. I probably have them on my desk at	11:43:22	13	no.	11:45:19
14	home.	11:43:25	14	Q. Do you agree that you believe that J&J's	11:45:19
15	Q. Okay.	11:43:25	15	talc was never the problem and that they were the good	11:45:24
16	A. Yes.	11:43:26	16	guys in the talc story and other talcs might have been	11:45:26
17	Q. Are we talking like a Redweld-size worth	11:43:26	17	the problem, right?	11:45:30
18	of -- of papers or -- or something smaller than a	11:43:34	18	A. That's, I think, a reasonable summary,	11:45:32
19	banker's box?	11:43:36	19	yes.	11:45:37
20	A. Well, smaller, yeah. Maybe	11:43:36	20	Q. Okay. All right. So let's talk a bit	11:45:37
21	(indicating) -- I'm separating my fingers -- about one	11:43:39	21	about 1971 and what was going on at that time. So I	11:45:50
22	inch.	11:43:45	22	want to kind of set the scene. I think you're a pretty	11:45:54
23	Q. Got it.	11:43:45	23	good storyteller, so I thought we could start with that.	11:45:57
24	A. So about an inch depth. Yeah. It -- it's	11:43:46	24	A. Okay.	11:46:00
25	documents that -- reports, techniques.	11:43:50	25	Q. In September of 1971 your team at Mount	11:46:00
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1 Sinai began the study of asbestos content of consumer 11:46:05 2 talcs; is that right? 11:46:08 3 A. No. Actually, it's not. I believe that 11:46:10 4 we started the study of consumer talcs well before 1971. 11:46:16 5 I believe that we published our -- we published our 11:46:25 6 asbestos body studies in 1969. That's at the 11:46:30 7 Johannesburg meeting. That would be Selikoff's first 11:46:42 8 paper in that area. My first publication would be about 11:46:44 9 1970. 11:46:49 10 But, of course, the issue is there's a 11:46:50 11 publication of the document, which is the publication of 11:46:57 12 the data, but in order to publish -- it's built on a 11:47:04 13 body of information that preceded a year or two years 11:47:08 14 before that. And so a year or two years before 1971 -- 11:47:14 15 what, three years -- we were speaking with federal 11:47:22 16 agencies like Food & Drug concerning fibers and fiber 11:47:26 17 exposure. We were invited to the group at Cincinnati, 11:47:34 18 we were invited to Food & Drug down in Washington, D.C., 11:47:43 19 and we spoke about these issues. 11:47:53 20 Food & Drug at that time -- this is in the 11:47:58 21 nine -- late nineteen seven -- '60s. Food & Drug 11:48:02 22 regarded talc as a -- an additive in a -- in a 11:48:06 23 pharmaceutical, in food products, regarded talc as safe, 11:48:14 24 generally regarded as safe. The document was called the 11:48:21 25 Green Document. And there were a number of materials 11:48:25 Page 82	1 I was getting at -- I was just trying to set the stage. 11:50:24 2 I know you -- you covered a lot of topics right there, 11:50:27 3 and we'll get into those as -- as we go along, but 11:50:28 4 really -- here. I'll just do this. I'll mark this as 11:50:31 5 Exhibit 19. I'll give this to you. And maybe this will 11:50:35 6 help us. 11:50:38 7 (Exhibit 19 was marked and 11:38:15 8 attached to the transcript.) 11:38:15 9 BY MR. ASHBY: 11:50:41 10 Q. Do -- do you recognize this document? 11:50:41 11 A. Expert report, yes. 11:50:46 12 Q. Okay. 11:50:48 13 A. Asbestos -- bup, bup, bup, bup. Talc. 11:50:50 14 Q. And is this a report that you drafted in 11:50:56 15 2015 as an expert in some kind of litigation? 11:50:59 16 A. Yes. 11:51:07 17 Q. Okay. So if you turn to page 3, really 11:51:07 18 what I was looking at, and I probably misstated, but 11:51:09 19 at -- in paragraph 3 there it says, In September 1971 my 11:51:13 20 team at -- 11:51:17 21 A. Yeah. 11:51:17 22 Q. -- Environmental Sciences Lab -- 11:51:17 23 Laboratory, ESL -- and you told us today it was the EML 11:51:21 24 before that -- at Mount Sinai -- 11:51:24 25 A. Oh. Before that we were called -- we were 11:51:26 Page 84
1 and compounds generally regarded as safe, and talc was 11:48:31 2 one of them. And so we talked about our data. And we 11:48:36 3 said, you know, we're interested in these particles. We 11:48:41 4 find asbestos bodies. Does this mean that the -- the 11:48:45 5 lung is reacting to these particles? Does it mean 11:48:48 6 there's some biological potential here? Is it an agent 11:48:51 7 of scarring? 11:48:55 8 So these were all issues. I mean, 11:48:58 9 they're -- they're interesting now, but you're looking 11:49:00 10 at it 2023. Go back 55 years. What did we know about 11:49:06 11 fiber type, about concentration, about exposure, about 11:49:14 12 risk, about scarring, about malignancies? These were 11:49:21 13 all unknowns. And so we raised concerns. 11:49:28 14 And so your last statement that you read, 11:49:32 15 which you said, you know, Langer said that I'd make a 11:49:36 16 better witness -- bup, bup, bup, bup. Yeah. I'm -- I'm 11:49:43 17 looking at 2023. And I think a lot of people look at 11:49:45 18 the past -- the past feel, the past knowledge base, 11:49:50 19 through the lens of 2023. And we think of -- of what 11:50:00 20 the potential exposure risk is, what we call health, 11:50:07 21 what we call low risk, high risk, and so forth and so 11:50:13 22 on. 11:50:16 23 Q. Okay. Okay. So I -- I think there were 11:50:17 24 some things that were nonresponsive in what I asked, so 11:50:18 25 I'll just move to strike some of that. But really what 11:50:22 Page 83	1 called Environmental Health in the Department of 11:51:30 2 Medicine. There was no School of Medicine when I first 11:51:36 3 started there in 1965. It was only Mount Sinai 11:51:39 4 Hospital, which was a teaching hospital. And the -- let 11:51:44 5 me -- let me be pithy. Let me just say -- okay. All 11:51:49 6 right. 11:51:53 7 Q. Sure. Okay. So it -- it goes on, In 11:51:53 8 September '71 my team at ES -- ESL at Mount Sinai School 11:51:56 9 of Medicine began in a more formal manner the study of 11:52:01 10 the asbestos content of consumer talcs. 11:52:04 11 A. Yes. 11:52:06 12 Q. Is that accurate? 11:52:06 13 A. Yes. 11:52:07 14 Q. Okay. That's all I was getting at. 11:52:08 15 A. Yes. 11:52:10 16 Q. And in this time period of 1971 or the 11:52:10 17 early 1970s there's a lot going on in the world of 11:52:18 18 asbestos beyond just consumer talcs, true? 11:52:22 19 A. No question. 11:52:27 20 Q. Okay. And -- and it says, if we go down a 11:52:28 21 little further on page -- page 3, the last paragraph 11:52:30 22 says, During the early 1970s my laboratory at Mount 11:52:31 23 Sinai School of Medicine was in near constant receipt of 11:52:36 24 household and commercial products for asbestos content 11:52:38 25 analysis. Is that accurate? 11:52:41 Page 85

1 A. Yes. 11:52:43 2 Q. Okay. Because around this time, in the 11:52:43 3 early 1970s, there's a lot of knowledge being developed 11:52:47 4 regarding asbestos, particularly asbestos in the 11:52:51 5 workplace and even at the -- even at the households, 11:52:53 6 right? 11:52:56 7 A. Asbestos made the 5:00 news. 11:52:56 8 Q. And -- and when -- when I see here that it 11:52:59 9 says you were in near constant receipt of household and 11:53:06 10 commercial products for asbestos content analysis, and 11:53:10 11 then you go on to say these included textile products -- 11:53:15 12 A. Yes. 11:53:19 13 Q. -- personal care products -- 11:53:19 14 A. Yes. 11:53:20 15 Q. -- building materials, and all manner of 11:53:20 16 other consumer goods, right? 11:53:23 17 A. Yes. 11:53:25 18 Q. Can -- can you tell me the types of -- 11:53:27 19 well, actually, I'll strike that. 11:53:31 20 How -- how many products would you say at 11:53:33 21 the time contained asbestos as an intended ingredient in 11:53:34 22 the United States? 11:53:37 23 MR. SATTERLEY: Objection -- 11:53:43 24 THE WITNESS: At least -- 11:53:43 25 MR. SATTERLEY: -- to foundation. 11:53:43 Page 86	1 The -- Irving contacted -- I think 11:55:57 2 Mendelson was the president of the International Ladies' 11:56:06 3 Garment Workers Union in New York, and alerted to the 11:56:08 4 fact that his people were cutting this fabric and the 11:56:13 5 dust generated was dust that contained asbestos fiber. 11:56:19 6 BY MR. ASHBY: 11:56:19 7 Q. So -- 11:56:25 8 A. And that was -- that was common. I mean, 11:56:25 9 there were all kinds of interesting materials. 11:56:27 10 Q. I was just going to ask, so that's just 11:56:30 11 one example -- 11:56:32 12 A. Exactly. 11:56:32 13 Q. -- of probably, what, thousands of 11:56:33 14 different types of products you've looked at that 11:56:35 15 have -- have contained asbestos? 11:56:35 16 MR. SATTERLEY: Objection. Foundation. 11:56:38 17 Speculation. 11:56:39 18 THE WITNESS: And mercifully -- 11:56:40 19 mercifully, we didn't do a thousand -- 11:56:42 20 BY MR. ASHBY: 11:56:42 21 Q. Okay. 11:56:42 22 A. But we did a great number, a great number. 11:56:44 23 Would it have been 100? Yeah. It would have been 100. 11:56:47 24 Could it have been 150? Yeah. Everyone was sending us 11:56:51 25 something. They were sending us the kitty litter. They 11:56:54 Page 88
1 THE WITNESS: At least half the products 11:53:44 2 sent to us contained fiber, asbestos fiber. 11:53:45 3 I mean, my favorite story is we were 11:53:55 4 contacted by a woman in Connecticut who said she had 11:53:57 5 purchased a coat for her daughter and on the coat label 11:54:07 6 it indicated it contained 8 percent chrysotile asbestos. 11:54:16 7 Irving Selikoff received the letter. He contacted the 11:54:26 8 woman. He said, This is not possible. He said -- and 11:54:30 9 she said, I have the coat. He said, We're going to buy 11:54:33 10 the coat from you and we're going to examine it. Thank 11:54:35 11 you very much. Send me the bill. And we bought the 11:54:39 12 coat from her. 11:54:42 13 And the coat was manufactured in New York 11:54:47 14 City with fabric in -- fabric that was imported from 11:54:49 15 Milan, Italy. It was imported under a tariff which 11:54:56 16 permitted tariff fees to be changed if the product, the 11:55:04 17 fabric, contained a fiber which imparted special 11:55:13 18 properties to the material. And the fiber that was 11:55:19 19 mentioned was chrysotile asbestos. It was woven into 11:55:24 20 the fabric in Italy. It was brought into New York City 11:55:28 21 where it was cut and fashioned; the International 11:55:33 22 Ladies' Garment Workers Union. And they were in 11:55:37 23 touch -- Irving Selikoff -- I did the assays. We 11:55:43 24 included it in our report, our annual report. Maybe it 11:55:51 25 was the annual report of 1974. 11:55:52 Page 87	1 were sending us putties from different job sites. They 11:56:58 2 were sending us new -- pipe covering for pipes in the 11:57:04 3 basement of homes, a -- a -- a cellulose chrysotile 11:57:09 4 combination of cellu whatever. 11:57:15 5 Then there were paper maches, paper maches 11:57:20 6 from the Boy Scouts of America or whatever. The 11:57:24 7 recommendation in the Boy Scout Handbook was that 11:57:30 8 asbestos cement, the good varieties from Johns-Manville, 11:57:33 9 may be used as a -- as a modeling material. I mean, 11:57:37 10 you -- it was the original report out of JM -- and I'm 11:57:43 11 talking Sinclair's monograph on asbestos. He said there 11:57:50 12 were 3,000 consumer uses. 11:57:54 13 Mercifully, we didn't -- we didn't look at 11:57:59 14 3,000. We didn't look at 1,000. But there were plenty 11:58:01 15 of people -- asbestos made the 5:00 news. And people 11:58:05 16 became concerned not so much about what was known but 11:58:10 17 what was unknown. And so there was uncertainty. And 11:58:15 18 the uncertainty drove analysis. Now, we used to say why 11:58:20 19 don't you send this to the Consumer Product Safety 11:58:30 20 Commission. That's -- that's their job. 11:58:33 21 Q. All right. And -- and then around this 11:58:36 22 time, in this early 1970s period or maybe even before 11:58:37 23 1971, it -- what I see from this report is that you 11:58:40 24 began to purchase consumer talcum powder products from 11:58:43 25 retail outlets near Mount Sinai in New York City? 11:58:46 Page 89

1 A. Yes. That's correct. 11:58:49	1 understanding of the analyses or a -- a better 12:01:36
2 Q. Okay. And you also analyzed talcums that 11:58:50	2 understanding of your findings in -- 12:01:39
3 members of the lab staff may have had in their medicine 11:58:55	3 A. Yes. 12:01:39
4 cabinets at their homes? 11:58:58	4 Q. -- that 1971 to '72 period? 12:01:41
5 A. Yes. 11:58:59	5 A. Occasionally. 12:01:45
6 Q. And so you've discussed with Mr. Satterley 11:59:00	6 Q. Okay. And -- and we saw a video earlier. 12:01:47
7 quite a bit about the 1971 testing that you did of 11:59:03	7 There was one of these gentlemen that were talking. In 12:01:50
8 the -- the Johnson's Baby Powder product. And I think 11:59:07	8 any event, there -- there was a reference to an article. 12:01:52
9 what I understood you to say was that the analysis that 11:59:12	9 I know Mr. Satterley asked you if you ever published any 12:01:55
10 was performed on the 1971 product, or at least the 11:59:16	10 articles on this issue. What I'm asking, though, is a 12:01:59
11 product about that time, that analysis was never 11:59:21	11 newspaper article, because I think that was the 12:02:02
12 published in any peer-reviewed journal? That's true? 11:59:23	12 reference in the video. There was a newspaper article 12:02:04
13 A. I -- I think that's true, yeah. 11:59:26	13 in 1972 that had quoted you. And so do you remember 12:02:08
14 Q. And -- and do you recall originally when 11:59:28	14 being quoted in 1972 in newspaper articles regarding 12:02:14
15 the analysis was done of that product, was it done by 11:59:34	15 your findings in relation to consumer talcs? 12:02:18
16 PLM or electron microscopy or both? 11:59:39	16 A. Not specifically. 12:02:21
17 A. We would have employed both polarized 11:59:44	17 Q. Okay. So let's just -- let's see if I can 12:02:22
18 light microscopy. We would have employed x-ray 11:59:51	18 find that, and we can take a look at -- 12:02:26
19 diffraction. We would have employed electron 11:59:56	19 A. Is it -- oh, I'm thinking -- is this the 12:02:27
20 microscopy, which included selected area diffraction and 12:00:01	20 Wall Street Journal? Not Wall Street. It would be 12:02:30
21 the generation of chemical information. But, of course, 12:00:07	21 Washington Post? 12:02:35
22 that was not by energy dispersive at that time. That 12:00:11	22 Q. It might be. It might be the Washington 12:02:35
23 was with crystal spectrometry. That was an electron 12:00:14	23 Post article because there were -- there were quite a 12:02:37
24 microprobe analyzer, which had a different system and 12:00:21	24 few at the time, I believe. 12:02:38
25 method for analyzing x-rays generated from an irradiated 12:00:24	25 A. Yeah. I mean, I know where that confusion 12:02:41
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1 particle. 12:00:30	1 may have been, but okay. 12:02:43
2 Q. And -- and at that time I -- my 12:00:30	2 MR. ASHBY: So this is going -- so this is 12:02:45
3 understanding is that, in -- in addition to the 12:00:34	3 going to be a challenge, but I'll -- I'll do this. I'll 12:02:47
4 Johnson's Baby Powder you had looked at a Lander's Baby 12:00:36	4 mark this Exhibit 20, but the -- the writing is very 12:02:50
5 Powder too in that 1971 period? 12:00:43	5 small, Dr. Langer, and I apologize. I don't have 12:02:53
6 A. Could be. 12:00:44	6 anything better than this. 12:02:55
7 Q. And -- and the findings with respect to 12:00:45	7 (Exhibit 20 was marked and 12:02:57
8 those analyses at the very preliminary stages had been 12:00:46	8 attached to the transcript.) 12:02:58
9 sent or given to someone at the New York City 12:00:51	9 BY MR. ASHBY: 12:03:00
10 Environmental Protection department? Does that sound 12:00:53	10 Q. Okay. So this -- Exhibit 20 is an article 12:03:23
11 right? 12:00:55	11 entitled Asbestos in J&J Baby Powder question mark. And 12:03:29
12 A. Yes, that sounds right. 12:00:55	12 then the bigger heading is Doctor Admits He May Have 12:03:33
13 Q. Okay. And -- and because of that what 12:00:56	13 Been Mistaken. Do you see that? 12:03:36
14 happened was your preliminary findings that hadn't been 12:00:58	14 A. Yes. 12:03:38
15 published yet are disclosed, were disclosed by somebody 12:01:02	15 Q. Okay. Do you remember this article 12:03:38
16 at the New York City's office to the media, right? 12:01:04	16 from -- this is from 1972. 12:03:40
17 A. Correct. 12:01:07	17 MR. SATTERLEY: Where was it published at? 12:03:44
18 Q. And it -- it -- it -- it drew some 12:01:08	18 MR. ASHBY: This is in New Brunswick, New 12:03:47
19 attention, didn't it? 12:01:11	19 Jersey. 12:03:50
20 A. Yes, it did. 12:01:12	20 MR. SATTERLEY: Okay. 12:03:51
21 Q. And you were interviewed several times in 12:01:13	21 THE WITNESS: Yeah. Well, I wish I had a 12:03:52
22 1971 and 1972 about your baby powder findings, right? 12:01:18	22 better copy of this because it -- because there's an 12:03:57
23 A. Yes. 12:01:23	23 explanation of what -- what was either confused or what 12:04:05
24 Q. Now, at -- at some point did you take a 12:01:24	24 was reported and what was withdrawn. 12:04:11
25 closer look at the materials to get a better 12:01:28	25 BY MR. ASHBY: 12:04:15
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1 Q. Yeah. Well, let's see if we can get 12:04:15	1 doctor said. 12:05:49
2 through it a little bit. I'll read what I -- 12:04:18	2 A. That's me, yeah. 12:05:50
3 A. Please. 12:04:20	3 Q. Okay. So we agree you said that in 1972 12:05:51
4 Q. -- what I see here. And I -- I understand 12:04:21	4 to this -- 12:05:54
5 it's -- it's a small copy. 12:04:23	5 A. It sounds reasonable. Okay. 12:05:55
6 It says Langer. It doesn't say 12:04:24	6 Q. Okay. And then this definitely sounds 12:05:56
7 Dr. Langer, but it just says Dr. Langer -- 12:04:26	7 like you. It says, He continued, meaning you continued, 12:06:00
8 MR. SATTERLEY: I can't read it. 12:04:28	8 in quotes, "It annoys the hell out of me." 12:06:03
9 Dr. Langer, can -- can you read that? 12:04:30	9 A. Yes. That's -- that's a Langer-ism. 12:06:06
10 THE WITNESS: No. 12:04:31	10 Q. Yeah. There are a lot more important 12:06:09
11 MR. SATTERLEY: Do you have a better, 12:04:33	11 things than looking for asbestos in talcum powder. For 12:06:11
12 bigger, copy at all? 12:04:35	12 example, they should be worrying about asbestos in spray 12:06:15
13 MR. ASHBY: I do not have a bigger -- 12:04:36	13 paint and paper mache. 12:06:18
14 well, I -- I can probably zoom in on my computer if you 12:04:38	14 A. Yeah. 12:06:20
15 want. I mean -- 12:04:41	15 Q. And you told me about paper mache earlier, 12:06:20
16 THE WITNESS: Someone can read it to me. 12:04:41	16 right -- 12:06:23
17 It's all right. 12:04:43	17 A. Yeah. 12:06:23
18 BY MR. ASHBY: 12:04:43	18 Q. -- being a problem? 12:06:23
19 Q. Well, let's see. I'll read it to you, and 12:04:43	19 A. Yeah. 12:06:24
20 Mr. Satterley can tell me if I'm reading it wrong. 12:04:45	20 Q. Okay. So does it -- does that sound like 12:06:24
21 MR. SATTERLEY: I'll trust you, but I 12:04:48	21 something you would have said at the time too? 12:06:26
22 can't read it very well, but I -- I need to get a 12:04:50	22 A. Sure. 12:06:28
23 magnifying glass. 12:04:50	23 Q. And then it says -- it goes on. Now I'm 12:06:28
24 THE WITNESS: I can't. 12:04:53	24 moving over to the next -- the third column. It says, 12:06:34
25 BY MR. ASHBY: 12:04:54	25 But Dr. Langer said the amount of asbestos he saw in the 12:06:39
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1 Q. It says, Dr. Langer tested one container 12:04:54	1 baby powder was, in quotes now, "only a bare trace 12:06:42
2 of Lander's Baby -- 12:04:57	2 level." At the current state of medical knowledge he 12:06:47
3 MR. SATTERLEY: What paragraph are you on? 12:04:59	3 said there is no way of knowing if such a small quantity 12:06:53
4 MR. ASHBY: I am on paragraph one, two -- 12:05:01	4 could be harmful. You said that? 12:06:57
5 paragraph five. 12:05:03	5 A. You know, I'm a smart guy. 12:06:59
6 MR. SATTERLEY: Paragraph five. 12:05:04	6 Q. So you -- you agree with -- 12:07:01
7 MR. ASHBY: Just below the word admit. 12:05:06	7 A. Absolutely. Remember, you're -- you're 12:07:03
8 The first full paragraph below admit. 12:05:08	8 looking back there. I mean, you're looking back then, 12:07:05
9 MR. SATTERLEY: All right. 12:05:11	9 in -- 2023 you could conclude differently possibly. 12:07:09
10 BY MR. ASHBY: 12:05:11	10 Q. Okay. 12:07:17
11 Q. Dr. Langer tested one container of 12:05:11	11 A. Okay. You've read it correctly. Thank 12:07:20
12 Lander's Baby Powder and one of Johnson & Johnson's. 12:05:13	12 you. 12:07:22
13 And then it quotes you. It says, Foolishly I sent them 12:05:16	13 Q. I read it correctly. And that -- to be 12:07:22
14 a written report after looking at only two samples, he 12:05:20	14 fair to you as well, does that sound or at least sound 12:07:25
15 said, meaning you. 12:05:23	15 like something you would have said if you don't 12:07:29
16 A. Is that right? 12:05:25	16 necessarily remember saying it? 12:07:30
17 Q. Does that sound like something you would 12:05:26	17 A. Yes. 12:07:31
18 have said? 12:05:28	18 Q. Okay. All right. Well, you know what? 12:07:32
19 A. That I've been foolish? 12:05:28	19 Maybe I'm not done with that. 12:07:49
20 Q. No, no, no, no. 12:05:30	20 In the very last sentence of this article 12:08:01
21 A. Okay. Keep reading, please. 12:05:31	21 it says here, which you may have said, "Dr. Langer says 12:08:05
22 Q. Okay. And then it's still quoting you. 12:05:36	22 some talcum contains lots of asbestos, some very little. 12:08:11
23 It says, The data was very preliminary in nature and 12:05:40	23 The Johnson & Johnson sample happens to be very pure 12:08:15
24 what is more. I may have mistaken long talcum fibers 12:05:43	24 talc." 12:08:18
25 for asbestos fibers. They have similar properties, the 12:05:45	25 A. Yeah. 12:08:19
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1	Q. Do you agree with that?	12:08:19	1	where it starts the amounts of chrysotile? Are you with	12:11:02
2	A. Yeah. Those would be the samples -- I	12:08:20	2	me.	12:11:11
3	think that we got them through Gavin, Gavin	12:08:27	3	A. Yeah.	12:11:11
4	Hildick-Smith, but I don't want to mislead you.	12:08:31	4	Q. Okay.	12:11:11
5	Q. Yeah.	12:08:34	5	A. I've got it.	12:11:12
6	A. That's my impression.	12:08:34	6	Q. Okay. And -- and it looks like what you	12:11:12
7	Q. No. And that's -- and that's fair.	12:08:35	7	wrote to Dr. Smith -- Hildick-Smith was, The amounts of	12:11:14
8	Mr. Satterley used with you a document.	12:08:38	8	chrysotile are relatively small, occurring in amounts we	12:11:18
9	It was Exhibit No. 12. And this is around the same	12:08:42	9	estimate at less than 0.01 percent. The J&J baby talc	12:11:21
10	time, so this is in -- November 10 of 1971. It's	12:08:49	10	is of quite high quality and as a matter of fact, in	12:11:29
11	Exhibit 12, if you want to find the one that	12:08:54	11	relation to the number of samples we have examined thus	12:11:33
12	Mr. Satterley showed you. And this is your letter to	12:08:56	12	far, it is the purest. Do you see that?	12:11:35
13	Mr. Hildick -- or Dr. Hildick-Smith.	12:09:00	13	A. Yeah. Yes.	12:11:38
14	A. Yes.	12:09:04	14	Q. And that's what you told Dr.	12:11:39
15	Q. I -- I'll wait for you to find it.	12:09:04	15	Hildick-Smith, correct?	12:11:41
16	A. We're on 12?	12:09:15	16	A. Yes.	12:11:41
17	Q. Yeah. It's Exhibit 12. It looks kind of	12:09:37	17	Q. It sounds like that's the same thing you	12:11:42
18	like this (indicating).	12:09:40	18	were telling the reporters at the time too, right?	12:11:46
19	A. I can't find it in this stack, so...	12:09:40	19	A. Yeah, but I can't vouch for the -- for the	12:11:49
20	Q. Well, you know what? I'm sure I -- well,	12:09:42	20	reporters and the accuracy of their interpretation of	12:11:54
21	let's see if I have an extra copy.	12:09:43	21	what I was talking about.	12:11:58
22	Oh, yeah. I brought one myself.	12:09:50	22	Q. All right. Did -- were you aware that	12:12:01
23	Preparation's half the battle.	12:09:57	23	Johnson & Johnson determined the lot from which the baby	12:12:10
24	MR. SATTERLEY: Which one are you doing?	12:10:01	24	talc that you tested came from?	12:12:16
25	MR. ASHBY: This is your Exhibit 12. It's	12:10:03	25	A. I believe so.	12:12:17
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1	November 10, 1971.	12:10:05	1	Q. Okay. And -- and so you -- you remember	12:12:18
2	MR. SATTERLEY: December the 10th you	12:10:07	2	that Johnson & Johnson had sent samples from that same	12:12:21
3	mean?	12:10:08	3	lot to the lab at McCrone, correct?	12:12:25
4	MR. ASHBY: No. I have November 10th.	12:10:09	4	A. I believe.	12:12:28
5	MR. SATTERLEY: Oh, November 10th. I'm	12:10:12	5	Q. And the lab Dr. -- or Professor Pooley's	12:12:29
6	sorry.	12:10:13	6	lab as well, correct?	12:12:32
7	MR. ASHBY: Okay.	12:10:13	7	A. I believe.	12:12:33
8	MR. SATTERLEY: You're right. November	12:10:14	8	Q. And -- well, you respect Fred Pooley as a	12:12:39
9	10th.	12:10:15	9	microscopist, correct?	12:12:43
10	MR. ASHBY: Okay.	12:10:16	10	A. Certainly.	12:12:44
11	BY MR. ASHBY:	12:10:20	11	Q. You respect the folks at McCrone; for	12:12:45
12	Q. All right. Okay. And, I'm sorry, that	12:10:21	12	example, Ian Stewart, as a --	12:12:48
13	one's printed double-sided, Dr. Langer. It's --	12:10:22	13	A. Yes.	12:12:49
14	A. That's all right.	12:10:22	14	Q. -- competent microscopist?	12:12:50
15	Q. -- actually a two-page document.	12:10:25	15	A. Yes, indeed.	12:12:51
16	You all right?	12:10:31	16	Q. I don't -- Walter McCrone was not an	12:12:52
17	A. Yeah.	12:10:32	17	electron microscopist; is that...	12:12:54
18	Q. So in -- in -- all right. So we were	12:10:32	18	A. No. He was more optical property	12:12:57
19	talking -- I was -- why I brought this out -- I'll be	12:10:35	19	oriented, yes.	12:13:00
20	clear -- is on this issue of the purity of the Johnson &	12:10:37	20	Q. So if -- if -- if Johnson & Johnson at the	12:13:01
21	Johnson talc, because you make a statement in this	12:10:41	21	time wants to get a second opinion from someone, is it	12:13:06
22	document that Mr. Satterley and you didn't discuss.	12:10:44	22	perfectly acceptable for them to go to somebody like Ian	12:13:09
23	If we go on page 2 of the document in	12:10:47	23	Stewart or Professor Pooley to ask them to look at those	12:13:12
24	the -- the paragraph that trails over onto the second	12:10:53	24	samples as well?	12:13:15
25	page, it's the last sentence, I believe, do you see	12:10:58	25	A. Yes.	12:13:17
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1 Q. They'd do a good job, and they'd give an honest -- honest answer, wouldn't they? 12:13:17 2 12:13:21 3 MR. SATTERLEY: Objection. Calls for speculation; honesty. 12:13:23 4 12:13:24 5 BY MR. ASHBY: 12:13:26 6 Q. Well, do you know Professor Pooley to be dishonest? 12:13:26 7 12:13:28 8 A. No. 12:13:29 9 Q. Do you know Ian Stewart to be dishonest? 12:13:29 10 A. No. 12:13:32 11 MR. SATTERLEY: Objection. Foundation. Speculation. 12:13:32 12 12:13:35 13 BY MR. ASHBY: 12:13:35 14 Q. Would you agree that they are objective scientists of high integrity? 12:13:36 15 12:13:37 16 MR. SATTERLEY: Objection. Objection. Calls for speculation. Improper opinion testimony. 12:13:40 17 12:13:43 18 THE WITNESS: Yes. 12:13:44 19 BY MR. ASHBY: 12:13:44 20 Q. All right. Okay. So putting aside for the difference in protocols that your lab might have had as compared to Ian Stewart's lab or -- or Professor Pooley's lab, you were aware that Professor Pooley and Ian Stewart at McCrone were unable to find chrysotile in the -- in the samples from the same lot you looked at 12:13:44 21 12:13:47 22 12:13:52 23 12:13:55 24 12:14:00 25 12:14:04 Page 102	1 your other times that you talked to some lawyers, and you said something like, comparing modern technology and techniques to what we had in 1971 is like comparing a -- an SR-71, a supersonic jet fighter, to the first plane the Wright Brothers flew at Kitty Hawk. A. Pretty much. Q. Yeah. But if I understand right, in -- in nine -- in the early -- or in the late '60s and the early 1970s you had an electron microscope called -- or made by RCA? A. Yes. Q. And it was a 3G model? A. Yes. Correct. Q. Okay. Somewhere in the mid '70s -- 1970s you got a newer one, and it's probably... A. The 100CX JEOL. Q. Yeah. Okay. A. Well, we also got at the same time a -- a Hitachi H.U.11 E125. Q. Okay. A. That was used by Dr. Suzuki for pathology materials. Q. So would you agree with me that your technology and the techniques that you developed with this new technology became more advanced throughout the 1970s? A. Absolutely. Q. So did we decide -- do you know when you got the -- so I'm looking at Exhibit 4 now. Do -- do you remember when you got the JE -- J-O-E-L (sic)? A. Well, we got that at the same time under a grant from the National Institute of Environmental Health Sciences called a center grant, an overall umbrella grant, seven-figure grant per year. That would be an equipment -- the JEOL, that 100CX, I guess with -- with an academic discount would have been several hundred thousand -- several hundred -- 400 or -- \$400,000 in purchase price. The RCA -- the RCA 3G, which was improved as an RCA 4, was marketed at about 45,000. Q. Uh-huh. A. So there's a lot going on in the field of microscopy. And, yeah, the -- the improvements were enormous, the abilities of the instruments quite different, and the improvements in analyses and analysis was remarkable. Q. All right. You -- so what we see in Exhibit 4 is the JOEL (sic) model 100? A. Yes. Q. You didn't have that electron microscope
1 at, correct? 12:14:07 2 MR. SATTERLEY: Objection. Speculation. 12:14:08 3 THE WITNESS: I was not aware of that, meaning that those assays were the property of Johnson & Johnson. Whether they were shared with me at that time, I cannot recall. I'm not certain that they shared their results with me. 12:14:09 4 12:14:10 5 12:14:16 6 12:14:19 7 12:14:22 8 BY MR. ASHBY: 12:14:23 9 Q. Okay. Did you become aware at some point that Professor Pooley and Ian Stewart had looked at samples of Johnson & Johnson Baby Powder at that time and found there to be no chrysotile asbestos in them? A. Eventually. Q. Okay. Fair enough. Okay. So now let's do something interesting. Let's talk -- or at least I think it's interesting. Can we -- I want to talk to you about the evolution of technology for -- in general but specifically for your lab as well. Clearly the technology available to an electron microscopist in 1971 is not the same as it is today; is that fair? A. That's -- yes. That's fair. Q. Okay. It's a silly statement, but -- and you have this really good quote that I saw in one of	12:16:35 12:16:36 12:16:37 12:16:42 12:16:46 12:16:50 12:16:53 12:16:55 12:17:02 12:17:12 12:17:19 12:17:22 12:17:27 12:17:39 12:17:45 12:17:46 12:17:48 12:17:52 12:18:02 12:18:07 12:18:12 12:18:13 12:18:18 12:18:22 12:18:22
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1 in 1971; is that right? 12:18:25	1 electron beam on a particle to get the chemistry; is 12:21:00
2 A. No. 12:18:27	2 that right? 12:21:03
3 Q. Okay. 12:18:28	3 A. 19 -- you mean in the RCA? 12:21:05
4 A. Did not have it. 12:18:29	4 Q. Yeah, in the RCA. Let -- why -- why don't 12:21:10
5 Q. You had the RCA 3G at the time? 12:18:30	5 I ask it again? I'll ask it in a much simpler way. 12:21:12
6 A. Yeah. 12:18:35	6 A. No, no, no. We -- we -- we could not 12:21:15
7 Q. All right. And -- and the RC -- 12:18:35	7 determine chemistry with the RCA, period. 12:21:16
8 A. (Speaking simultaneously) 12:18:35	8 Q. Period. 12:21:18
9 Q. Oh, I'm sorry. Go ahead. I don't want to 12:18:37	9 Yeah. Right. Unlike the JOEL (sic) 12:21:19
10 cut you off. 12:18:37	10 later, you could determine chemistry with the JOEL 12:21:22
11 A. No, no, no. Please. I'm just going to 12:18:38	11 (sic)? 12:21:25
12 tell you details. It's just... 12:18:40	12 A. Yes. 12:21:25
13 Q. May -- you never know. Maybe I want to 12:18:42	13 Q. Okay. So in 1971 you had a microscope 12:21:26
14 know. 12:18:45	14 that -- or an electron microscope that you couldn't 12:21:29
15 All right. Okay. So the -- the RCA 3G 12:18:46	15 determine -- you couldn't use to determine chemistry 12:21:33
16 electron microscope that you had in 1971 had limitations 12:18:52	16 with, right? 12:21:35
17 that this JOEL (sic) did not, correct? 12:18:58	17 A. Correct. 12:21:36
18 A. Absolutely. 12:19:03	18 Q. And you also -- although you could try to 12:21:36
19 Q. Okay. So, for example, you talked about 12:19:03	19 determine crystal structure with it, it was very 12:21:40
20 with Mr. Satterley when using the JOEL (sic) -- 12:19:05	20 difficult and limited in your ability to be precise? 12:21:42
21 A. J-E-O-L. 12:19:11	21 A. Yes. 12:21:46
22 Q. J-O -- 12:19:13	22 Q. Okay. All right. And when doing the 12:21:46
23 A. J-E-O-L. 12:19:13	23 analyses -- so let's move forward in 1976 now and the 12:21:59
24 Q. Yeah. J-O-E-L (sic) -- 12:19:15	24 paper that you and Mr. Satterley talked about, which 12:22:03
25 A. Right. 12:19:15	25 is... 12:22:06
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1 Q. -- microscope you could focus on 12:19:19	1 A. Yeah. The one published in Myron 12:22:10
2 diffracted electrons in order to determine -- to 12:19:22	2 Mehlman's journal, yes. 12:22:13
3 determine crystal structure? 12:19:25	3 Q. Where is it? 12:22:16
4 A. Yes. 12:19:26	4 MR. SATTERLEY: I think you left it down 12:22:19
5 Q. Okay. Could -- could you do that with the 12:19:27	5 here, maybe. 12:22:20
6 RCA 3G that you had in 1971? 12:19:31	6 MR. ASHBY: Oh. Is that why I don't have 12:22:21
7 A. You could, but it was very primitive and 12:19:34	7 it? Okay. 12:22:22
8 the diffraction patterns were virtually uninterpretable. 12:19:37	8 Thank you, Joe. 12:22:24
9 Q. Uh-huh. 12:19:41	9 MR. SATTERLEY: Uh-huh. 12:22:24
10 A. I mean, the system was crude. 12:19:47	10 THE WITNESS: I'm going to interrupt you 12:22:26
11 Magnification only went up to 31,000 times direct on the 12:19:50	11 for just a second. 12:22:29
12 stage. The JEOL electron microscope you could go up to 12:19:55	12 MR. ASHBY: Do you want to take a break? 12:22:30
13 480,000 times magnification -- I mean, in order of 12:20:00	13 THE WITNESS: I'm going to take a break. 12:22:31
14 magnitude difference. And you could focus on the 12:20:05	14 MR. ASHBY: Yeah. Okay. That's perfectly 12:22:32
15 scattered diffracted electrons in the back focal plane 12:20:09	15 acceptable. 12:22:34
16 of the objective lens. That's one of the major 12:20:14	16 THE VIDEOGRAPHER: The time is 12:22. And 12:22:35
17 contributions. 12:20:19	17 we are off the video record. This is the end of media 12:22:37
18 And you had a -- you had apertures that 12:20:21	18 number two. 12:22:41
19 could limit the field to get scattered electrons at -- 12:20:24	19 (A recess was taken.) 12:22:41
20 you could remove them from the recording. The -- the 12:20:29	20 THE VIDEOGRAPHER: All right. The time is 12:30:16
21 differences were extraordinary. 12:20:36	21 12:30. This is the beginning of media number three, and 12:30:00
22 Q. Uh-huh. 12:20:39	22 we are back on the video record. 12:30:03
23 Another limitation that the 1971 RCA 12:20:42	23 BY MR. ASHBY: 12:30:05
24 microscope had that the JOEL microscope did not was that 12:20:47	24 Q. Okay. Dr. Langer, where we left off, we 12:30:05
25 with the RCA in 1971 you couldn't beam or extend the 12:20:53	25 were going to make the jump to 1976. And just -- just 12:30:08
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1 to set the table, we've marked as Exhibit 16 a 12:30:11 2 publication that you had with Drs. Rohl and Selikoff and 12:30:14 3 others entitled Consumer Talcums and Powders: Mineral 12:30:20 4 and Chemical Characterization. 12:30:25 5 Do you recall what time of year in 1976 12:30:29 6 that article was published? Well, I'll -- I'll tell 12:30:34 7 you -- 12:30:36 8 A. Maybe the spring. 12:30:36 9 Q. I -- well, I thought it was in November. 12:30:44 10 Does that sound right? 12:30:45 11 A. Maybe it is November, yeah. 12:30:47 12 Q. All right. At the time this, and maybe 12:30:48 13 still is, this is a seminal study of the time regarding 12:30:51 14 the analysis of talc for absence or presence of asbestos 12:30:55 15 minerals; is that fair? 12:31:01 16 A. I would say that is the standard, the 12:31:03 17 exemplar at that time. 12:31:07 18 Q. And you stand by this paper? 12:31:13 19 A. You bet. 12:31:14 20 Q. And I've seen you say that in nine -- in 12:31:15 21 the 1976 paper you used standards and techniques that -- 12:31:18 22 that had never been used up until that point for talc 12:31:22 23 analysis; is that true? 12:31:25 24 A. Yes, I believe that to be true. 12:31:26 25 Q. And you've said this paper was the best 12:31:28 Page 110	1 Q. And when you were asked that question, you 12:32:57 2 were asked -- and I'll -- 12:32:59 3 MR. ASHBY: Do you want this transcript, 12:33:01 4 Joe? 12:33:02 5 MR. SATTERLEY: You -- you can use it with 12:33:02 6 him. I don't... 12:33:04 7 BY MR. ASHBY: 12:33:05 8 Q. All right. Well, just let me start over. 12:33:08 9 Let me see if I can find the -- I'm going to highlight 12:33:09 10 it for you. Okay? 12:33:12 11 Okay. Can you read that or is that too 12:33:27 12 small for you? 12:33:29 13 A. That's better. 12:33:30 14 You have highlighted the following: I 12:33:34 15 actually meant to only and -- only -- to only ask does 12:33:37 16 the paper accurately and fully set out the results of 12:33:45 17 the testing up to the date of its publication? 12:33:51 18 Mr. Hensler said he objects to the form. 12:33:57 19 The witness: I believe so, yes. 12:34:01 20 Okay. 12:34:04 21 Q. Okay. And then that was your testimony 12:34:05 22 that day under oath, correct? 12:34:06 23 A. Yeah. 12:34:07 24 Q. Okay. The -- the findings in this paper 12:34:08 25 were conservative in that if there was something, 12:34:18 Page 112
1 paper written to that point concerning the analysis of 12:31:31 2 consumer talcums; is that fair? 12:31:34 3 A. Yes. I still believe that. Yes. 12:31:36 4 Q. And does this 1976 study that we've marked 12:31:39 5 as Exhibit 16 accurately and fully set out all of the 12:31:42 6 results of your analyses concerning consumer talc 12:31:47 7 through pub -- the publication date which was around 12:31:51 8 November 1976? 12:31:55 9 A. I'm not certain of that. We may have had 12:31:57 10 assays that -- other analyses that were not published in 12:32:01 11 that paper where, I mean, we had looked at -- we had 12:32:07 12 looked at industrial-grade talcs at that time. We had a 12:32:16 13 lot of data on that. But I think for consumer talcs 12:32:20 14 that's a fair representation, yes. 12:32:23 15 Q. Okay. Let me see if I can parse that out. 12:32:25 16 So for consumer talcs this paper in 1976 12:32:30 17 accurately and fully set out the results of your testing 12:32:39 18 through the date of its publication; is that true? 12:32:42 19 A. Generally -- generally so -- 12:32:46 20 Q. Okay. 12:32:46 21 A. -- yes. 12:32:47 22 Q. Yeah. In -- do you recall being deposed 12:32:47 23 in -- in 2021? I asked you about that before. You were 12:32:50 24 asked that same question in 2021. 12:32:53 25 A. Could have. Could have been, yes. 12:32:55 Page 111	1 anything, that resembled asbestos that you had found, 12:34:20 2 you would have reported it, true? 12:34:25 3 A. True. 12:34:27 4 Q. And this was an analysis of 21 consumer 12:34:27 5 talcum samples; is that correct? 12:34:34 6 A. 21 consumer talcum products, yes -- 12:34:36 7 Q. Okay. 12:34:36 8 A. -- marketed as consumer talcum products. 12:34:39 9 Q. Four of the samples -- I'm on table 6 now, 12:34:43 10 just to make it easier if you want -- do you still have 12:34:50 11 the copy of it? 12:34:52 12 A. I'll find it. 12:34:53 13 Q. Okay. 12:34:53 14 A. Okay. What's up? 12:35:26 15 Q. You've got it? Okay. 12:35:28 16 There were four samples of -- of the 21 12:35:41 17 that were the Johnson & Johnson talcs, correct? 12:35:45 18 A. We never published the names of the talc. 12:35:49 19 It wasn't done at that time. The Public Health Service 12:35:52 20 didn't permit it. We wouldn't have gained, for example, 12:36:00 21 access to facilities had we mentioned it, the specific 12:36:04 22 name of the facility, but they were designated as 12:36:12 23 facility factory A, factory B, or in bulk plant D or 12:36:15 24 whatever. 12:36:21 25 So we published numbers of -- of the 12:36:22 Page 113

1 talcs. And it was later on that the -- the key to the 12:36:28	1 A. Amphibole. 12:38:49
2 numbers was eventually released. So when you say 12:36:33	2 Q. -- amphibole? 12:38:50
3 Johnson & Johnson, it's not indicated in here. They're 12:36:38	3 A. Correct. 12:38:50
4 mere -- merely numbers of talc consumer products. 12:36:45	4 Q. And there was no chrysotile found as well 12:38:52
5 Q. Understood. I -- and my question probably 12:36:49	5 in any of the Johnson & Johnson samples, correct? 12:38:53
6 wasn't as precise as it should be. 12:36:51	6 A. No. No, that's not correct. 12:38:56
7 You know from having done the research 12:36:53	7 Q. Well, let's take a look. The -- if we -- 12:38:57
8 that four of the -- of the 21 samples were Johnson & 12:36:55	8 can -- can you turn to table 4? 12:39:01
9 Johnson talc -- 12:36:59	9 A. This is yours. 12:39:03
10 A. Eventually, yes. 12:37:00	10 Table 4, Summary of Mineralogical 12:39:45
11 Q. -- products? 12:37:01	11 Composition of 21 Consumer Talcum and Powders. Yes. 12:39:49
12 And you -- well, I'll -- I'll give -- I'll 12:37:02	12 Q. Okay. And the sample in which chrysotile 12:39:53
13 give this to you. This is Exhibit 21. 12:37:04	13 was found, one of them was sample 12, correct? 12:39:55
14 (Exhibit 21 was marked and 12:37:06	14 A. Chrysotile. Across the bottom. Number 12:39:58
15 attached to the transcript.) 12:37:08	15 12, less than 0.5. Number 15, less than 0.5. Correct. 12:40:03
16 BY MR. ASHBY: 12:37:08	16 Q. Do any other samples indicate a finding of 12:40:12
17 Q. Do you recognize that document? 12:37:08	17 chrysotile at major present -- 12:40:15
18 A. There it is, and you have the key. You -- 12:37:10	18 A. No. 12:40:18
19 you know all now. In the fullness of time all is 12:37:20	19 Q. -- or trace levels or any level for that 12:40:18
20 revealed. 12:37:23	20 matter? 12:40:22
21 Q. I have a key. So this key -- well, as I 12:37:23	21 A. No. 12:40:22
22 understand it, this is a document that you prepared; is 12:37:27	22 Q. Okay. And we know that sample 12 from the 12:40:23
23 that right, Dr. Langer? 12:37:29	23 key that you prepared is Faberge Brut Talc, correct? 12:40:28
24 A. Yeah. Ev -- yes. 12:37:30	24 A. May I have the -- 12:40:34
25 Q. Okay. 12:37:30	25 Q. Oh, yeah. You can have it back. You gave 12:40:36
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1 A. Eventually, yeah. 12:37:32	1 it back. 12:40:39
2 Q. Eventually, sure. 12:37:32	2 A. Thank you. 12:40:39
3 And this document, I think what it shows 12:37:35	3 Q. I'll give it to you again. 12:40:39
4 is the sample -- the product names that associate with 12:37:37	4 A. Number 12. Number 12. Faberge Brut Talc. 12:40:41
5 the sampled numbers in which anthophyllite and tremolite 12:37:42	5 Anthophyllite. Okay. 12:40:48
6 or any amphibole was found; is that correct? 12:37:45	6 Q. All right. So one of the samples that -- 12:40:54
7 A. Yes. 12:37:48	7 in which chrysotile was found was the Faberge Brut Talc, 12:40:56
8 Q. Okay. The two samples that contained the 12:37:49	8 correct? 12:40:59
9 chrysotile in the study were not any of the four Johnson 12:38:05	9 A. This is with this key. Is it so? I'm 12:40:59
10 & Johnson samples that you analyzed, correct? 12:38:10	10 going to do something now. This -- this may interest 12:41:03
11 MR. SATTERLEY: I'm -- I'm -- 12:38:13	11 you. 12:41:06
12 THE WITNESS: Yeah. What -- 12:38:13	12 Q. Okay. 12:41:07
13 MR. SATTERLEY: -- confused here, counsel. 12:38:13	13 A. The Johnson & Johnson talcs came from an 12:41:13
14 This doesn't -- this document doesn't say anything about 12:38:15	14 ultramafic body. Ultramafic -- an ultramafic body is a 12:41:16
15 chrysotile on this document. Are you referring to a 12:38:17	15 magnesium-rich body. And it means that the talc is 12:41:25
16 different document? 12:38:19	16 associated with serpentine of various kinds. 12:41:29
17 MR. ASHBY: No. No. This one. 12:38:20	17 So I'm going to go from the materials that 12:41:32
18 THE WITNESS: You are correct. This 12:38:22	18 we're talking about to the chemistry tables. That's 12:41:34
19 document refers only to amphiboles, whether it's 12:38:25	19 going to identify which of the talcs are Johnson & 12:41:39
20 anthophyllite or tremolite. There is no chrysotile 12:38:35	20 Johnson. 12:41:48
21 indicated nor are there any Johnson & Johnson Baby 12:38:37	21 So here we are. Table number 5. I'm 12:41:48
22 Powders on this list. 12:38:46	22 looking at -- I want to look at the trace metals to see 12:41:51
23 BY MR. ASHBY: 12:38:46	23 the nickel, chromium, iron. Let's see -- major oxides. 12:41:56
24 Q. Correct. And -- and that's because there 12:38:47	24 No. Let's skip the major oxides. Let's go into the 12:42:06
25 wasn't any -- 12:38:49	25 trace metals. Trace elements, 21 consumer talcs. Let's 12:42:09
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1 look at these. 12:42:15 2 Look at that. Look at the chromium 12:42:16 3 levels. Talc number 1. Talc number 4. Let's go 12:42:20 4 across. Talc number 9. Let's go across. Talc number 12:42:30 5 16. 12:42:35 6 Now, let me look at this list that you 12:42:36 7 gave me. 12:42:44 8 Q. Well, that's a list you prepared, right? 12:42:44 9 A. No. No. Someone else did. Someone else 12:42:46 10 did because these are all -- it says total fiber. No. 12:42:49 11 You just pointed out there were two chrysotile samples 12:42:56 12 that are noted in here. And they're not noted on 12:43:00 13 this -- this particular table, tabulated data. And the 12:43:03 14 question is -- the question is why isn't it noted with 12:43:09 15 chrysotile and the other -- the other -- among the other 12:43:18 16 talcs? Let's take a look at this. Why is that? Isn't 12:43:25 17 that strange? 12:43:29 18 No. Wait. Wait. One. One. Cashmere 12:43:35 19 Bouquet. Bup, bup, bup, bup. There's -- there's two. 12:43:42 20 That's good. 12:43:48 21 How about three? Is three indicated on 12:43:49 22 here? Two. Two. Why is there two samples two noted? 12:43:51 23 Two number fives noted. Two number 11s noted. Well, 12:44:02 24 it's because they're matched across. No. 12:44:12 25 Q. Okay. 12:44:17 Page 118	1 Q. I'll try to do that. 12:44:59 2 A. Okay. Now I'm looking at these -- the 12:45:01 3 bulk chemistry. No. 12:45:08 4 How about the trace metals? Trace metals 12:45:09 5 are more informative. 12:45:11 6 Q. All right. 12:45:11 7 A. And I'm looking at an index trace metal 12:45:13 8 for an ultramafic. It's number -- oh. I'm going to do 12:45:17 9 this. 12:45:23 10 Q. Okay. 12:45:24 11 A. Hold the... 12:45:24 12 Q. Dr. Langer, I don't know if I have a 12:45:25 13 question pending, so I -- and I kind of want to cut -- 12:45:29 14 A. Okay. 12:45:29 15 Q. -- cut to the chase -- 12:45:32 16 A. All right. Go ahead. 12:45:32 17 Q. -- a little bit. 12:45:33 18 A. Yes. Go ahead. 12:45:34 19 Q. For -- let's just -- do you -- if -- if I 12:45:35 20 represent to you that the Johnson & Johnson talc samples 12:45:43 21 are 4, 9 -- 12:45:46 22 A. Makes sense. 12:45:50 23 Q. -- 18, and 20... 12:45:51 24 A. 4, 9, 18 -- all right. Okay. Let's look 12:46:00 25 at chromium. 12:46:04 Page 120
1 A. This tabulated data is almost 12:44:18 2 incomprehensible. 12:44:21 3 Q. Well, let me see if I can figure it out. 12:44:22 4 My understanding was -- so do you see, Dr. Langer, at 12:44:24 5 the bottom it says Arth -- it says A. Langer, deposition 12:44:26 6 index -- 12:44:30 7 A. Yeah. 12:44:30 8 Q. -- Exhibit 9 from 2013? What's -- 12:44:30 9 A. That's the Hensler thing, right? 12:44:32 10 Q. No, no, no. This is -- no. This is 12:44:35 11 different. This is -- 12:44:36 12 A. All right. 12:44:36 13 Q. -- your deposition in 2013. 12:44:38 14 A. 2013. You're correct. 12:44:39 15 Q. Yeah. So my understanding at that 12:44:41 16 deposition -- I'll -- and I'll try to find it -- was 12:44:42 17 this was a document that you had prepared and brought to 12:44:45 18 that deposition. 12:44:47 19 MR. SATTERLEY: Objection. Foundation. 12:44:49 20 Speculation. 12:44:50 21 THE WITNESS: I don't think so. 12:44:51 22 BY MR. ASHBY: 12:44:53 23 Q. Okay. 12:44:54 24 A. I don't think so. But, yeah, if -- if you 12:44:54 25 could look that up, that would be great. Thank you. 12:44:57 Page 119	1 Q. Well -- well, hold on. I -- I didn't 12:46:05 2 even -- I didn't ask you a question yet. 12:46:06 3 A. Well, I'm -- I'm just mulling this over. 12:46:09 4 Q. Okay. 12:46:09 5 A. I have to answer -- 12:46:11 6 Q. Yes. 12:46:11 7 A. -- your questions properly -- 12:46:12 8 MR. SATTERLEY: And let me -- 12:46:12 9 THE WITNESS: -- correctly. 12:46:13 10 MR. SATTERLEY: Let me object to the 12:46:13 11 representation. Mr. Ashby is not under oath. He's not 12:46:15 12 a witness. 12:46:19 13 BY MR. ASHBY: 12:46:20 14 Q. All right. So you were asked about this 12:46:21 15 at your deposition in 2021. 12:46:22 16 A. Yeah. 12:46:23 17 Q. And I could -- we could go over the 12:46:24 18 testimony if you like. And what you were asked is: 12:46:25 19 Understanding that you don't have the key in front of 12:46:30 20 you -- 12:46:32 21 A. Yes. 12:46:32 22 Q. -- but if the key were to say that talc 12:46:33 23 samples 4, 9, 18 -- 12:46:36 24 A. 4, 9, 18, and 20. 12:46:38 25 MR. ASHBY: Yeah. 12:46:41 Page 121

1	MR. SATTERLEY: Well, let me place an	12:46:41	1	That was Don Bowes' laboratory. And Skinner did the	12:49:37
2	objection because the key that you gave him as Exhibit	12:46:42	2	analyses, the spectroscopy, and so on. So we're dealing	12:49:43
3	21 doesn't say that, so I -- I -- I object to the	12:46:45	3	with apples and oranges.	12:49:47
4	confusion, misrepresentation --	12:46:48	4	And if I would have found it, I -- it's	12:49:49
5	MR. ASHBY: Okay.	12:46:51	5	not your failing. It -- I -- I should have written it	12:49:53
6	MR. SATTERLEY: -- and foundation.	12:46:51	6	more clearly. I apologize for that. But there were	12:49:59
7	BY MR. ASHBY:	12:46:53	7	different techniques in the tabulated listings, and	12:50:02
8	Q. Okay. So let me just start over.	12:46:54	8	therefore they do not -- they do not -- what's the right	12:50:08
9	If I represent to you that the Johnson &	12:46:56	9	word? They do not present clearly the analytical	12:50:15
10	Johnson talc samples are 4, 9, 18, and 20 --	12:46:58	10	differences.	12:50:28
11	MR. SATTERLEY: Same objection.	12:47:05	11	That sounded a little garbled.	12:50:35
12	BY MR. ASHBY:	12:47:07	12	Q. So let -- let me see if I can -- if -- if	12:50:37
13	Q. -- we can agree those talc samples don't	12:47:08	13	I can figure this out.	12:50:38
14	have an indication of a chrysotile finding?	12:47:10	14	A. Okay.	12:50:39
15	MR. SATTERLEY: Same objections.	12:47:17	15	Q. In -- in table 4 there is an area or a	12:50:40
16	BY MR. ASHBY:	12:47:17	16	mineral row that says chrysotile, correct?	12:50:43
17	Q. Is that fair?	12:47:15	17	A. Well, let me get to table 4.	12:50:47
18	A. In terms of the list at -- at .5	12:47:26	18	Q. Okay.	12:50:49
19	percent -- less than .5, whatever, .05 -- okay.	12:47:29	19	A. All right. Table 5. Let me get to table	12:51:10
20	Q. Okay. And -- and -- and really if you had	12:47:34	20	4.	12:51:13
21	found chrysotile in samples 4, 9, 18, or 20, even though	12:47:36	21	Q. Do you have table 4? I can get -- I can	12:52:18
22	they're trace level, that would have been recorded in	12:47:45	22	get you there. I -- I can just hand you mine.	12:52:20
23	table 4, correct?	12:47:47	23	A. Please.	12:52:23
24	MR. SATTERLEY: Same objections.	12:47:57	24	Q. Okay.	12:52:23
25	THE WITNESS: Okay. Yes. I would have	12:47:57	25	A. Okay.	12:52:23
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1	reported it, yes.	12:47:59	1	Q. So you have there table --	12:52:24
2	BY MR. ASHBY:	12:48:10	2	A. Table 4. Summary of Mineralogical	12:52:29
3	Q. So -- and --	12:48:11	3	Composition of 21 -- (reading to self) -- bup, bup, bup,	12:52:33
4	A. Oh, wait a minute.	12:48:11	4	bup -- major and minor. So we're talking about x-ray	12:52:36
5	Q. Okay.	12:48:13	5	diffraction. We're not talking about transmission	12:52:39
6	A. You know, you're right.	12:48:15	6	electron microscopy.	12:52:41
7	Q. Okay. You really had me going --	12:48:17	7	So we determine trace amounts of chloride	12:52:43
8	A. I have --	12:48:17	8	and phlogopite, which is a magnesium mica, calcium	12:52:46
9	Q. -- for a minute there.	12:48:18	9	dolomite. Those are carbonates. Calci -- kaolin. In	12:52:55
10	A. Yes.	12:48:18	10	other words, there were some clays that were in these	12:52:56
11	The analyses reflect different analytical	12:48:23	11	formulations.	12:53:01
12	methods. If I put a mineralogical makeup of these 21	12:48:29	12	Chrysotile, 2 -- zero -- less than 0.5	12:53:07
13	talcs and I indicate that two contain chrysotile to a	12:48:37	13	percent. That's obviously by x-ray diffraction.	12:53:11
14	certain level, .5, whatever, that assay was obtained by	12:48:44	14	Q. Uh-huh. So in the column for chrysotile	12:53:16
15	x-ray diffraction and our standard method of	12:48:50	15	in --	12:53:18
16	quantitatively determining fiber content by x-ray	12:48:53	16	A. Yes.	12:53:18
17	diffraction. The finding of chrysotile fibrils at the	12:48:58	17	Q. -- table 4 there is -- or can we agree	12:53:19
18	trace amounts, at those lower amounts, was by	12:49:03	18	that there's no finding of trace or major chrysotile	12:53:21
19	transmission electron microscopy. And we indicated that	12:49:07	19	present in samples 4, 9, 18, or 20? Table 4.	12:53:25
20	the levels were less than .01 percent, one part in	12:49:11	20	A. Yes. It would be only by TEM. You're	12:53:33
21	10,000.	12:49:18	21	right.	12:53:37
22	So there -- there are different tables	12:49:20	22	Q. Okay. And there -- there are no findings	12:53:38
23	representing very different analytical techniques. The	12:49:22	23	in that report by TEM of chrysotile in samples 4, 9, 18,	12:53:39
24	trace metal and bulk chemistry methods were determined	12:49:27	24	or 20?	12:53:48
25	in a first-class geochemistry laboratory in Glasgow.	12:49:31	25	A. Are you talking about the entire report?	12:53:48
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1	Q. Yes, the entire report.	12:53:50	1	asking my question.	12:55:27
2	A. I can't make that statement.	12:53:51	2	MR. SATTERLEY: No. You -- Dr. Langer,	12:55:27
3	Q. All right.	12:53:51	3	did you finish answering your question?	12:55:28
4	A. I mean, there -- it -- it -- there may be	12:53:56	4	THE WITNESS: Yes.	12:55:30
5	a statement in here, but identifying a -- a product was	12:53:56	5	MR. SATTERLEY: Okay.	12:55:31
6	clearly not done in this paper.	12:54:00	6	BY MR. ASHBY:	12:55:31
7	Q. Okay.	12:54:02	7	Q. Okay. I have -- okay. And -- and for the	12:55:32
8	A. Clearly not done.	12:54:05	8	samples that are 4, 9, 18, and 20 there are no findings	12:55:37
9	Q. All right. And -- and are you saying	12:54:07	9	of tremolite or antho -- anthophyllite in those samples,	12:55:42
10	today you can't -- do you recall that -- well, let --	12:54:10	10	correct?	12:55:45
11	let me ask you this: Do you recall that there were four	12:54:12	11	A. No amphiboles. You're right.	12:55:45
12	samples of Johnson & Johnson talc?	12:54:15	12	Q. Okay. I think we're probably -- I'm	12:55:47
13	A. Yes, I do. Yes.	12:54:16	13	sorry.	12:55:47
14	Q. Okay. In that report? Okay.	12:54:17	14	A. Okay. Thank you.	12:55:47
15	And if -- if I represent that the samples	12:54:19	15	Q. I think we're probably done with that.	12:55:58
16	were 4, 9, 18, and 20, do you have any reason to dispute	12:54:23	16	Okay. When you talked to Mr. Satterley	12:56:00
17	that right now?	12:54:27	17	earlier, you talked about the finding of the chrysotile	12:56:03
18	MR. SATTERLEY: Object to the form.	12:54:28	18	at the trace levels in the talc, correct?	12:56:05
19	THE WITNESS: To dispute which?	12:54:30	19	A. Yes.	12:56:10
20	(Speaking simultaneously)	12:54:31	20	Q. Okay. And -- and then I thought he asked	12:56:10
21	BY MR. ASHBY:	12:54:31	21	you if there were any other samples that you had tested	12:56:16
22	Q. Oh. All right. Do you have any -- if --	12:54:32	22	in which you found chrysotile, and you said you were	12:56:18
23	if I suggest to you that the samples were 4, 9, 18 and	12:54:32	23	uncertain of that to Mr. Satterley; is that correct?	12:56:22
24	20 --	12:54:36	24	A. You know, we looked at -- yes. I mean,	12:56:25
25	A. I'll accept that. Samples number 4 and 9	12:54:36	25	the answer to your question is -- did I say that? Yes.	12:56:28
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1	are obviously from an ultramafic. And let's say the	12:54:40	1	And as a way of an explanation, we looked at so many	12:56:33
2	Johnson talc mine early on was up in Vermont and it was	12:54:44	2	samples. Is it possible we looked at these other	12:56:37
3	associated with a serpentine body, which includes the	12:54:50	3	samples? Yes, it's all -- it's all possible. Can I	12:56:40
4	serpentine minerals in chrysotile. The likelihood of a	12:54:54	4	make a -- a blanket statement that it never or wasn't or	12:56:43
5	cross-contaminant would -- with chrysotile and talc	12:54:57	5	never analyzed or never did I -- no, I can't make that	12:56:51
6	during the beneficiation --	12:55:01	6	blanket statement. But it's -- my recollection is	12:56:54
7	MR. ASHBY: I'll just -- I'll move to	12:55:04	7	whatever the -- whatever the outcome was, it was a	12:57:00
8	strike as not responsive.	12:55:06	8	limited number. It was those that were reported.	12:57:05
9	MR. SATTERLEY: Please don't interrupt	12:55:07	9	Q. Uh-huh. Right.	12:57:08
10	him.	12:55:09	10	I -- I guess my question to you is if --	12:57:11
11	BY MR. ASHBY:	12:55:10	11	if -- if there were other chrysotile findings that you	12:57:12
12	Q. I -- the -- the -- the -- the question	12:55:11	12	had in relation to any of these talcs, would you have	12:57:14
13	really -- well, actually, I'll do this.	12:55:11	13	reported it in the 1976 study?	12:57:18
14	MR. SATTERLEY: No. Your question was you	12:55:13	14	A. I think so.	12:57:20
15	wanted him to accept your numbering system.	12:55:14	15	Q. Okay. That's -- that's -- and so as we	12:57:21
16	MR. ASHBY: Yeah, of course.	12:55:14	16	sit here today the -- the only -- the only sample you're	12:57:37
17	MR. SATTERLEY: He's answering the	12:55:16	17	certain of finding or can remember finding chrysotile	12:57:41
18	question why he would accept the numbering system, and	12:55:17	18	in -- in relation to Johnson's Baby Powder is that	12:57:44
19	he explained geologically. So please let him answer the	12:55:20	19	sample in 1971?	12:57:46
20	question.	12:55:23	20	MR. SATTERLEY: Objection.	12:57:48
21	BY MR. ASHBY:	12:55:23	21	Mischaracterization. Mischaracterization of prior sworn	12:57:49
22	Q. So with -- without the key today --	12:55:23	22	testimony.	12:57:57
23	MR. SATTERLEY: Please let him answer the	12:55:24	23	BY MR. ASHBY:	12:57:58
24	question.	12:55:26	24	Q. Okay.	12:58:01
25	MR. ASHBY: I'm -- I'm -- I'm -- I'm	12:55:26	25	A. No, I -- I can't -- I can't make a	12:58:01
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1 statement like that. 12:58:04	1 where you were asked: Okay. I forgot to ask this. The 13:00:20
2 Q. Okay. 12:58:05	2 other document that you identified a moment ago as 13:00:23
3 A. Finding it only in the 1971 assays, the 12:58:06	3 Exhibit 9, were you the author of this, do you recall? 13:00:25
4 initial assays that we explored and so on, is -- are 12:58:11	4 And your answer was -- 13:00:28
5 those the only ones? 12:58:15	5 MR. SATTERLEY: Let -- let me place an 13:00:29
6 Q. Well -- 12:58:15	6 objection. 13:00:31
7 A. As I sit here -- I know this is painful, 12:58:18	7 BY MR. ASHBY: 13:00:31
8 but as I -- as I sit here, the 1976 paper represented an 12:58:23	8 Q. And your answer was yes. 13:00:31
9 ongoing study. Did I ever find any after the 1971 12:58:36	9 (Speaking simultaneously) 13:00:31
10 assays? I can't represent that. 12:58:40	10 MR. SATTERLEY: Please -- please, counsel. 13:00:33
11 Q. Okay. Fair enough. 12:58:43	11 Let me place an objection. Number one, a copy of this 13:00:34
12 All right. Let's -- let's move on. 12:58:45	12 transcript has not been provided. It's not been printed 13:00:37
13 A. Okay. I'll keep it pithy. 12:58:51	13 out. Don't know the name of the case. Don't know the 13:00:37
14 Q. After the -- or, actually, was there a 12:58:55	14 parties present. Don't know the context of what the 13:00:37
15 pre-publication of the 1976 paper or that -- that was -- 12:58:59	15 situation is. So I object to the use of something not 13:00:37
16 A. Yes. 12:59:04	16 being shared with the -- with me or -- or the witness. 13:00:51
17 Q. That created some media reporting? 12:59:04	17 BY MR. ASHBY: 13:00:51
18 A. There was always media reporting. 12:59:06	18 Q. Okay. So would you like to take a -- I -- 13:00:51
19 Everyone was interested in asbestos and consumer 12:59:10	19 I don't have a copy for you, but I'm happy to show you 13:00:53
20 products. 12:59:14	20 on my computer, if you'd like to take a copy -- look 13:00:55
21 The -- well, without going into the whole 12:59:24	21 at -- look at the transcript. 13:00:59
22 litany -- 12:59:25	22 A. Yeah. I'd like to know what I was talking 13:00:59
23 Q. Yeah. No. That's fine. 12:59:25	23 about. Yeah. 13:01:01
24 You know, what I wanted to show you was -- 12:59:27	24 Q. So this was a -- a deposition in Baltimore 13:01:02
25 I -- I don't have it printed out here. It's just one of 12:59:28	25 City Court for a case there in 2013. And you were an 13:01:09
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1 the few I didn't bring. Is -- this is a -- so if we go 12:59:31	1 expert witness in the case. 13:01:19
2 back -- 12:59:35	2 A. Uh-huh. 13:01:23
3 MR. SATTERLEY: I can't -- how do I review 12:59:37	3 Q. And I believe that you were working with 13:01:23
4 what you haven't printed out? 12:59:38	4 Quinn Emanuel at the time? Does that sound familiar? 13:01:25
5 MR. ASHBY: I'll let -- you can -- you can 12:59:40	5 A. Quinn Emanuel, yeah. 13:01:29
6 take a look at it. 12:59:40	6 MR. SATTERLEY: What's the name of the 13:01:31
7 MR. SATTERLEY: And how do I cross-examine 12:59:42	7 case? Can you tell me the name? 13:01:32
8 on it? 12:59:44	8 MR. ASHBY: The name of the case is 13:01:34
9 MR. ASHBY: I can -- 12:59:45	9 Goldsmith. Harold Goldsmith versus ACandS. 13:01:35
10 THE WITNESS: What is this? 12:59:45	10 THE WITNESS: Yeah. Wait. Sure. 13:01:52
11 MR. ASHBY: I can email you that. It's a 12:59:46	11 BY MR. ASHBY: 13:01:52
12 transcript. It's a deposition transcript. I'm just 12:59:47	12 Q. I don't -- 13:01:52
13 wanting to lay a foundation for that -- the exhibit that 12:59:49	13 A. I should have known that. Okay. 13:01:53
14 we looked at, for Exhibit 21. 12:59:51	14 Q. So if you want to take a look at the -- 13:01:56
15 MR. SATTERLEY: Well, object to not having 12:59:53	15 what I've -- the testimony of -- let me see if I can 13:01:58
16 a copy of it and putting it into context. I don't know 12:59:55	16 highlight it for you. That'll make it much easier. 13:02:01
17 what it is. 12:59:58	17 The part I was talking about was right 13:02:07
18 BY MR. ASHBY: 12:59:59	18 here. 13:02:09
19 Q. So, Dr. Langer, I just -- really quickly, 12:59:59	19 MR. SATTERLEY: Did you have a page 13:02:19
20 I -- on -- on Exhibit 21, which was that key, if you see 13:00:01	20 number? 13:02:20
21 here this was from a deposition on June 14th of 2013. 13:00:06	21 THE WITNESS: This is page number 189. 13:02:21
22 A. Yes. 13:00:13	22 My God, you talk up a storm. 13:02:31
23 Q. And it's in relation to Exhibit 9. 13:00:14	23 Okay. And I forgot to ask, the other 13:02:34
24 A. Okay. 13:00:14	24 document that you identified a moment ago, Exhibit 9, 13:02:37
25 Q. And I'm looking at testimony that day 13:00:17	25 were you the author of this, do you recall? 13:02:43
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1	Yes.	13:02:48	1	amphiboles, which is -- was used as a non-specific term	13:05:17
2	BY MR. ASHBY:	13:02:48	2	in our paper.	13:05:22
3	Q. Okay. So --	13:02:48	3	Q. Uh-huh. Right. Okay. So --	13:05:29
4	A. Yes, I recalled it.	13:02:48	4	A. Which means -- yes.	13:05:30
5	Q. So does that --	13:02:50	5	Q. And -- and as part of that reporting it	13:05:31
6	A. And this --	13:02:51	6	was reported -- and there was a New York Times article,	13:05:34
7	Q. Does that at -- does that at all refresh	13:02:52	7	for example. I -- why don't I -- why don't I just show	13:05:36
8	your recollection that that was the document?	13:02:53	8	you that, from 1976?	13:05:38
9	A. No, it doesn't, but I --	13:02:54	9	A. What year New York Times?	13:05:40
10	Q. Okay.	13:02:54	10	Q. March 10.	13:05:46
11	A. -- will assume it's correct. And if I	13:02:56	11	A. Is this the report from the city agency,	13:05:52
12	said no, I misspoke. And I don't want to confuse	13:02:59	12	the --	13:05:55
13	anyone. Thank you.	13:03:03	13	Q. No. That's -- that's in 1970. That's --	13:05:55
14	Q. Thank you.	13:03:04	14	those are the earlier ones.	13:05:57
15	Okay. It -- it -- so -- and do you recall	13:03:15	15	MR. SATTERLEY: Objection.	13:05:59
16	that the media reports about your 1976 testing or your	13:03:20	16	MR. ASHBY: So I'll mark this as Exhibit	13:06:03
17	1976 paper consistently stated that the Johnson &	13:03:25	17	20 -- 22.	13:06:05
18	Johnson talcum powder products were not contaminated	13:03:32	18	(Exhibit 22 was marked and	12:37:06
19	with asbestos?	13:03:35	19	attached to the transcript.)	12:37:06
20	MR. SATTERLEY: Objection. Calls for	13:03:40	20	BY MR. ASHBY:	12:37:06
21	speculation. Overly broad. Vague.	13:03:41	21	Q. Okay. So this is an article in the New	13:06:10
22	BY MR. ASHBY:	13:03:47	22	York Times on March 10th, 1976. It's entitled Asbestos	13:06:14
23	Q. Well, here. That -- because of that	13:03:48	23	Found in Ten Powders.	13:06:18
24	objection, here is what I'll do. In -- when you were	13:03:48	24	A. Okay.	13:06:19
25	deposed in 2021 you were asked that question, whether or	13:03:52	25	Q. Do you recall the -- the media reporting	13:06:19
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1	not the media reports about your 1976 testing	13:03:57	1	on this?	13:06:22
2	consistently stated that you found Johnson & Johnson	13:04:01	2	A. No, I don't recall it.	13:06:22
3	talcum powder products not to be contaminated with	13:04:03	3	Q. Okay.	13:06:24
4	asbestos. And your answer was: I think I might have	13:04:07	4	A. But it seems that Arthur Rohl was the --	13:06:26
5	said that then, yes.	13:04:10	5	con -- confirmed the test with Dr. Langer. Said of the	13:06:33
6	A. If that's what I said, I said. In terms	13:04:12	6	findings, this is no firm evidence on low-level or	13:06:39
7	of what I was talking about, in terms of whether	13:04:15	7	intermediate exposures such as from using talcum powder.	13:06:44
8	their -- the question presented was whether amphibole	13:04:19	8	We don't know for sure what the danger level is.	13:06:47
9	asbestos particles were there, chrysotile particles,	13:04:23	9	That sounds circumspect, something I would	13:06:52
10	what were the concentrations and so on and so forth, the	13:04:30	10	have said.	13:06:56
11	answers are whatever is there in the testimony. I	13:04:35	11	Q. I think that's being attributed to	13:06:56
12	wasn't evading anything. It was just a response to a	13:04:39	12	Dr. Rohl, that statement, actually.	13:06:58
13	specific series of inquiries, if you like. And I	13:04:46	13	A. What if I were to tell you I think it was	13:06:59
14	answered to the best --	13:04:51	14	me?	13:07:02
15	Q. Yeah.	13:04:51	15	Q. All right. Fair enough.	13:07:02
16	A. -- of my recollection.	13:04:52	16	If -- if you go down to the third	13:07:04
17	Q. Yeah. No. And -- and really all I'm	13:04:53	17	paragraph from the bottom that starts with the products	13:07:08
18	asking is -- is -- is at the time, in 1976, the	13:04:59	18	that the researchers --	13:07:11
19	reporting was there were 10 powders that contained	13:05:01	19	A. Yes.	13:07:12
20	asbestos based on your 1976 article --	13:05:05	20	Q. Okay. Do you see that?	13:07:12
21	A. Okay.	13:05:07	21	It says, The products that the researchers	13:07:13
22	Q. -- right?	13:05:08	22	found un -- uncontaminated with asbestos fibers were	13:07:15
23	Do you -- do you recall that?	13:05:09	23	various ones.	13:07:19
24	A. There were 10 that contained chrysotile --	13:05:10	24	A. Yeah.	13:07:20
25	that contained asbestos, chrysotile and asbestiform	13:05:12	25	Q. But importantly for us is Johnson's -- two	13:07:20
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1 Johnson's Baby Powder and a Johnson's Medicated Powder. 13:07:25 2 Do you see that? 13:07:29 3 A. Yes, I do. 13:07:30 4 Q. Okay. Did -- and -- and that -- that was 13:07:30 5 never an article that you corrected in any way or 13:07:41 6 changed or -- or wrote a letter to the editor saying 13:07:43 7 that that was wrong? 13:07:45 8 A. I -- I never corrected anything that 13:07:46 9 appeared in the newspaper. 13:07:47 10 MR. SATTERLEY: And objection. 13:07:49 11 Foundation. Mischaracterization. No Foundation he ever 13:07:51 12 saw the article. 13:07:52 13 BY MR. ASHBY: 13:07:53 14 Q. Well, you -- do you understand at the time 13:07:54 15 that -- the 10 asbestos -- or the 10 powders that were 13:07:55 16 being reported as possibly containing asbestos were 13:07:59 17 powders other than Johnson & Johnson powders? 13:08:05 18 A. I'm uncertain of that. 13:08:12 19 Q. Okay. All right. And then you continued 13:08:13 20 to look at talcum powders after the 1976 publication; is 13:08:17 21 that true? 13:08:21 22 A. That's right. Yes. 13:08:22 23 Q. And -- but the results of that subsequent 13:08:23 24 analysis were never published; is that true? 13:08:25 25 A. That was part of the Edinburgh paper. 13:08:28 Page 138	1 don't have my copy, can you read that for us? 13:10:35 2 A. In 1979, Dr. Rohl -- 13:10:37 3 MR. SATTERLEY: Let me just place a 13:10:39 4 general objection that this isn't cross -- this isn't 13:10:41 5 proper cross-examination. But go ahead. 13:10:44 6 THE WITNESS: In 1979 Dr. Rohl and I 13:10:45 7 published a paper noting that a fol -- noting that a 13:10:48 8 follow-up analysis, quote, of cosmetic talcums purchased 13:10:51 9 during the period 1975-1978 was in progress. Okay. 13:10:58 10 Preliminary results suggest that fewer products contain 13:11:06 11 fibrous minerals. 13:11:11 12 I think that's correct. That's a correct 13:11:13 13 characterization. 13:11:15 14 Rohl and Langer -- fibrous mineral content 13:11:16 15 of consumer talc-containing products -- bup, bup, bup, 13:11:16 16 bup -- in Dust and Disease, 1979. The results of this 13:11:25 17 subsequent analysis were never published. However, the 13:11:27 18 results did not show that any of the cosmetic talcum 13:11:37 19 products contained asbestos particles. 13:11:41 20 The Dust and Disease -- 13:11:44 21 BY MR. ASHBY: 13:11:47 22 Q. All right. Wait. I'm sorry. You're -- 13:11:47 23 A. That was published, of course, in the 13:11:48 24 monograph Dust and Disease. 13:11:50 25 The results did not show that any of the 13:11:56 Page 140
1 Q. Well, the -- the -- 13:08:32 2 A. There were 30 or some odd powders that 13:08:36 3 were analyzed that were part of that paper. 13:08:40 4 Q. Right. That was -- well, the Edinburgh 13:08:47 5 was in what, in 20 -- I mean -- sorry. The Edinburgh 13:08:48 6 was in 1975, right? 13:08:50 7 A. Edinburgh was in -- I -- it may be '75. 13:08:52 8 It may be '76. 13:09:03 9 Q. Okay. Why don't we do this: I'm going to 13:09:04 10 give you -- if we go back to Exhibit 19, this might help 13:09:06 11 us orient. Do you have a copy of your Exhibit 19 there? 13:09:20 12 Probably not. 13:09:24 13 A. 19 is the -- the Penn State Symposium? 13:09:30 14 Q. No. Exhibit 19 is your report in 2015. 13:09:32 15 Do you think you have it there? You might, right? 13:09:43 16 A. This looks like the papers on my desk at 13:09:47 17 home. 13:09:50 18 No, I don't have -- I -- I just can't 13:10:11 19 locate it in this pile, so... 13:10:13 20 Q. Okay. That's fine. I'll -- I'll give you 13:10:15 21 my copy. 13:10:19 22 A. Thank you. 13:10:19 23 Q. And there's a paragraph here that I've 13:10:20 24 highlighted with my blue pen that starts with, in -- in 13:10:25 25 1979. So could you just read that for me? Since I 13:10:30 Page 139	1 cosmetic talcum products -- I'm saying analyzed -- 13:11:59 2 contained asbestos particles. 13:12:06 3 So the follow-up study -- well, obviously 13:12:10 4 it improved in quality. 13:12:12 5 Q. Can I borrow that back from you? 13:12:16 6 A. Sure. Please. 13:12:18 7 Q. Okay. So this is your document that you 13:12:19 8 drafted in -- in 2015. So we're talking eight years 13:12:22 9 ago, right? 13:12:25 10 A. Yeah. 13:12:26 11 Q. And it looks like what you're saying at 13:12:26 12 the time is -- is you continue to do analysis after the 13:12:29 13 1970s? 13:12:32 14 A. Follow-ups. Yeah. 13:12:33 15 Q. Follow-ups through 1979. But the results 13:12:34 16 of the subsequent analyses that were done were never 13:12:42 17 published; that's true? 13:12:45 18 A. 1979 -- if it's 1979 Dust and Disease, our 13:12:46 19 papers were published in the monograph. 13:12:52 20 Q. Yeah. But the -- the 1979 paper, though, 13:12:54 21 referenced that you had been looking at more consumer 13:12:57 22 talcum powders, but the 1979 paper did not publish any 13:12:59 23 results, correct? 13:13:03 24 A. I'm not following. 13:13:05 25 Q. Oh. Well, the -- the 1979 paper wasn't 13:13:07 Page 141

1 necessarily about asbestos analys -- or talcum powder 13:13:11 2 analysis for asbestos content; it was a broader paper 13:13:18 3 than that, right? 13:13:21 4 A. Yes. I think that is correct. 13:13:25 5 Q. Yeah. 13:13:27 6 A. We looked at other materials, yes. 13:13:27 7 Q. And at the time in that paper what you 13:13:29 8 said was we're -- we're still looking at consumer talcs, 13:13:35 9 but we have yet to publish our findings? Is that -- is 13:13:41 10 that your recollection? 13:13:45 11 A. That is not my clear -- 13:13:46 12 Q. Okay. 13:13:46 13 A. -- recollection, but it sounds like 13:13:52 14 something that we -- 13:13:55 15 Q. All right. 13:13:55 16 A. -- would continue to analyze, we would 13:13:55 17 accumulate data, but not be ready to publish. 13:13:59 18 Q. Yeah. We'll -- 13:14:03 19 A. Yeah, it sounds like things that happened 13:14:04 20 to us. 13:14:05 21 Q. Well, you wrote it here in this report 13:14:06 22 which you have for -- as Exhibit 19. Is -- what you say 13:14:07 23 is, in 1979 Dr. Rohl and I published a paper -- so this 13:14:10 24 is the paper in Dust and Disease, right? 13:14:14 25 A. Yeah. 13:14:17 Page 142	1 you drafted your report you would have included all of 13:15:34 2 your -- well, let me -- let me strike that. 13:15:41 3 To the extent you -- you drafted an expert 13:15:44 4 report in the litigation -- 13:15:47 5 A. Yeah. 13:15:48 6 Q. -- you -- you include all the information 13:15:48 7 you have, and you -- 13:15:51 8 A. At that time, yeah. 13:15:51 9 Q. At that time. And -- 13:15:52 10 A. Right. 13:15:52 11 Q. And you're honest when you write it at 13:15:55 12 that time? 13:15:57 13 A. Of course. 13:15:57 14 Q. Okay. 13:15:58 15 A. That's what I found. That's what I found 13:16:00 16 or didn't find, as the case may be. 13:16:02 17 Q. Yeah. Correct. 13:16:04 18 A. Right. 13:16:06 19 Q. Okay. So let's talk about now -- well, 13:16:06 20 let -- let me ask you this: I'll do it this way. All 13:16:34 21 right. When -- when -- you've talked a -- a little bit 13:16:42 22 about it's 2023, things were different in -- in 1971 or 13:16:44 23 even 1976. When you look back on those early chrysotile 13:16:51 24 findings in the Johnson's Baby Powder at the trace 13:17:01 25 levels, is -- is your view today that there is no safety 13:17:06 Page 144
1 Q. Noting that a follow-up analysis -- and 13:14:17 2 this is in quotes -- of cosmetic talcums purchased 13:14:20 3 during the period 1975 to 1978 -- 13:14:24 4 A. '78. 13:14:28 5 Q. -- was in progress. 13:14:29 6 A. Yeah. 13:14:31 7 Q. Okay? 13:14:31 8 A. Yeah. 13:14:31 9 Q. And what you go on to say in this 13:14:32 10 report -- I think what you're explaining here is that 13:14:35 11 although I -- we wrote that in 1979, we actually never 13:14:37 12 ended up publishing any of that, those results, correct? 13:14:41 13 A. Correct. 13:14:44 14 Q. Okay. But what you do say, to clear up 13:14:45 15 any confusion that someone might have about what those 13:14:48 16 findings were from your analyses for that 1975 to 1978 13:14:51 17 period is this: However, the results did not show that 13:14:57 18 any of the cosmetic talcum products analyzed contained 13:15:00 19 asbestos particles. Is that -- did I read that right? 13:15:04 20 A. Well, that's -- that -- whatever statement 13:15:07 21 we made, whatever statements were made at that time or 13:15:09 22 follow-up depositions I'll accept. Okay. 13:15:14 23 Q. Yeah. Well, I -- I -- honestly, 13:15:21 24 Dr. Langer, I'm reading what you wrote down as your 13:15:25 25 report. And let me ask you this: Did -- at the time 13:15:28 Page 143	1 risk to those findings that you found in 1971? 13:17:12 2 MR. SATTERLEY: Objection. Calls for 13:17:21 3 expert opinion. Beyond the scope. Foundation. 13:17:26 4 BY MR. ASHBY: 13:17:26 5 Q. Well, let's just put -- you were asked 13:17:27 6 this question in -- in 2021. Okay? 13:17:28 7 A. Yeah. 13:17:28 8 Q. You were asked: If you look back on -- on 13:17:30 9 that time with the benefit of -- of the years that have 13:17:32 10 passed, and when you look at those trace findings of 13:17:37 11 chrysotile in the product, do you believe that that 13:17:44 12 leads to any safety risk? 13:17:48 13 MR. SATTERLEY: Same -- same objection. 13:17:51 14 Also, there was an objection at the 2021 deposition. 13:17:52 15 He's not a retained expert witness. Beyond the scope of 13:17:55 16 the direct examination. Foundation. 13:17:59 17 BY MR. ASHBY: 13:18:08 18 Q. Okay. How about this? Would you agree 13:18:08 19 that there's no identifiable cancer risk in relation 13:18:10 20 specifically to the -- these bare trace levels of 13:18:13 21 chrysotile that you found in the 1971 samples of 13:18:17 22 Johnson's Baby Powder? 13:18:21 23 MR. SATTERLEY: Same -- same objection. 13:18:22 24 Foundation. Beyond the scope of direct foundation. Not 13:18:23 25 disclosed as an expert witness. Foundation. 13:18:26 Page 145

1	THE WITNESS: If you're talking about	13:18:34	1	if any, but --	13:22:08
2	risk, you're talking about safety -- well, it all	13:18:36	2	A. If it was impossible?	13:22:09
3	depends what your perception is.	13:18:42	3	Q. Right. But looking back on it now where	13:22:10
4	If you were to use the government	13:18:46	4	you're at after all these years of being at Mount Sinai,	13:22:13
5	agencies' model in terms of risk, their mathematical	13:18:50	5	all the epidemiology, the toxicology that's been done,	13:22:17
6	model indicates there is no safe level. And they	13:19:02	6	you're comfortable now saying that to the extent you	13:22:21
7	indicate that there is risk of disease, whatever the	13:19:08	7	found chrysotile at these trace levels in the joint --	13:22:24
8	disease is -- well, malignancy -- a risk of malignancy	13:19:14	8	in -- in the -- in the Johnson's Baby Powder, the risk	13:22:28
9	has no safe level, there's no threshold, but proceeds to	13:19:21	9	associated with that is a phantom risk?	13:22:32
10	be zero level of exposure, which means every increment	13:19:26	10	MR. SATTERLEY: Objection. Beyond the	13:22:34
11	of exposure greater than zero is associated with an	13:19:31	11	scope. Foundation.	13:22:36
12	increment of risk. So you've got that model to deal	13:19:36	12	THE WITNESS: Yes.	13:22:43
13	with.	13:19:42	13	MR. SATTERLEY: Mr. Ashby just gave you	13:22:44
14	The question is, given the fact that	13:19:44	14	two thumbs up.	13:22:46
15	there's no safe level, it means there is some risk --	13:19:48	15	MR. ASHBY: No, I didn't.	13:22:47
16	even if infinitesimally small, there is some risk	13:19:57	16	MR. SATTERLEY: Yeah, he did.	13:22:48
17	associated with exposure. And so there are models that	13:20:01	17	MR. ASHBY: Object to the colloquy.	13:22:51
18	are based on linear dose response which gives you a	13:20:12	18	MR. SATTERLEY: Well, you're -- you're not	13:22:56
19	number and gives you a risk following exposure to	13:20:16	19	going to admit that you just gave two thumbs up to	13:22:57
20	chrysotile asbestos. And that risk some would regard as	13:20:24	20	Dr. Langer, are you?	13:23:00
21	unacceptable and others would regard as a phantom risk.	13:20:30	21	MR. ASHBY: No.	13:23:00
22	BY MR. ASHBY:	13:20:30	22	MR. SATTERLEY: Okay. We should have a	13:23:02
23	Q. Okay.	13:20:30	23	camera on you.	13:23:04
24	A. And so you're dealing with -- you're	13:20:39	24	BY MR. ASHBY:	13:23:06
25	dealing with perception, people's perception, and	13:20:44	25	Q. Okay. And -- and -- and if we're talking	13:23:16
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1	whether or not there are people who accept risk and	13:20:47	1	about chrysotile -- well, I'll strike that.	13:23:21
2	those who don't. But it's a model. It is a model	13:20:51	2	And if we're talking about chrysotile	13:23:27
3	that's embraced by the government agencies. And there	13:21:00	3	only -- so just to orient you, this question is just	13:23:28
4	you're -- you're stuck with it.	13:21:05	4	going to be about chrysotile. If -- and if we're	13:23:32
5	Q. Okay. And -- and when you were asked a	13:21:08	5	talking about chrysotile only, that -- that phantom risk	13:23:34
6	very similar question in 2021 at your deposition,	13:21:11	6	is only going to be associated with pleural mesothelioma	13:23:40
7	what -- your answer was -- is this risk that you can	13:21:14	7	and not peritoneal mesothelioma; is that true?	13:23:44
8	look back on and associate with the -- your findings in	13:21:19	8	MR. SATTERLEY: Objection. Beyond --	13:23:47
9	1971 --	13:21:23	9	objection. Beyond the scope of direct examination. Not	13:23:48
10	A. Yeah.	13:21:24	10	an expert witness in this case. Foundation.	13:23:52
11	Q. -- is a phantom risk?	13:21:24	11	THE WITNESS: That would be the case.	13:23:57
12	MR. SATTERLEY: Object.	13:21:26	12	BY MR. ASHBY:	13:23:59
13	THE WITNESS: Yeah.	13:21:26	13	Q. Okay. And -- and I know you talked about	13:23:59
14	MR. SATTERLEY: Object to the form of the	13:21:27	14	this idea, this model of what the regulatory agencies do	13:24:08
15	question. Mischaracterization of prior testimony. And	13:21:28	15	with risk and their assessments. You would not exclude,	13:24:12
16	mischaracterization of -- of his answer.	13:21:31	16	though, that there could be a safe level to chrysotile;	13:24:18
17	THE WITNESS: Yeah. I would have said	13:21:35	17	is that true?	13:24:22
18	that.	13:21:37	18	A. I would not --	13:24:22
19	BY MR. ASHBY:	13:21:37	19	MR. SATTERLEY: Objection. Let me place	13:24:23
20	Q. Now -- and -- and...	13:21:38	20	an object. Beyond the scope of direct examination.	13:24:25
21	A. But that, of course, is the benefit of 50	13:21:38	21	Also, not listed as an expert witness.	13:24:27
22	years of research. And it's -- it is what it is.	13:21:47	22	THE WITNESS: I would not exclude that,	13:24:30
23	Q. Yeah. I mean, I think I understand what	13:21:57	23	no.	13:24:32
24	you're saying. I -- I think maybe what you're saying,	13:21:58	24	BY MR. ASHBY:	13:24:33
25	in -- in 1971 it's hard to determine what the risk is,	13:22:01	25	Q. And -- and when it comes to chrysotile --	13:24:39
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1 I alluded to this in the last question, so I'll start 13:24:46	1 be sure to call Mrs. Langer and make sure the house is 13:27:38
2 over. 13:24:49	2 not burning down. 13:27:42
3 When it comes to chrysotile, the risk at 13:24:50	3 MR. ASHBY: Okay. Sorry about that. 13:27:42
4 any level, whether it's tiny or phantom or 13:24:52	4 THE WITNESS: I left the coffee pot on, 13:27:43
5 infinitesimal or otherwise, wouldn't apply to 13:24:58	5 and... 13:27:44
6 peritoneal mesothelioma because chrysotile does not 13:25:00	6 MR. SATTERLEY: Let's go off the video. 13:27:45
7 cause peritoneal mesothelioma? 13:25:02	7 THE VIDEOGRAPHER: Yeah. Yeah. 13:27:47
8 MR. SATTERLEY: Same -- same objection. 13:25:03	8 THE WITNESS: Yeah. 13:27:48
9 Beyond the scope of direct examination, and foundation. 13:25:06	9 THE VIDEOGRAPHER: The time is 1:28. 13:27:48
10 THE WITNESS: It is not expected to be or 13:25:09	10 MR. SATTERLEY: All right. 13:27:48
11 found to be an agent in peritoneal mesothelioma 13:25:16	11 THE VIDEOGRAPHER: This is the end of 13:27:51
12 causation. This is true. 13:25:21	12 media unit three. 13:27:51
13 BY MR. ASHBY: 13:25:24	13 MR. SATTERLEY: I'll try getting to -- 13:27:51
14 Q. If I ask you the same question in relation 13:25:25	14 THE VIDEOGRAPHER: We're off the video 13:27:53
15 to pericardial mesothelioma, would your answer be the 13:25:27	15 record. 13:27:55
16 same? 13:25:30	16 (A recess was taken.) 13:27:56
17 MR. SATTERLEY: Let me place an objection. 13:25:32	17 (Exhibit 23 was marked and 13:28:50
18 Beyond the scope. Foundation. 13:25:33	18 attached to the transcript.) 13:31:30
19 BY MR. ASHBY: 13:25:37	19 THE VIDEOGRAPHER: Let's see. The time is 13:31:30
20 Q. If you know. 13:25:38	20 1:32. This is the beginning of media number four, and 13:32:10
21 A. No. No. As a matter of fact, if it's up 13:25:39	21 we are back on the video record. 13:32:14
22 in the chest, above the diaphragm, you would think 13:25:41	22 BY MR. ASHBY: 13:32:16
23 that -- there -- there have been reports of metastatic 13:25:48	23 Q. So I'm going to hand you, Dr. Langer, 13:32:17
24 disease from the pleura to the pericardium and 13:25:53	24 this -- it's a memorandum from March 22, 1976. It says 13:32:20
25 vice-versa. So that's another issue, another story. 13:25:57	25 the attendees were Arthur M. Langer and Arthur Rohl with 13:32:26
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1 Q. Okay. Okay. Well, do you recall -- when 13:26:08	1 the Division of Cosmetics Technology, FDA, Mr. Wilson, 13:32:31
2 you and Dr. Rohl -- well, actually, do you recall 13:26:23	2 and Mr. Yates. 13:32:37
3 meeting with Dr. Rohl and you in March of 1976 to 13:26:25	3 A. Okay. 13:32:39
4 discuss your findings in relation to your studies of 13:26:29	4 Q. Okay? 13:32:39
5 consumer talcs? 13:26:34	5 Do you -- before I give you this, do you 13:32:39
6 A. I'm not sure I understand the question. 13:26:36	6 recall meeting with those gentlemen in -- in March of 13:32:42
7 Q. Okay. In -- in 1976, in March, do you 13:26:38	7 1976? 13:32:45
8 recall meeting with representatives from the FDA with 13:26:43	8 A. No. 13:32:45
9 Dr. Rohl to discuss your findings related to consumer 13:26:46	9 Q. Okay. Let's see if I can give you this 13:32:46
10 talc? 13:26:51	10 and it can refresh your rec -- recollection. So why 13:32:48
11 A. I'm not sure. 13:26:51	11 don't you take a look at it? Then I'm going to ask you 13:32:50
12 Q. Okay. Now, let me see if I can -- well, 13:26:53	12 specifically about some things on page 3. 13:32:53
13 let me see if I can refresh your recollection then. 13:27:09	13 All right. I know you -- I know you 13:33:17
14 A. Okay. 13:27:13	14 haven't gotten through the whole document yet, but -- 13:33:18
15 MR. ASHBY: Okay. I'll mark this as 13:27:25	15 MR. SATTERLEY: Are you going to let him 13:33:19
16 Exhibit 22. 13:27:27	16 read the document? I mean, you -- if you're trying to 13:33:21
17 MR. SATTERLEY: I thought there already 13:27:29	17 refresh his recollection with it, I think you should let 13:33:22
18 was an Exhibit -- 13:27:31	18 him read it. 13:33:25
19 MR. ASHBY: Oh, sorry. Is that -- did I 13:27:31	19 THE WITNESS: Okay. 13:35:29
20 already hit that one? 13:27:32	20 BY MR. ASHBY: 13:35:30
21 MR. SATTERLEY: Yeah. The newspaper 13:27:32	21 Q. Okay. What -- what I wanted to ask you 13:35:31
22 article was 22, wasn't it? 13:27:33	22 was, does that help refresh your recollection as to 13:35:32
23 MR. ASHBY: I don't know. I can't -- I 13:27:33	23 whether or not you discussed with the gentlemen from the 13:35:36
24 handed them over, so I've lost -- 13:27:34	24 FDA your findings about chrysotile in two of the 13:35:38
25 THE WITNESS: You find your paper. I'll 13:27:36	25 consumer talc products in 1976? 13:35:44
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1 A. No, it doesn't refresh my memory, but 13:35:47	1 A. Yes. 13:38:04
2 it is -- if the quotes are correct, and they sound 13:35:52	2 Q. In the two -- okay. 13:38:05
3 correct, my concerns regarding the finding of 13:35:55	3 So in the 1976 study you did -- to the 13:38:09
4 chrysotile, it was tempered by the fact that the 13:36:01	4 extent you identified chrysotile in those two samples, 13:38:12
5 contamination -- the electron microscopy assay requires 13:36:10	5 it was using TEM, correct? 13:38:16
6 multiple areas to be scanned and that a number of grid 13:36:16	6 A. Yes. 13:38:18
7 openings is required to distinguish findings from 13:36:23	7 Q. Okay. 13:38:18
8 background. And that considering that these findings 13:36:27	8 A. Yes. The other table that you were 13:38:22
9 may be so low, whether or not they were hazardous is 13:36:34	9 quoting from when you said that there's no chrysotile 13:38:23
10 open to question. 13:36:38	10 indicated, there were two samples that were not 13:38:26
11 In general, I did not think that 13:36:40	11 identified as J&J with the .5 percent chrysotile, 13:38:30
12 chrysotile was a -- a real problem as far as cosmetic 13:36:42	12 that -- that table was marked concentration or quantity 13:38:36
13 talcs were concerned. I mean, that -- that makes sense. 13:36:48	13 by weight, which is obviously by x-ray diffraction. So 13:38:45
14 The written up analytical section by Yates 13:36:52	14 here it's -- it's more quantitative to distinguish a 13:38:49
15 is a little confused, but my statements are the ones 13:36:55	15 background from an actual amount. 13:38:54
16 that are part of that. 13:36:59	16 Q. Okay. And -- and does this refresh your 13:39:03
17 Q. You -- no. You can -- you can keep that 13:37:02	17 recollection that you told the FDA representatives that 13:39:05
18 document. 13:37:03	18 you considered those chrysotile findings in those two 13:39:09
19 A. Okay. 13:37:03	19 non-J&J talc products to be quite low and probably not 13:39:14
20 Q. You don't have to hand it back to me. 13:37:04	20 hazardous? 13:39:18
21 A. Thank you. 13:37:07	21 A. Yes. 13:39:19
22 Q. Do you see there -- you were just reading 13:37:07	22 MR. SATTERLEY: Objection. Beyond the 13:39:20
23 from the part on chrysotile. And it's -- what was 13:37:09	23 scope. 13:39:21
24 written was, In two of the 19 commercial cosmetic talcs 13:37:12	24 BY MR. ASHBY: 13:39:21
25 examined fiber counts of approximately 24 fibrils per 13:37:17	25 Q. And -- 13:39:21
Page 154	Page 156
1 grid square were obtained. Do you see that? 13:37:21	1 MR. SATTERLEY: Wait a second. Let me 13:39:22
2 MR. SATTERLEY: Let me object to the 13:37:23	2 place my objection. Beyond the scope. Foundation. And 13:39:23
3 improper cross-examination. 13:37:25	3 not expert witness. 13:39:26
4 THE WITNESS: Which -- which page is that 13:37:27	4 BY MR. ASHBY: 13:39:27
5 on? 13:37:32	5 Q. And -- and you agree that you told them in 13:39:28
6 BY MR. ASHBY: 13:37:33	6 general you did not think chrysotile was the real 13:39:30
7 Q. So I'm on page 3. 13:37:34	7 problem as far as cosmetic talcs were concerned? 13:39:32
8 A. Yes. 13:37:37	8 MR. SATTERLEY: Objection. Beyond the 13:39:35
9 Q. In the section on chrysotile. 13:37:37	9 scope. Foundation. Not a retained expert witness. 13:39:36
10 A. Yes. 13:37:38	10 THE WITNESS: I believed that, yes. 13:39:41
11 Q. And it says in between the parts that may 13:37:39	11 BY MR. ASHBY: 13:39:43
12 be highlighted there -- 13:37:41	12 Q. And I'm surmising from reading that, what 13:39:44
13 A. Yes. 13:37:42	13 was believed to be the real problem at the time was 13:39:49
14 Q. -- in -- in two of the 19. Do you see 13:37:42	14 probably the amphiboles that you were finding; is that 13:39:51
15 that? 13:37:45	15 true? 13:39:53
16 A. Yes. Yes. 13:37:45	16 A. I think so. 13:39:53
17 Q. And it says, In two of the 19 commercial 13:37:46	17 Q. Okay. And we've already established you 13:39:54
18 cosmetic talcs examined fiber counts of approximately 24 13:37:49	18 didn't find any amphiboles in the J&J talc, correct? 13:39:56
19 fibrils per grid square were obtained. Do you see that? 13:37:53	19 A. Correct. 13:40:03
20 A. Yes. Yes. 13:37:55	20 Q. Okay. Then Mr. Satterley asked you about 13:40:03
21 MR. SATTERLEY: Same objection. 13:37:58	21 Dr. Chalmers and the press release. At -- at the time 13:40:13
22 BY MR. ASHBY: 13:37:59	22 Dr. Chalmers was the president of Mount Sinai Medical 13:40:19
23 Q. Okay. So does that refresh your 13:37:59	23 Center? 13:40:24
24 recollection that you used TEM to identify chrysotile in 13:38:01	24 A. President and Dean of the School of 13:40:24
25 your 1976 study? 13:38:03	25 Medicine. 13:40:26
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1 Q. You took my next question from me. I was 13:40:26 2 going to ask you if he was the Dean. 13:40:28 3 And this happened in 1976, this press 13:40:31 4 release. And it was in response to some media reporting 13:40:37 5 that had been done in 1976, correct? 13:40:42 6 A. I think so. 13:40:44 7 Q. And what Dr. Chalmers said in his press 13:40:45 8 release was that the most commonly used baby talc has 13:40:58 9 been consistently free of asbestos? Do you recall him 13:41:02 10 saying that? 13:41:05 11 A. Well, that was his opinion, I guess. 13:41:06 12 Q. Yeah. Right. And we know that he's 13:41:09 13 talking about Johnson & Johnson Baby Powder at that 13:41:13 14 point, right? 13:41:16 15 A. I'm not sure. One of the issues that I 13:41:16 16 always pursued was market share, and nobody would tell 13:41:19 17 me anything, although I assumed that the J&J talc was a 13:41:22 18 major component of market share. 13:41:28 19 Q. Uh-huh. 13:41:32 20 And he -- Dr. Chalmers said it was his 13:41:33 21 opinion -- it was the opinion of the Mount Sinai 13:41:36 22 Department of Pediatrics -- 13:41:39 23 A. Yes. 13:41:41 24 Q. -- that baby talc is a useful and safe 13:41:41 25 product, correct? 13:41:44 Page 158	1 And your answer was: Yes, of course. 13:43:18 2 A. Well, that's not a correct answer. Irving 13:43:23 3 Selikoff, yes. Chalmers was not Dean of the School of 13:43:26 4 Medicine. He came in the early '70s, maybe '75, so he 13:43:31 5 would not have been interested in talcum powder in the 13:43:39 6 institution. So that answer pertains specifically to 13:43:43 7 Irv Selikoff. 13:43:48 8 Q. Okay. 13:43:49 9 A. Of course he would know. Yes, of course. 13:43:51 10 Q. Okay. So Irv Selikoff would have known, 13:43:53 11 but you're changing your testimony from 2021 to say now 13:43:55 12 that Mr. Chalmer -- or Dr. Chalmers would not have 13:43:59 13 known? 13:44:02 14 MR. SATTERLEY: Objection. Argumentative. 13:44:03 15 THE WITNESS: He would not have known, no. 13:44:04 16 He didn't arrive in the institution. 13:44:05 17 BY MR. ASHBY: 13:44:08 18 Q. Okay. And -- and when you gave your 13:44:09 19 deposition testimony in 2021 you were truthful and 13:44:10 20 honest during that testimony, correct? 13:44:12 21 A. I would hope so. 13:44:16 22 Q. And you were under oath at -- 13:44:16 23 A. I was sworn. Yes. 13:44:18 24 Q. That's what I was going to ask you. You 13:44:18 25 were under oath at the time to tell the truth, correct? 13:44:21 Page 160
1 A. Yes. 13:41:45 2 Q. And before Dr. Chalmers wrote that, he 13:41:45 3 obviously knew about your 1976 findings, correct? 13:41:50 4 A. Oh, yes. 13:41:52 5 Q. All right. And he obviously knew about 13:41:53 6 your 1971 findings related to Lander's and -- and -- 13:41:55 7 A. No. 13:41:55 8 Q. -- Johnson Baby Powder? 13:41:59 9 A. No. 13:42:03 10 Q. Okay. In -- in -- in your deposition in 13:42:04 11 2021 you were asked -- well, why don't I show you? Do 13:42:10 12 you still have it there or do -- do I need to get it for 13:42:26 13 you? 13:42:29 14 A. What do you need? 13:42:29 15 Q. Here. I'll just use this one. That's 13:42:30 16 fine. 13:42:32 17 So a similar question was asked of you in 13:42:35 18 2021. Let me see if I can highlight it for you. 13:42:38 19 Okay. So what you were asked in 2021 was 13:42:50 20 this question: You would have spoken with Dr. Selikoff 13:42:56 21 and Dr. Chalmers about your 1971 finding of a trace 13:42:58 22 amount of chrysotile in J&J powder as well as your 1976 13:43:02 23 finding and reported public paper not finding any trace 13:43:07 24 chrysotile in J&J powder? You would have talked about 13:43:12 25 both studies, both findings with them, correct? 13:43:16 Page 159	1 A. I believe so, yes. 13:44:22 2 Q. So are you -- at -- were you aware that 13:44:23 3 Dr. Selikoff wrote to one of the reporters in relation 13:44:28 4 to that statement from -- from Dr. Chalmers? 13:44:35 5 A. No. And I think that Irv countered that 13:44:38 6 comment. He thought it was inappropriate for him to 13:44:44 7 comment because that wasn't his field, that was not the 13:44:49 8 asbestos field, and he had limited knowledge of the 13:44:53 9 effects of low-level exposures or whatever for 13:44:59 10 chrysotile specifically. 13:45:05 11 MR. ASHBY: Okay. So I'll just move to 13:45:07 12 strike as speculation. 13:45:10 13 Why don't I show you what Dr. Selikoff 13:45:12 14 wrote, and you can tell me -- 13:45:13 15 THE WITNESS: Yes, please. 13:45:16 16 MR. ASHBY: Yeah. I -- instead of doing 13:45:17 17 it like that. I'll mark this as Exhibit 24. 13:45:18 18 (Exhibit 24 was marked and 12:37:42 19 attached to the transcript.) 13:46:00 20 BY MR. ASHBY: 13:46:00 21 Q. This is a letter from Dr. Irving Selikoff 13:45:40 22 to Marian Burros at the Washington Post? 13:45:48 23 A. The Washington Post. Marian Burros. Yes. 13:45:49 24 Do you know what Marian Burros' expertise 13:45:53 25 was? 13:45:56 Page 161

1	Q. I think food.	13:45:56	1	distortion --	13:47:58
2	A. Yes.	13:45:57	2	A. Wow.	13:47:59
3	Q. Okay. So Marian Burros had written an	13:46:01	3	Q. -- which he says is not a very difficult	13:48:00
4	article about your --	13:46:02	4	task, I presume, on the part of a skilled writer able to	13:48:02
5	A. Yeah.	13:46:02	5	make use of omissions. Do you see that?	13:48:05
6	Q. -- about your article?	13:46:04	6	A. Yes.	13:48:08
7	A. Yeah.	13:46:05	7	MR. SATTERLEY: Let me object to hearsay	13:48:09
8	Q. And in response to that she -- or I'll	13:46:06	8	on all of this.	13:48:11
9	strike that.	13:46:11	9	THE WITNESS: Wow.	13:48:12
10	She had interviewed Dr. Selikoff in	13:46:12	10	BY MR. ASHBY:	13:48:15
11	writing her article, correct?	13:46:14	11	Q. And he goes on to say that, I specifically	13:48:15
12	A. I think so.	13:46:16	12	stated that I was in agreement with Dr. Chalmers and I	13:48:17
13	Q. And Dr. Selikoff felt like he had been --	13:46:17	13	thought his statement was carefully and accurately	13:48:21
14	A. Misquoted.	13:46:23	14	written.	13:48:24
15	Q. -- misquoted. Yeah. Right. That	13:46:24	15	Do you see that?	13:48:24
16	statements he -- that he did not make were being	13:46:27	16	A. Yes.	13:48:25
17	misattributed to him, correct?	13:46:29	17	MR. SATTERLEY: Same objection.	13:48:26
18	A. Okay. Yeah.	13:46:30	18	BY MR. ASHBY:	13:48:27
19	Q. So he wrote a letter to Ms. Burros	13:46:31	19	Q. So this is -- this is Dr. Selikoff setting	13:48:29
20	explaining that to her, correct?	13:46:33	20	the re -- the record straight with Ms. Burros that he	13:48:32
21	A. I believe so.	13:46:35	21	agrees with Dr. Chalmers' statement, correct?	13:48:34
22	Q. All right. So let's look at Exhibit 24.	13:46:36	22	A. Yeah.	13:48:38
23	A. Okay.	13:46:36	23	MR. SATTERLEY: Same objection.	13:48:44
24	Q. Do you recognize this as a letter from	13:46:49	24	BY MR. ASHBY:	13:48:45
25	Dr. Selikoff on the Mount Sinai letterhead to Ms. Marian	13:46:5	25	Q. And what he goes to say in that next	13:48:45
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1	Burros?	13:46:56	1	paragraph, if you look down at the second sentence, is,	13:48:48
2	A. Yes, with a copy to Tom Chalmers and David	13:46:57	2	I stated that the cosmetic industry was to be	13:48:51
3	Pomrinse. He was president of the -- of Mount Sinai	13:47:00	3	congratulated on having improved its product and the	13:48:53
4	Hospital.	13:47:05	4	credit should be given where due. So this, too, didn't	13:48:56
5	Q. Oh, okay. So do you see in the first	13:47:05	5	fit your perspective.	13:49:00
6	paragraph there --	13:47:15	6	Do you see that?	13:49:04
7	A. He's astonished.	13:47:16	7	A. Yes.	13:49:04
8	Q. Yeah, he's -- he's astonished.	13:47:18	8	Q. All right.	13:49:04
9	I was astonished by your article in the	13:47:19	9	A. Boy, was he angry. Phew. Wow.	13:49:05
10	Washington Post on March 26th, 1976, astonished because	13:47:21	10	Unbelievable.	13:49:14
11	of the inaccurate stance of the story, and the sly	13:47:25	11	Q. Okay. Okay.	13:49:15
12	selections used in its preparation.	13:47:28	12	A. Wow.	13:49:16
13	A. Wooh.	13:47:30	13	Q. You can keep that one.	13:49:16
14	Q. Does that sound like something	13:47:30	14	A. Well, there's grist for the mill on both	13:49:29
15	Dr. Selikoff would say?	13:47:32	15	sides.	13:49:32
16	A. Actually not.	13:47:34	16	Q. So it wasn't -- and Dr. Selikoff wasn't	13:49:33
17	Q. No?	13:47:34	17	the type of person that would usually be this animated	13:49:35
18	A. No, he wouldn't.	13:47:36	18	over an issue; is that correct?	13:49:38
19	Q. These gave the impression that there was a	13:47:38	19	A. Very much so, correct.	13:49:39
20	disagreement on my part and on the part of our	13:47:43	20	Q. So you'd have to have a lot of conviction	13:49:41
21	laboratory with the position of Dr. C. Chalmers. Do you	13:47:45	21	to write such strongly worded -- or such a strongly	13:49:43
22	see that?	13:47:49	22	worded letter to somebody like Ms. Burros?	13:49:47
23	A. Yes.	13:47:49	23	MR. SATTERLEY: Objection. Foundation.	13:49:50
24	Q. Okay. And what Dr. Selikoff says is that	13:47:52	24	Speculation.	13:49:52
25	this can only be characterized as a deliberate	13:47:55	25	THE WITNESS: I have never seen a letter	13:49:53
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1 like that from Irv Selikoff. Wow. 13:49:55	1 you're drafting a manuscript to have conversations with 13:51:37
2 BY MR. ASHBY: 13:50:06	2 industry about the manuscript. Is that a fair 13:51:40
3 Q. Were you -- are you aware -- are you 13:50:06	3 statement? 13:51:43
4 familiar with the -- I'm switching subjects now. 13:50:09	4 A. Yeah. I think that's so. 13:51:43
5 Are you -- are you familiar with the 13:50:12	5 Q. And what you said was it's pro -- it's 13:51:45
6 citizen's petition in 1986 by Mr. Douillet in which the 13:50:13	6 probable that a paper which has a pronounced effect on 13:51:48
7 FDA makes comments about consumer talcs? 13:50:19	7 an industry will be sent by the editor of the journal to 13:51:51
8 MR. SATTERLEY: Objection. Beyond the 13:50:23	8 a scientist in that industry. 13:51:55
9 scope. Foundation. 13:50:24	9 A. I think, yes. 13:51:57
10 THE WITNESS: No. 13:50:25	10 Q. Do you agree with that? 13:51:58
11 BY MR. ASHBY: 13:50:26	11 A. Oh, absolutely. Yes. 13:52:00
12 Q. Okay. Are -- are you aware -- let me ask 13:50:27	12 Q. And how many -- we -- nobody -- 13:52:01
13 it a bit more broadly then. Are you aware that in 1986 13:50:29	13 Mr. Satterley didn't ask you this, so let me ask you: 13:52:04
14 the FDA stated that, We find there is no basis at this 13:50:32	14 How many articles do you have that have been published 13:52:08
15 time, meaning 1986, for the agency to conclude that 13:50:36	15 in the peer-reviewed literature? 13:52:10
16 there is a health hazard attributable to asbestos in 13:50:40	16 A. Out of about 300 and change reports or 13:52:12
17 cosmetic talc? 13:50:43	17 papers or whatever -- bup, bup, bup -- I'd say about 13:52:21
18 MR. SATTERLEY: Objection. 13:50:45	18 100. 13:52:24
19 BY MR. ASHBY: 13:50:46	19 Q. And you're not aware that you've ever 13:52:24
20 Q. Were you aware of that statement? 13:50:46	20 received comments on any of your manuscripts from 13:52:31
21 A. Yes. 13:50:47	21 Johnson & Johnson, true? 13:52:34
22 MR. SATTERLEY: Objection. Beyond the 13:50:48	22 A. It depends on the journal. There are some 13:52:35
23 scope. 13:50:51	23 journals who will tell you who the reviewers were. And 13:52:40
24 MR. ASHBY: Okay. 13:50:51	24 most journals will provide critiques from experts 13:52:44
25 MR. SATTERLEY: Foundation. 13:50:52	25 without recognition of who they are. They are 13:52:53
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1 BY MR. ASHBY: 13:50:54	1 anonymous. In fact, many reviewers would not review or 13:52:57
2 Q. Mr. Satterley asked you a bit about 13:50:55	2 critique if their identity was made known, no. 13:53:07
3 Dr. Estrin? 13:50:59	3 Q. Right. All right. And so my question was 13:53:11
4 A. Norman Estrin. 13:51:02	4 just, I think, more simple than that. You -- you don't 13:53:14
5 Q. Yeah. 13:51:04	5 have knowledge that Johnson & Johnson has ever commented 13:53:18
6 MR. SATTERLEY: Is he a doctor? 13:51:04	6 or -- I'll strike that. 13:53:23
7 MR. ASHBY: I don't -- 13:51:05	7 You don't know that you've ever received 13:53:25
8 THE WITNESS: No. 13:51:05	8 comments that came directly from Johnson & Johnson about 13:53:27
9 MR. ASHBY: Oh. Mr. Estrin. Sorry. 13:51:07	9 any of your manuscripts; is that fair? 13:53:29
10 THE WITNESS: Yes. 13:51:07	10 A. No. As -- recently I have been provided 13:53:34
11 MR. ASHBY: All right. So I'll strike 13:51:07	11 documents by Mr. Satterley, and those documents included 13:53:37
12 that. 13:51:08	12 critiques of individuals that read that paper, and they 13:53:45
13 MR. SATTERLEY: He's a lobbyist. 13:51:08	13 were scientists or representatives of Johnson & Johnson. 13:53:55
14 MR. ASHBY: I'll -- I'll -- what's that? 13:51:10	14 So that was only very recently, in the last six months 13:53:59
15 MR. SATTERLEY: He's a lobbyist, not a 13:51:12	15 or so. 13:54:05
16 doctor. 13:51:12	16 Q. Okay. So at the time of your deposition 13:54:05
17 MR. ASHBY: So I'll start over. I'll 13:51:15	17 in 2021 you were asked the same question, if you've ever 13:54:08
18 strike all that. 13:51:15	18 received comments on any of your draft papers from 13:54:13
19 BY MR. ASHBY: 13:51:15	19 Johnson & Johnson. And your answer at that time was: 13:54:15
20 Q. Mr. Satterley asked you a little bit about 13:51:16	20 No, not that I know of. 13:54:18
21 Mr. Estrin, correct? 13:51:18	21 A. That's right. Not that I knew then. Yes. 13:54:20
22 A. Yes. 13:51:19	22 Correct. 13:54:24
23 Q. Now -- and in 2021 at your deposition you 13:51:20	23 Q. Okay. And -- and to the extent Johnson & 13:54:25
24 were asked similar questions about that manuscript. And 13:51:25	24 Johnson had a -- or had seen a pre-print of a 13:54:42
25 what you told us was that it's occasionally done when 13:51:33	25 manuscript, that -- that doesn't necessarily mean that 13:54:46
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1 Johnson & Johnson gave comments to someone that were in 13:54:51 2 turn given to you, correct? 13:54:54 3 A. I don't know that. I have no idea 13:54:57 4 concerning the structure. I have no idea concerning the 13:54:59 5 skein, the procession of events or whether that was pro 13:55:11 6 forma or whether it was a special case. I have no idea. 13:55:15 7 Q. In -- in any event, to -- to the extent -- 13:55:19 8 well, I'll -- I'll strike that. 13:55:22 9 You -- you stand by your 1976 study, 13:55:24 10 correct? 13:55:26 11 A. Yes. 13:55:27 12 Q. Okay. 13:55:27 13 A. That's a damn good study. That's state of 13:55:27 14 the art. 13:55:30 15 Q. And if you get a comment from someone, not 13:55:30 16 knowing who that -- who it's coming from, and you think 13:55:32 17 it's poppycock or it's not scientifically valid, you'll 13:55:36 18 ignore that comment, won't you? 13:55:43 19 A. Not really. Two years ago I submitted a 13:55:45 20 major paper to a journal from a conference. And these 13:55:49 21 papers were peer-reviewed. I don't know who the 13:55:59 22 peer-reviewers were. The paper was on the chemical 13:56:02 23 modification of the surface of an asbestos mineral and 13:56:06 24 its alter -- its altered biological potential. 13:56:10 25 And this reviewer said, Your 13:56:15 Page 170	1 have it. You address the issue. 13:57:54 2 Q. Yeah. I -- I think if I understand, there 13:57:57 3 are some -- some times when you get comments back where 13:57:59 4 you have to address the issue? 13:58:02 5 A. Yes. 13:58:03 6 Q. But at all times you stand by your 13:58:04 7 opinions and your results? 13:58:07 8 A. Generally so. On rare occasions the point 13:58:08 9 is made, and it's a valid point, in which you have to 13:58:13 10 change your statements. 13:58:17 11 Q. Okay. 13:58:19 12 A. The data -- the data stays the same. The 13:58:20 13 interpretation may change if altered. But that's -- 13:58:23 14 that's fair. 13:58:28 15 Q. Okay. 13:58:28 16 A. That's a good review, by the way. 13:58:32 17 Q. What is? 13:58:34 18 A. The fact that you can -- you can read a -- 13:58:35 19 a criticism and find it valid and it keeps you from 13:58:39 20 saying something dopey in the open literature that stays 13:58:43 21 there forever. 13:58:48 22 Q. Mr. Satterley asked you a bit about 13:59:02 23 Edinburgh and the meeting there and the -- the -- the 13:59:04 24 manuscript that was ultimately not used during the 13:59:07 25 meeting, correct? 13:59:10 Page 172
1 chrysophosphate was shown to be -- chrysophosphate, 13:56:20 2 that's a phosphorous oxychloride gas reacted with 13:56:23 3 chrysotile asbestos -- and you modified the surface and 13:56:28 4 you rendered the surface unable to interact 13:56:31 5 biologically. 13:56:35 6 Q. Uh-huh. 13:56:35 7 A. However, one of the batches of 13:56:37 8 chrysophosphate were dumped into laboratory animals. 13:56:40 9 And one study, this bioassay, produced malignancies, 13:56:45 10 mesotheliomas, in laboratory animals reacted with this 13:56:51 11 chemical. 13:56:58 12 Q. Uh-huh. 13:56:58 13 A. I had to respond to it. 13:56:59 14 I said, Yes, there are reasons for this. 13:57:01 15 The incomplete reaction of the material, or the batch 13:57:05 16 was an early batch, the -- the -- bup, bup, bup, bup, 13:57:10 17 bup, bup, bup. I addressed the issue. So someone could 13:57:15 18 disagree with your paper. Some would -- it's up to the 13:57:18 19 editor. You either address it or they'll reject your 13:57:24 20 paper because an expert said, No, I don't agree with it. 13:57:29 21 Q. Uh-huh. 13:57:29 22 A. So the bottom line -- the bottom line is, 13:57:34 23 yes, you tend to address the issue. You can say, This 13:57:43 24 is where you're wrong, this is the data, and therefore I 13:57:48 25 stand by my statements in the data set. But there you 13:57:50 Page 171	1 A. Yes. 13:59:11 2 Q. Okay. So if -- if I understand it, it 13:59:11 3 sounds like you had a pre-print of the manuscript, and 13:59:14 4 that pre-print of the manuscript would have gone out to 13:59:17 5 the attendees of the conference? 13:59:20 6 A. Yes. 13:59:21 7 Q. Okay. Professor Pooley ultimately decided 13:59:22 8 not to disseminate that manuscript at that -- 13:59:26 9 A. Yeah. 13:59:28 10 Q. -- during the conference? 13:59:28 11 A. We gave him the -- the ultimate decision. 13:59:29 12 It was presented in his home country. And he was the 13:59:33 13 senior author, I believe. Well, maybe Art was, Art 13:59:38 14 Rohl. I'm uncertain. But he was the presenting -- one 13:59:44 15 of the presenters. And we gave the decision to Fred, 13:59:53 16 and Arthur also on the -- on the U.S. side of the ocean, 13:59:58 17 made the decision, okay, well, let's withdraw it. 14:00:04 18 Q. And -- 14:00:04 19 A. We've said it already. 14:00:07 20 Q. And -- and you used the term in talking to 14:00:09 21 Mr. Satterley that Professor Pooley was being pressured 14:00:16 22 in a way to do that? 14:00:18 23 A. Yes. 14:00:20 24 Q. You -- you've said that that was not 14:00:20 25 Johnson & Johnson doing the pressuring, though, correct? 14:00:24 Page 173

1	A. I think it was someone else. That --	14:00:27	1	you real quick?	14:02:18
2	Q. Boots? A company --	14:00:28	2	A. Sure.	14:02:18
3	A. Boots?	14:00:30	3	Q. All right.	14:02:18
4	Q. A -- Boots -- a company called Boots was	14:00:30	4	MR. ASHBY: Here you go, Mr. Satterley.	14:02:26
5	doing it, right?	14:00:32	5	BY MR. ASHBY:	14:02:26
6	A. Boots, a pharmaceutical -- a pharmacy	14:00:33	6	Q. Okay. So what is this, what we've marked	14:02:34
7	chain, Boots.	14:00:37	7	as Exhibit 25?	14:02:36
8	Q. Okay. Ultimately, though, in the end you	14:00:39	8	MR. SATTERLEY: Objection. Beyond the	14:02:37
9	and Dr. Rohl presented your findings in the published	14:00:43	9	scope.	14:02:39
10	literature in 1976, correct?	14:00:48	10	THE WITNESS: What is -- what's the issue?	14:02:40
11	A. Yeah, I think so.	14:00:49	11	Are you asking me about the issue?	14:02:43
12	Q. And later Professor Pooley also presented	14:00:50	12	BY MR. ASHBY:	14:02:46
13	his findings, the other half of that manuscript --	14:00:54	13	Q. Yeah. No. I'm -- just a real simple	14:02:46
14	A. Of course.	14:00:57	14	question. What is it we're looking at that's Exhibit	14:02:47
15	Q. -- I think in -- I don't -- but he did at	14:00:58	15	25?	14:02:51
16	some point present that in -- in the peer-reviewed	14:01:00	16	A. This is a statement that we submitted to	14:02:51
17	literature, right?	14:01:03	17	the National Toxicology Program at their hearings on the	14:02:53
18	A. I believe so.	14:01:04	18	biological significance of talc as to whether they	14:02:59
19	Q. Okay. In -- in 2000 you and John Addison	14:01:15	19	should ultimately ban it, and so on and so forth.	14:03:03
20	drafted some comments to a draft report from the	14:01:18	20	Q. Okay.	14:03:03
21	National Toxicology Program regarding talc, correct?	14:01:19	21	A. John Addison was a consultant for a number	14:03:08
22	A. Yes. Yes.	14:01:24	22	of talc producers in Europe. He asked me to evaluate	14:03:11
23	Q. And in that doc --	14:01:25	23	and read documents with him and prepare a comment	14:03:21
24	MR. SATTERLEY: Objection. Beyond the	14:01:25	24	regarding our findings concerning talc.	14:03:23
25	scope.	14:01:26	25	Q. Okay. In this document you state that --	14:03:37
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1	BY MR. ASHBY:	14:01:26	1	that studies showed that the mesothelioma potential of	14:03:39
2	Q. And in that document you wrote that talc	14:01:27	2	the talc fiber is zero.	14:03:41
3	per se is not carcinogenic to humans, correct?	14:01:30	3	MR. SATTERLEY: Objection. Beyond the	14:03:43
4	MR. SATTERLEY: Objection. Beyond the	14:01:32	4	scope. And what -- what page are you specifically going	14:03:44
5	scope.	14:01:34	5	to?	14:03:46
6	THE WITNESS: That is the statement of the	14:01:34	6	MR. ASHBY: Page 5.	14:03:47
7	International Agency for Research on Cancer. Talc as	14:01:35	7	THE WITNESS: Yeah.	14:03:51
8	the mineral is not carcinogenic to humans.	14:01:39	8	BY MR. ASHBY:	14:03:52
9	BY MR. ASHBY:	14:01:44	9	Q. Do you recall that?	14:03:53
10	Q. And you stand by those comments, correct?	14:01:44	10	A. Yes.	14:03:53
11	A. Yes.	14:01:46	11	MR. SATTERLEY: What paragraph on page 5?	14:03:54
12	Q. Why don't -- let's...	14:01:46	12	I'm just trying to find where you're reading from.	14:03:57
13	MR. SATTERLEY: Let me just place an	14:01:53	13	MR. ASHBY: The fourth paragraph. And --	14:04:02
14	objection, beyond the scope.	14:01:58	14	MR. SATTERLEY: I don't see the word	14:04:12
15	MR. ASHBY: Yeah. All right. I'll	14:02:00	15	mesothelioma in the fourth paragraph.	14:04:13
16	mark -- I'll hand it to you so you have it. So here is	14:02:01	16	MR. ASHBY: Okay.	14:04:15
17	Exhibit 24.	14:02:04	17	MR. SATTERLEY: I'm just trying to find	14:04:16
18	MR. SATTERLEY: You've already done 24.	14:02:06	18	what -- what you're saying. Where -- where is	14:04:18
19	MR. ASHBY: I'm sorry. Gosh.	14:02:06	19	mesothelioma mentioned?	14:04:20
20	MR. SATTERLEY: 25?	14:02:08	20	MR. ASHBY: Page 5, paragraph four.	14:04:22
21	MR. ASHBY: Exhibit 25.	14:02:08	21	MR. SATTERLEY: One, two, three --	14:04:25
22	(Exhibit 25 was marked and	14:02:12	22	MR. ASHBY: The last sentence.	14:04:26
23	attached to the transcript.)	14:02:14	23	MR. SATTERLEY: Oh.	14:04:28
24	BY MR. ASHBY:	14:02:14	24	BY MR. ASHBY:	14:04:28
25	Q. Can I have that -- borrow that back from	14:02:15	25	Q. Do you see here, Dr. Langer, it says,	14:04:28
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1 Furthermore the implantation experiments by Stanton, et 14:04:32	1 I'm trying to follow along. 14:07:00
2 al. (1981) showed that the mesothelioma potential of 14:04:35	2 MR. ASHBY: Okay. All right. So I'm on a 14:07:02
3 talc fiber was zero? 14:04:38	3 page that's called the Unified Fiber Theory. It's, I 14:07:27
4 A. Yes. 14:04:39	4 think, the fifth one from the end or fourth one from the 14:07:31
5 MR. SATTERLEY: Objection. Beyond the 14:04:40	5 end. 14:07:34
6 scope. 14:04:42	6 MR. SATTERLEY: Same objection. Beyond 14:07:38
7 BY MR. ASHBY: 14:04:42	7 the scope. 14:07:39
8 Q. Okay. You stand by that statement, 14:04:43	8 BY MR. ASHBY: 14:07:40
9 correct? 14:04:44	9 Q. Do you see at the top -- there you go. 14:07:40
10 A. Yes. 14:04:44	10 A. The Unified Fiber Theory. Yes. 14:07:51
11 Q. All right. And then around 2011 do you 14:04:44	11 Q. Okay. And -- and what is written here is 14:07:52
12 recall preparing a presentation with Dr. Nolan and 14:04:47	12 this: From the experimental studies already in the 14:07:54
13 Dr. Rubin in response to the NIOSH roadmap criteria? 14:04:52	13 literature indicate that morphology and biopersistence 14:07:58
14 A. Yeah. That was a dog also. Yes. 14:05:00	14 are not the keys to explaining fiber carcino -- 14:08:03
15 Q. And do you stand by the statements in that 14:05:04	15 carcinogenici -- 14:08:06
16 presentation? 14:05:10	16 A. Carcinogenicity. 14:08:09
17 I'm sorry. Did I -- did we get an answer? 14:05:27	17 Q. Cars -- yeah. Let me try that again. 14:08:11
18 I might -- I might have missed it. 14:05:31	18 What it says here is, From the 14:08:12
19 A. No. There was no answer because I -- 14:05:31	19 experimental studies already in the literature indicate 14:08:14
20 Q. Okay. 14:05:31	20 that morphology and biopersistence are not the keys to 14:08:17
21 A. I was waiting for a paragraph to read what 14:05:33	21 explaining fiber carcinogenicity. Do you see that? 14:08:21
22 I said. 14:05:35	22 A. Yeah. 14:08:24
23 Q. Oh, fair enough. I'll strike that. 14:05:36	23 MR. SATTERLEY: Objection. Beyond the 14:08:24
24 So now I'm talking about the NIOSH 14:05:37	24 scope. 14:08:25
25 presentation in 2011. So I'll mark this as Exhibit 26. 14:05:39	25 BY MR. ASHBY: 14:08:26
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1 (Exhibit 26 was marked and 14:05:39	1 Q. And you also say here, Both erionite and 14:08:26
2 attached to the transcript.) 14:05:57	2 fibrous talc are thought to be biopersistent, yet one is 14:08:30
3 BY MR. ASHBY: 14:05:57	3 a powerful animal and human carcinogen and the other is 14:08:34
4 Q. Here you go. 14:06:02	4 not. 14:08:38
5 Do you recognize this as comments that 14:06:08	5 MR. SATTERLEY: Objection. Beyond the 14:08:38
6 were prepared by you and Dr. Nolan and Dr. Rubin? 14:06:10	6 scope. 14:08:41
7 A. Yes. 14:06:15	7 THE WITNESS: Correct. 14:08:41
8 Q. Were these -- 14:06:26	8 BY MR. ASHBY: 14:08:41
9 MR. SATTERLEY: Objection. Beyond the 14:06:27	9 Q. Is that correct? 14:08:42
10 scope. 14:06:28	10 A. Yes. 14:08:42
11 BY MR. ASHBY: 14:06:29	11 Q. You agree that cleavage fragments are not 14:08:43
12 Q. Were these comments prepared in response 14:06:30	12 asbestos and should not be counted, correct? 14:08:59
13 to the NIOSH -- 14:06:31	13 A. Yes. Of course. 14:09:01
14 A. Roadmap. 14:06:34	14 Q. And -- and you've -- you've written 14:09:02
15 Q. -- roadmap; is that right? 14:06:35	15 that -- actually, I'll strike that. 14:09:05
16 A. Yeah. 14:06:37	16 A. Yes. 14:09:09
17 Q. Okay. 14:06:37	17 Q. But you've published that, correct, 14:09:10
18 A. I'm sorry. I said yes. 14:06:42	18 that -- 14:09:13
19 Q. No. That's fine. It -- it's easy to do. 14:06:44	19 A. Yes. 14:09:13
20 And -- and in this document you wrote 14:06:47	20 Q. And you've testified under oath that 14:09:13
21 that, Morphology and biopersistence are not the keys to 14:06:50	21 cleavage fragments do not cause mesothelioma in humans? 14:09:18
22 explaining carcinogenesis. 14:06:52	22 MR. SATTERLEY: Objection. 14:09:22
23 MR. SATTERLEY: Let me -- wait -- wait a 14:06:53	23 THE WITNESS: Yes. 14:09:22
24 second. There's no page numbers on this. Where are you 14:06:54	24 MR. SATTERLEY: Beyond the scope. 14:09:22
25 going? I mean, what page are -- or where -- where -- 14:06:57	25 BY MR. ASHBY: 14:09:23
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1	Q. Correct?	14:09:24	1	MR. SATTERLEY: Objection. Over -- beyond	14:10:57
2	A. Correct.	14:09:24	2	the scope. Overly broad. Vague. Ambiguous. Compound.	14:10:59
3	Q. And you've written even to government	14:09:24	3	BY MR. ASHBY:	14:11:04
4	agencies that cleavage fragments are not biologically	14:09:27	4	Q. Okay. It -- I need to find that. I	14:11:24
5	important?	14:09:33	5	wanted to look back at your report from 2015 that we	14:11:26
6	MR. SATTERLEY: Objection. Beyond the	14:09:33	6	marked as Exhibit 19 just briefly.	14:11:30
7	scope.	14:09:35	7	In -- in -- in -- in Exhibit 19 you write,	14:11:41
8	THE WITNESS: Yes.	14:09:36	8	PLM is an important technique for distinguishing amongst	14:11:42
9	BY MR. ASHBY:	14:09:37	9	particles in a bulk powder and remains an effective way	14:11:46
10	Q. And the view that --	14:09:37	10	to determine --	14:11:50
11	A. Yes. Yes.	14:09:38	11	MR. SATTERLEY: Can you -- can you tell us	14:11:51
12	Q. Yeah. And -- and this view that cleavage	14:09:39	12	what page and what paragraph?	14:11:53
13	fragments do not cause mesothelioma is generally	14:09:42	13	MR. ASHBY: I think this is page 2.	14:11:53
14	accepted in the scientific community --	14:09:44	14	BY MR. ASHBY:	14:11:55
15	MR. SATTERLEY: Objection.	14:09:46	15	Q. Let -- let -- let me just ask you this:	14:11:56
16	BY MR. ASHBY:	14:09:46	16	Do -- do you agree PLM is an important technique for	14:11:58
17	Q. -- correct?	14:09:46	17	distinguishing amongst particles in a bulk powder and	14:12:01
18	MR. SATTERLEY: Beyond the scope.	14:09:47	18	remains an effective way to determine whether a sample	14:12:03
19	Foundation. Calls for expert opinion.	14:09:47	19	such as cosmetic talcum powder contains asbestos?	14:12:06
20	THE WITNESS: It depends. It depends on	14:09:50	20	A. The answer is yes --	14:12:09
21	which side of the fence you're sitting.	14:09:56	21	MR. SATTERLEY: Objection.	14:12:13
22	BY MR. ASHBY:	14:10:00	22	THE WITNESS: -- if the particle	14:12:14
23	Q. Now -- and so let me get some	14:10:00	23	population is of sufficient size. But the answer is	14:12:15
24	clarification on that. It -- when you were asked that	14:10:01	24	yes.	14:12:18
25	question in 2021 you said: There's still some argument	14:10:04	25	MR. SATTERLEY: Objection. Beyond the	14:12:19
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1	as some argue against science and believe that cleavage	14:10:09	1	scope.	14:12:22
2	fragments might also cause mesothelioma. Is that what	14:10:13	2	BY MR. ASHBY:	14:12:22
3	you're referring to?	14:10:16	3	Q. All right. Do you read that analysis of a	14:12:33
4	A. Yes.	14:10:17	4	single isolated particle may not permit a definitive	14:12:34
5	MR. SATTERLEY: Objection. Improper	14:10:18	5	identification of the particle as asbestos, especially	14:12:37
6	impeachment, cross-examination.	14:10:19	6	of the source -- especially if the source material is	14:12:40
7	BY MR. ASHBY:	14:10:26	7	uncharacterized or unknown?	14:12:44
8	Q. All right. And these are all statements	14:10:27	8	A. That's generally yes; however, there are	14:12:46
9	that you have made to regulatory agencies and in the	14:10:31	9	methods of determining the surfaces expressed by the	14:12:51
10	public literature -- the published literature?	14:10:36	10	particle as to whether they are surfaces separated by	14:12:58
11	MR. SATTERLEY: Objection. Objection.	14:10:37	11	cleavage, which would make it a fragment, or surfaces of	14:13:04
12	Overly broad.	14:10:38	12	the particle that are related to other -- other	14:13:09
13	BY MR. ASHBY:	14:10:38	13	mineralogical mechanisms like twinning or intergrowth.	14:13:13
14	Q. Correct?	14:10:40	14	So it's -- it comes with a certain number of qualifiers.	14:13:20
15	MR. SATTERLEY: Oh, go ahead. Finish.	14:10:41	15	Q. Yeah.	14:13:20
16	You finished with your question?	14:10:41	16	A. But the basic statement is it depends.	14:13:25
17	MR. ASHBY: All right. Let me -- let me	14:10:43	17	Q. Right. Well, you agree that the	14:13:29
18	say it again.	14:10:44	18	identification of asbestos depends on the environment in	14:13:32
19	BY MR. ASHBY:	14:10:45	19	context. So if you're dealing with like a workplace	14:13:37
20	Q. And -- and these -- these are all	14:10:45	20	sample, for -- for example, you may have some	14:13:44
21	statements with respect to cleavage fragments that	14:10:47	21	presumptive indication you're dealing with asbestos, but	14:13:45
22	you've given to federal agencies and in the published	14:10:51	22	if you're in another environment and you see an	14:13:48
23	literature, correct?	14:10:54	23	elongated particle there's no proof that you're looking	14:13:52
24	MR. SATTERLEY: Ob --	14:10:54	24	at an asbestos fiber?	14:13:54
25	THE WITNESS: Absolutely.	14:10:55	25	MR. SATTERLEY: Object --	14:13:54
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1	THE WITNESS: I agree.	14:13:56	1	A. Yes. Of course.	14:17:00
2	MR. SATTERLEY: Objection. It's vague,	14:13:57	2	Q. And your colleague, Dr. Nicholson,	14:17:01
3	ambiguous.	14:13:58	3	reported extensively on ambient levels throughout the	14:17:06
4	BY MR. ASHBY:	14:13:59	4	United States; is that true?	14:17:10
5	Q. So in situations like that where you'd see	14:13:59	5	A. Yes. His 50-city study for EPA, correct.	14:17:11
6	a single particle by TEM, is it good protocol to	14:14:02	6	Q. Okay. So -- so who was -- actually,	14:17:17
7	follow -- to also do PLM on the sample?	14:14:12	7	strike that.	14:17:19
8	MR. SATTERLEY: Objection. Beyond the	14:14:15	8	Well, Dr. Nicholson I don't think was in	14:17:20
9	scope.	14:14:18	9	any -- any of those pictures that we saw?	14:17:21
10	THE WITNESS: Maybe you can't. Maybe the	14:14:18	10	A. No.	14:17:21
11	particles are too small.	14:14:20	11	Q. Was he?	14:17:24
12	BY MR. ASHBY:	14:14:22	12	Okay. And who was Dr. Nicholson?	14:17:25
13	Q. All right. You've said that only using	14:14:29	13	A. Bill -- let's see. I guess Bill was --	14:17:26
14	analytical electron microscopy to identify asbestos in a	14:14:31	14	joined our group in 1967 perhaps. He was a -- his	14:17:34
15	product is an error because it tells you something about	14:14:36	15	background was physics. He did some work in solid-state	14:17:44
16	a subpopulation of particles but it doesn't tell you	14:14:39	16	physics. He did some work over in one of the computer	14:17:50
17	enough about the entire population of particles?	14:14:41	17	labs around Columbia. And he lived in the same town as	14:17:55
18	A. This is true.	14:14:46	18	Irving Selikoff, and so he had interaction with Irv, and	14:18:01
19	Q. And you've also said that electron	14:14:48	19	Irv hired him, so...	14:18:07
20	microscopy provides information, but more	14:14:54	20	Q. Do you have in mind that -- the ambient	14:18:09
21	diagnostics are required to confirm the presence or	14:14:56	21	levels or concentrations of asbestos that Dr. Nicholson	14:18:13
22	absence of asbestos?	14:15:00	22	reported in -- in the 1970s?	14:18:17
23	A. I think that is correct.	14:15:01	23	A. Do I have what, a knowledge of them?	14:18:21
24	Q. So in -- in the 1970s -- or my	14:15:02	24	Q. Yeah. Do you have knowledge of them,	14:18:23
25	understanding is that your lab considered three to five	14:15:16	25	sure.	14:18:26
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1	chrysotile fibers per grid to be background when	14:15:19	1	A. Yes.	14:18:27
2	examining talc by TEM?	14:15:22	2	MR. SATTERLEY: Objection. Beyond the	14:18:27
3	A. That was -- that statement was made before	14:15:25	3	scope.	14:18:28
4	we installed laminar flow hoods with HEPA filters,	14:15:33	4	MR. ASHBY: All right.	14:18:28
5	high-efficiency particulate absolute filters, which	14:15:42	5	THE WITNESS: Of course.	14:18:28
6	enabled us to prepare air samples without fear of	14:15:48	6	BY MR. ASHBY:	14:18:29
7	contamination with ambient particles. So that statement	14:15:53	7	Q. Do you have in mind what the numbers were	14:18:29
8	is -- may be true before the installation of these hoods	14:16:01	8	that he was reporting in the 1970s for a place like New	14:18:32
9	but not true following.	14:16:06	9	York, for example?	14:18:36
10	Q. Okay.	14:16:08	10	A. The issue was in his 50-city study for the	14:18:36
11	A. So the number of particles per grid	14:16:09	11	Environmental Protection Agency he did not report fibers	14:18:39
12	opening, which is background, or the number of particles	14:16:11	12	per ML or fibers per cubic meter of air. He reported	14:18:47
13	which is signal is -- is related to when these devices	14:16:15	13	the mass, the weight percentage, of fiber per volume of	14:18:53
14	were installed and the samples prepared.	14:16:24	14	air, nanograms per cubic whatever, per cubic meter,	14:19:01
15	Q. Right. And I think you're -- when you're	14:16:27	15	nanograms per ML, and so on.	14:19:08
16	saying you're -- the -- the statement that we're	14:16:33	16	Q. Are you familiar with any of the reports	14:19:11
17	referring to, there was a statement in Exhibit 23 about	14:16:34	17	about the concentrations of ambient asbestos in New York	14:19:15
18	the 3 to 5 --	14:16:37	18	City in the 1970s?	14:19:20
19	A. Yes.	14:16:39	19	A. Yes, of course. I --	14:19:22
20	Q. -- fibers. Okay.	14:16:39	20	MR. SATTERLEY: Objection.	14:19:24
21	A. That could be early on, yeah.	14:16:40	21	THE WITNESS: I published with Irv	14:19:25
22	Q. And you mentioned a word, ambient, that we	14:16:41	22	Selikoff and Nicholson on the asbestos levels following	14:19:28
23	haven't talked about yet. In -- in the 1970s is there	14:16:51	23	spray application of rising steel structures in New York	14:19:32
24	an ambient level of chrysotile asbestos that exists in	14:16:55	24	City. And the spray operations were described, the	14:19:38
25	New York City?	14:16:59	25	release of the insulating material that was applied to	14:19:44
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1 steel structures, and the overspray which entered the 14:19:54 2 air of New York City. We described Manhattan levels, 14:20:00 3 Bronx levels, Queens, Brooklyn, Staten Island, per -- 14:20:07 4 per borough. And the source material was from the 14:20:13 5 construction of high steel structures. 14:20:19 6 BY MR. ASHBY: 14:20:19 7 Q. Well -- 14:20:19 8 A. That would be the source of the -- of -- 14:20:24 9 of the fiber in air. And, yes -- and those values were 14:20:27 10 published. 14:20:31 11 Q. Is -- okay. Is -- is there a number you 14:20:32 12 would cite in fibers per cc for whatever the average 14:20:34 13 concentration of ambient level asbestos is in New York 14:20:38 14 City in the 1970s? 14:20:42 15 A. No, but it was -- the further out from the 14:20:43 16 epicenter, the source -- the further out from the source 14:20:48 17 of these operations the lower the values became. But 14:20:53 18 can I cite them directly now? No. I -- I'd have to 14:21:00 19 look in -- 14:21:07 20 Q. That's -- that's fair. 14:21:07 21 A. -- my files. 14:21:09 22 Q. That's fair. I just didn't know if you 14:21:09 23 had something off the top of your head. That's fine. 14:21:12 24 Thank you, Dr. Langer. 14:21:15 25 Are you familiar with the NIOSH 1976 14:21:16 Page 190	1 Q. Yeah. And I'm just focused on the ambient 14:22:18 2 piece of it, so not -- not the workplace standards. 14:22:20 3 A. Oh. Yes. 14:22:23 4 Q. So let -- so let me just ask you this: 14:22:24 5 It -- does it sound right to you if I tell you that 14:22:26 6 NIOSH was reporting, based on Dr. Nicholson's work, 14:22:30 7 ambient levels at peak levels of 0.03 fibers per cc? 14:22:34 8 MR. SATTERLEY: Objection. Beyond the 14:22:40 9 scope. Foundation. 14:22:41 10 THE WITNESS: 0. -- .03 fibers? 14:22:44 11 BY MR. ASHBY: 14:22:52 12 Q. Uh-huh. 14:22:52 13 A. Based on Nicholson's data? 14:22:53 14 Q. Yeah. 14:22:55 15 A. Oh, boy. There's a problem with 14:22:57 16 Nicholson's data. The original data coming out of the 14:22:58 17 50-city study was mass data, that is nanograms per cubic 14:23:01 18 meter. Now, you could assume a certain morphology for 14:23:11 19 chrysotile, and using the density of the mineral you can 14:23:18 20 arrive at some estimate of fibers per ML or fibers per 14:23:22 21 cc. So that value, 0.03 fibers per ML, is -- if I was 14:23:28 22 generous of spirit I would say an estimate or -- 14:23:37 23 Q. Okay. 14:23:40 24 A. -- otherwise it would be a guess. 14:23:41 25 Q. Okay. That's fair. 14:23:43 Page 192
1 recommended criteria document? 14:21:19 2 MR. SATTERLEY: Objection. Beyond the 14:21:23 3 scope. 14:21:24 4 THE WITNESS: What is the recommended 14:21:25 5 criteria of? 14:21:26 6 BY MR. ASHBY: 14:21:28 7 Q. The -- the revised recommended criteria 14:21:28 8 for an asbestos standard in 1976 that was -- 14:21:30 9 A. Sure. Of course. 14:21:33 10 Q. Okay. The -- in that document there -- 14:21:34 11 NIOSH cited much of Dr. Nicholson's work in regards to 14:21:38 12 the ambient levels, if you recall? 14:21:42 13 A. Yes. How foolish of them. 14:21:45 14 The -- the levels. The levels -- the 14:21:48 15 original standard, fiber standard, in the United States 14:21:50 16 was 12 fibers per cc, 1970. The emergency standard in 14:21:53 17 '72, five fibers. 14:22:02 18 Q. The -- 14:22:02 19 A. The standard in '76 was two fibers. It 14:22:02 20 went down to .2 in '86, then up to '93 0.1, which it is 14:22:05 21 now. 14:22:15 22 Q. Yeah. And I'm just -- 14:22:15 23 MR. SATTERLEY: Let me just -- let me just 14:22:15 24 place a general objection. Beyond the scope. 14:22:16 25 BY MR. ASHBY: 14:22:18 Page 191	1 Do -- do you -- maybe this is the better 14:23:44 2 question: Do you recall the -- in the NIOSH 1976 14:23:46 3 document that when citing the ambient levels across the 14:23:50 4 United States they said the peak levels could get as 14:23:54 5 high as 0.03 fibers per cc? 14:23:57 6 MR. SATTERLEY: Objection. Beyond the 14:24:00 7 scope. 14:24:01 8 THE WITNESS: It sounds -- 14:24:02 9 (Speaking simultaneously) 10 MR. SATTERLEY: Foundation. Speculation. 11 THE WITNESS: Yeah. Okay. 12 BY MR. ASHBY: 13 Q. Yeah. I mean, does that -- 14 MR. SATTERLEY: Let me place my objection, 14:24:04 15 Matt. You've interrupted me. 14:24:04 16 Did you get my objection? 14:24:04 17 THE REPORTER: I got yours, but I couldn't 14:24:13 18 get the answer. 14:24:15 19 MR. SATTERLEY: Okay. 14:24:15 20 THE REPORTER: Can you answer again, 14:24:15 21 please? 14:24:17 22 BY MR. ASHBY: 14:24:17 23 Q. So -- what -- what was my question? 14:24:18 24 All right. So if -- if NIOSH stated in 14:24:20 25 1976 in that recommended criteria document that peak 14:24:23 Page 193

1 levels for ambient asbestos in the United States could 14:24:28	1 1970; is that fair? 14:27:38
2 get as high as 0.03 fibers per cc in the 1970s, that is 14:24:30	2 A. Yeah. 14:27:40
3 something that you believe could be accurate? 14:24:41	3 Q. Okay. And you mentioned the -- the four 14:27:46
4 MR. SATTERLEY: Let me -- 14:24:43	4 labs in 1969. At some point -- I'll strike that. 14:27:48
5 BY MR. ASHBY: 14:24:43	5 You -- you mentioned the four labs in 14:27:54
6 Q. -- correct? 14:24:43	6 1969, one of them being Professor Pooley's lab? 14:27:55
7 MR. SATTERLEY: -- object. Beyond the 14:24:45	7 A. Yeah. 14:27:58
8 scope. Calls for speculation. Foundation. 14:24:46	8 Q. At some point in the 1970s, though, Walter 14:27:59
9 THE WITNESS: It could be an estimate, 14:24:51	9 McCrone starts an -- an electron microscopy group that's 14:28:02
10 yes. 14:24:54	10 led by Ian Stewart, correct? 14:28:07
11 BY MR. ASHBY: 14:24:55	11 A. Yeah. 14:28:09
12 Q. Okay. We touched a little bit on the 14:24:56	12 Q. Okay. 14:28:09
13 evolution of the microscopes, the electron microscopes. 14:25:01	13 A. Of course, we're -- we're dealing with the 14:28:11
14 Transmission or analytical electron 14:25:09	14 early rise -- the contamination of Lake Superior with 14:28:13
15 microscopy wasn't a standard method in the early 1970s 14:25:1	15 amphibole gang minerals, the processing of Taconite 14:28:21
16 to detect for the presence or absence of asbestos in 14:25:16	16 ores, O-R-E-S -- the processing of taconite ores, and 14:28:28
17 a -- in talc; is that true? 14:25:20	17 the rise of the U.S. Steel microscopy lab. 14:28:33
18 A. It was not a routine technique used by 14:25:22	18 And three individuals who scattered -- the 14:28:38
19 numerous laboratories. In 1969 there were four 14:25:31	19 three individuals: R. J. Lee, Scott Lally, and the best 14:28:46
20 laboratories established globally that assayed certain 14:25:40	20 microscopist of all, Gordon Nord who went to the USGS, 14:28:54
21 workplaces, certain environments, for fiber, four in the 14:25:47	21 who did really some excellent work on selected area 14:29:04
22 world: Pooley's laboratory, our laboratory in New York, 14:25:54	22 diffraction studies. But U.S. Steel as a corporate 14:29:08
23 Morris Skikne, S-K-I-K-N-E -- Morris Skikne, South 14:26:01	23 entity became very interested in the analysis of 14:29:10
24 Africa, the Ministry of Mines. He had a microscopy 14:26:08	24 microparticles by analytical electron microscopy. 14:29:17
25 unit. 14:26:11	25 So when you start to talk about McCrone, 14:29:24
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1 Q. Uh-huh. 14:26:11	1 he was a consulting guy. He was a chemical 14:29:28
2 A. And Patrick Sabastien who was in Jean 14:26:12	2 microscopist. And so he consulted with many industries. 14:29:32
3 Bignon's laboratory in Paris at that time before he went 14:26:19	3 He was known. 14:29:38
4 to Canada. 14:26:21	4 U.S. Steel -- they did work for the steel 14:29:41
5 So there are four laboratories using 14:26:23	5 manufacturers and then expanded out into asbestos in 14:29:44
6 electron beam instruments, TEM, for the analysis of 14:26:25	6 different ways. 14:29:49
7 fibers in the workplace, in the ambient air, so on. 14:26:32	7 And then there was a birth -- everybody 14:29:51
8 Q. Uh-huh. 14:26:35	8 was interested in asbestos in school buildings. And you 14:29:56
9 A. So it was not routine. There weren't 14:26:36	9 took the asbestos in school buildings. You had to 14:30:02
10 enough microscopy labs. There weren't enough technical 14:26:39	10 inspect. You had to do removal. You had to develop a 14:30:05
11 experts to do things like diffraction or interpret data 14:26:45	11 cadre of people in the United States who knew what in 14:30:12
12 or knew about chemistry or knew about the UICC standard 14:26:50	12 the hell they were looking at and knew what they were 14:30:14
13 asbestos minerals and their characterization. So it was 14:26:57	13 doing. And this -- this was the birth of an entire 14:30:17
14 few and far between. 14:27:02	14 industry. 14:30:24
15 Q. Uh-huh. Right. Okay. So you -- you 14:27:04	15 Q. Uh-huh. 14:30:24
16 anticipated my next question. 14:27:07	16 A. So that's the mid 1970s. 14:30:25
17 The instrument itself, the electron 14:27:12	17 Q. Yeah. I think you even went into the '80s 14:30:27
18 microscope, wasn't widely available, and -- and even if 14:27:13	18 with a hero there. 14:30:32
19 it was, there weren't a lot of people like you that knew 14:27:16	19 A. Of course. 14:30:35
20 how to use it to analyze specifically for asbestos in a 14:27:21	20 Q. So that -- but that's -- those are all 14:30:35
21 matrix? 14:27:23	21 really interesting points, and it -- it makes me think 14:30:35
22 A. Absolutely. 14:27:24	22 of this when you say that: Analysts that use electron 14:30:38
23 Q. Okay. And what you said previously was it 14:27:25	23 microscopes are developing expertise in the 1970s on how 14:30:45
24 wasn't routine by any stretch of the imagination to use 14:27:29	24 to identify asbestos, the presence or -- or lack thereof 14:30:49
25 TM to analyze talc in the late 1960s and very early into 14:27:33	25 in a -- a sample or assay, correct? 14:30:52
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1 A. Yes. 14:30:54	1 Q. But not everybody in the industry was 14:34:01
2 Q. Okay. And in the 1970s -- in the early 14:30:55	2 doing that; is that right? 14:34:02
3 1970s the -- the -- the standard at the time in terms of 14:31:01	3 MR. SATTERLEY: Objection. Foundation. 14:34:04
4 analyzing consumer talcs that's being done by the 14:31:05	4 Calls for speculation. 14:34:05
5 industry is not using TEM; is that correct? 14:31:09	5 THE WITNESS: Not to my knowledge. 14:34:07
6 MR. SATTERLEY: Objection. Foundation. 14:31:14	6 BY MR. ASHBY: 14:34:09
7 Calls for speculation. Beyond the scope. 14:31:15	7 Q. You're familiar with a Dr. James Millette? 14:34:11
8 THE WITNESS: Let's talk about a document 14:31:19	8 A. Yes, of course. 14:34:14
9 I'm sure you are familiar with. 14:31:20	9 Q. I'm sorry. 14:34:16
10 BY MR. ASHBY: 14:31:22	10 And -- and you're aware that Dr. James 14:34:19
11 Q. Oh, I don't know about that. 14:31:23	11 Millette ran the electron microscope lab for McCrone 14:34:21
12 A. You're familiar with this. You know that 14:31:24	12 in -- sometime in the '80s? 14:34:31
13 there's a group out in Colorado, let's say Dr. Kraus, 14:31:26	13 A. I thought Millette was NIOSH. 14:34:32
14 whose expertise is x-ray diffraction assay. He was 14:31:33	14 Q. He -- he -- he was. And then he went to 14:34:35
15 critical of our report. 14:31:38	15 work for McCrone. 14:34:38
16 These folks work for mineral industries, 14:31:42	16 A. Well, that's possible, but I'm not -- I 14:34:39
17 mineral commodities of very -- and their focus was on 14:31:50	17 didn't follow his career. 14:34:42
18 techniques like x-ray diffraction. They occasionally 14:31:54	18 Q. Okay. That's fine. 14:34:44
19 use scanning electron microscopy. They use polarized 14:31:59	19 Now, you -- you -- you know Dr. Millette 14:34:45
20 light microscopy. They use other techniques found in 14:32:01	20 to be a competent electron microscopist, although you 14:34:46
21 European pneumoconiosis laboratories; differential 14:32:05	21 may not always agree with him? 14:34:52
22 thermal analysis, infrared assays, infrared 14:32:13	22 A. Well, that's another issue. Yes. 14:34:54
23 spectroscopy. I mean, all kinds of interesting 14:32:18	23 Q. He is a reputable micro -- microscopist, 14:34:56
24 techniques. 14:32:21	24 correct? 14:34:58
25 We used ones that focused on minerals and 14:32:24	25 MR. SATTERLEY: Objection. Beyond the 14:35:00
Page 198	Page 200
1 particles that were colloidal size or less. Colloids 14:32:27	1 scope. 14:35:01
2 were particles -- let's say they had, well, 10 microns 14:32:33	2 THE WITNESS: Yes. 14:35:01
3 in greatest dimension. And, of course, asbestos is far, 14:32:38	3 MR. ASHBY: All right. I think the last 14:35:09
4 far less. 14:32:41	4 document I wanted to look at was this one. This will be 14:35:11
5 Q. Uh-huh. 14:32:43	5 Exhibit 27. 14:35:25
6 A. So you're -- you're dealing with an 14:32:43	6 (Exhibit 27 was marked and 14:35:26
7 interesting situation. You had to have been there to -- 14:32:48	7 attached to the transcript.) 14:35:28
8 to recognize the fact that these -- these laboratories 14:32:52	8 BY MR. ASHBY: 14:35:28
9 grew like topsy. They just sprung. And they were 14:32:56	9 Q. Why don't you tell me if you recognize 14:35:29
10 driven by the profit motive, whether it's Andy Longo 14:33:04	10 that document? 14:35:31
11 down in -- Bill Longo down in Florida or the RJ Lee 14:33:07	11 A. Oh. Yes. This is the -- yes, of 14:35:44
12 Group in Pennsylvania. They worked for various 14:33:15	12 course -- El Dorado Hills. He was correct. And Wiley 14:35:47
13 companies and industries and provided interesting 14:33:20	13 was correct. Yeah. Distinguishing cleavage fragments 14:35:53
14 analytical data. But those were different times, 14:33:24	14 from asbestos. Yeah. Okay. 14:36:02
15 weren't they? 14:33:32	15 Q. Okay. You -- you recognize this as a 14:36:07
16 MS. ASHBY: Yeah. I'll -- I'll move to 14:33:33	16 document that you drafted? 14:36:08
17 strike the nonresponsive portions from the question. 14:33:35	17 A. Yes. 14:36:09
18 BY MR. ASHBY: 14:33:35	18 Q. And you stand by this letter that you 14:36:10
19 Q. So the -- my question really was more 14:33:38	19 wrote? 14:36:14
20 about what's going on in the 1970s. And if a company 14:33:42	20 A. Yes. 14:36:15
21 that wants to look at its talc and determine whether or 14:33:50	21 Q. So this -- 14:36:19
22 not it could have asbestos in it, you'd agree a good 14:33:53	22 MR. SATTERLEY: Objection. Beyond the 14:36:19
23 thing would -- to do would be to send it out for a TEM 14:33:57	23 scope. 14:36:21
24 analysis? 14:33:59	24 BY MR. ASHBY: 14:36:22
25 A. Absolutely. 14:34:00	25 Q. This -- this letter -- well, let -- let me 14:36:24
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1 see if I can paraphrase. 14:36:25	1 that word? 14:38:05
2 This -- this letter is a letter that you 14:36:27	2 A. Gneis -- gneisses. 14:38:06
3 wrote in response to some EPA analysis that was being 14:36:29	3 Q. Gneisses? 14:38:06
4 done in -- in El Dorado Hills in which the EPA was 14:36:33	4 A. A schist. 14:38:08
5 finding these really high levels of tremolite asbestos; 14:36:38	5 Q. And con -- or contact metamorphic 14:38:10
6 is that fair? 14:36:40	6 terrains, metamorphic limestone, and is found as 14:38:13
7 A. Correct. 14:36:42	7 replacement minerals in, for example, pyroxenes? 14:38:16
8 MR. SATTERLEY: Objection. Beyond the 14:36:44	8 A. Pyroxenes, yes. 14:38:19
9 scope. 14:36:45	9 Q. Pyroxenes. Okay. 14:38:21
10 BY MR. ASHBY: 14:36:46	10 And you say it is also ubiquitous. 14:38:22
11 Q. And R. J. Lee was asked to take a look at 14:36:46	11 What -- what do you mean by that, it is also ubiquitous? 14:38:26
12 some of those same samples and determine if they could 14:36:49	12 A. In some terrains, like in metamorphic 14:38:29
13 duplicate the findings of the EPA, more or less? 14:36:52	13 terrains or areas in which you have metamorphosed 14:38:32
14 A. Yeah. 14:36:55	14 ultramafic rock, it is found commonly, it's found all 14:38:38
15 MR. SATTERLEY: Objection. Beyond the 14:36:56	15 over, so it's ubiquitous. 14:38:42
16 scope. 14:36:57	16 Q. And then you go on, Their presence, 14:38:44
17 BY MR. ASHBY: 14:36:58	17 meaning the tremolite-actinolite, dis -- distinction and 14:38:46
18 Q. And RJ Lee Group determined that some of 14:36:58	18 identification is but one important issue. Their 14:38:51
19 these things, these particles that the EPA was calling 14:37:01	19 morphological habit is another. 14:38:56
20 asbestos, wasn't really asbestos because it was cleavage 14:37:04	20 Do you -- 14:38:57
21 fragment? 14:37:08	21 A. Yes. 14:38:57
22 A. Correct. 14:37:08	22 Q. -- agree with that? 14:38:58
23 MR. SATTERLEY: Objection. Beyond the 14:37:09	23 A. Yes. 14:38:59
24 scope. 14:37:10	24 MR. SATTERLEY: Objection. Beyond the 14:38:59
25 BY MR. ASHBY: 14:37:11	25 scope. 14:39:01
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1 Q. And so you drafted this letter, which was 14:37:11	1 BY MR. ASHBY: 14:39:01
2 a -- a letter basically in -- in support of RJ Lee but 14:37:13	2 Q. And -- and does this have to do with the 14:39:01
3 really explaining your views on what you thought the EPA 14:37:18	3 fact that ul -- the tremolite can be ubiquitous, which 14:39:03
4 findings represented; is that fair? 14:37:21	4 to me means -- 14:39:08
5 A. Yes. 14:37:23	5 A. One of the common minerals, yes. 14:39:09
6 MR. SATTERLEY: Objection. Beyond the 14:37:24	6 Q. Yes. So one of these common minerals that 14:39:11
7 scope, and compound. 14:37:25	7 can be in a lot of places. 14:39:14
8 BY MR. ASHBY: 14:37:26	8 The precise morphological habit that is 14:39:15
9 Q. And I'm looking at the first paragraph. 14:37:26	9 asbestiform, that is tremolite, is not ubiquitous? 14:39:21
10 In the first paragraph you say, The RJ Lee Group 14:37:28	10 A. Rare. Yes. 14:39:24
11 critique was detailed, couched in solid mineralogical 14:37:32	11 MR. SATTERLEY: Let me object to the form 14:39:25
12 science and one that I was in -- in agreement with. 14:37:36	12 of the question, compound, and the commentary before the 14:39:27
13 MR. SATTERLEY: Objection. Beyond the 14:37:38	13 question. 14:39:30
14 scope. 14:37:38	14 BY MR. ASHBY: 14:39:31
15 THE WITNESS: Yes. 14:37:40	15 Q. Okay. So you would agree with me that the 14:39:32
16 BY MR. ASHBY: 14:37:40	16 morphological habit of chrysotile that is asbestiform 14:39:34
17 Q. You agree with that, don't you? 14:37:40	17 is -- 14:39:37
18 A. Yes, I do. I did. 14:37:42	18 A. Tremolite. 14:39:37
19 Q. And if I -- I'm just going to skip ahead 14:37:46	19 Q. Oh, shoot. Yeah. You're right. Sorry. 14:39:38
20 to the next page, to page 2. I'm looking at the top 14:37:48	20 Let me start over. Sharper than me, obviously. 14:39:41
21 paragraph. And I -- there's an interesting discussion 14:37:51	21 So would you agree with me that the 14:39:48
22 you have about explaining tremolite and how it can be 14:37:53	22 tremolite, although it might be ubiquitous, the 14:39:53
23 found. 14:37:58	23 particular habit that is asbestiform isn't rare? 14:39:57
24 And what you write is, 14:37:59	24 A. That's correct. 14:40:05
25 Tremolite-actinolite is found in schists -- and what's 14:38:02	25 Q. And you go on to say in the next 14:40:05
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1 paragraph, The EPA-EDE -- I'm sorry. Start over. 14:40:14	1 MR. SATTERLEY: Objection. Beyond the 14:42:11
2 You say, The EPA-EDH study should have 14:40:17	2 scope. 14:42:12
3 incorporated among the discussion and results statements 14:40:20	3 THE WITNESS: Yes. 14:42:12
4 regarding their data mean -- mean in terms of hazard or 14:40:23	4 MR. SATTERLEY: Beyond the scope. 14:42:12
5 risk to various segments of the El Dorado population. 14:40:27	5 BY MR. ASHBY: 14:42:12
6 All right. 14:40:31	6 Q. And -- and if I understand what's being 14:42:12
7 MR. SATTERLEY: Objection. Beyond the 14:40:31	7 said there is that something can start in this habit, 14:42:20
8 scope. 14:40:32	8 this massive habit, tremolite can start in a massive 14:42:23
9 MR. ASHBY: Okay. 14:40:33	9 habit, and it can be crushed, like milled, even in 14:42:28
10 THE WITNESS: Yes. 14:40:33	10 manufacture, and that can create many little cleaved 14:42:30
11 BY MR. ASHBY: 14:40:34	11 elongate particles that -- that resemble asbestos? 14:42:33
12 Q. And at the bottom of that same paragraph 14:40:43	12 A. Correct. 14:42:33
13 you say, The EPA should follow the existing policy of 14:40:45	13 MR. SATTERLEY: Move to -- 14:42:38
14 OSHA and not be concerned with cleavage fragments. 14:40:48	14 THE WITNESS: Correct. 14:42:38
15 Do you see that? 14:40:51	15 MR. SATTERLEY: Oh, excuse me. Objection. 14:42:41
16 MR. SATTERLEY: Objection. Beyond the 14:40:52	16 Beyond the scope. Calls for expert opinion. And 14:42:42
17 scope. Expert opinion. 14:40:53	17 mischaracterizes the document. 14:42:44
18 THE WITNESS: Yes, I agree. 14:40:53	18 BY MR. ASHBY: 14:42:46
19 BY MR. ASHBY: 14:40:53	19 Q. But even though the -- those -- 14:42:46
20 Q. You agree with that? 14:40:56	20 MR. SATTERLEY: Let him answer the 14:42:48
21 And I -- and -- and when you're 14:40:58	21 question. 14:42:49
22 referencing OSHA there, are you referencing the fact 14:40:59	22 MR. ASHBY: He said correct. 14:42:49
23 that OSHA had looked at this idea of whether or not 14:41:01	23 THE WITNESS: Yes. 14:42:49
24 tremolite cleavage fragments or amphibole cleavage 14:41:06	24 MR. SATTERLEY: Oh. Okay. 14:42:49
25 fragments could cause disease and -- and OSHA 14:41:11	25 BY MR. ASHBY: 14:42:49
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1 specifically determined that they could not? 14:41:13	1 Q. But even though those particles may 14:42:50
2 MR. SATTERLEY: Objection. Beyond the 14:41:15	2 resemble asbestos, these cleaved elongate particles from 14:42:52
3 scope. 14:41:16	3 tremolite, they are not asbestos? 14:42:55
4 THE WITNESS: In fact, they had a major 14:41:16	4 A. Yes. 14:42:57
5 hearing with that. Yes, that's correct. 14:41:19	5 MR. SATTERLEY: Objection. Beyond the 14:42:57
6 BY MR. ASHBY: 14:41:24	6 scope. Calls for expert opinion. 14:42:59
7 Q. And you agreed with OSHA at that major 14:41:27	7 THE WITNESS: Yes. 14:43:02
8 hearing, and you agree with that now, correct? 14:41:29	8 BY MR. ASHBY: 14:43:04
9 MR. SATTERLEY: Objection. Beyond the 14:41:31	9 Q. And if someone's not careful -- well, 14:43:05
10 scope. 14:41:33	10 if -- I'll -- I'll just ask it this way: And you say, 14:43:08
11 THE WITNESS: Yeah. I testified at that 14:41:34	11 Every effort must be made to distinguish between the 14:43:14
12 hearing. Yes. 14:41:35	12 two. 14:43:17
13 BY MR. ASHBY: 14:41:36	13 Do you see that? 14:43:17
14 Q. I understand. 14:41:37	14 A. Yes, of course. 14:43:18
15 And then the first paragraph on page 3 14:41:38	15 Q. And you agree with that? 14:43:19
16 says -- I'm in -- I'm kind of in the middle of it. It 14:41:40	16 A. Yes. 14:43:20
17 starts with tremolite asbestos. 14:41:48	17 MR. SATTERLEY: Objection. Beyond the 14:43:23
18 A. Okay. 14:41:50	18 scope. 14:43:24
19 Q. Tremolite asbestos does exist in El Dorado 14:41:50	19 BY MR. ASHBY: 14:43:24
20 County. However, non-asbestiform tremolite and other 14:41:52	20 Q. And the -- the -- the reason for that is 14:43:25
21 amphiboles exist as well, and their morphological habits 14:41:58	21 that if you don't distinguish between the two you -- the 14:43:26
22 form prismatic cleavage fragments when crushed. 14:42:02	22 analysts might indicate a false positive, meaning a 14:43:30
23 So that -- okay. So did you write that? 14:42:06	23 finding of asbestos even though it's not? 14:43:34
24 A. Yes. 14:42:09	24 MR. SATTERLEY: Beyond the scope. 14:43:36
25 Q. And you agree with that? 14:42:09	25 THE WITNESS: Yes. 14:43:38
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1 BY MR. ASHBY: 14:43:39	1 studies exaggerate fiber release and are flawed? 14:45:33
2 Q. And it was your conclusion that the EPA 14:43:42	2 MR. SATTERLEY: Objection. Beyond the 14:45:36
3 made a critical flaw in their analysis resulting in an 14:43:45	3 scope. 14:45:37
4 overwhelming number of false-positive identifications of 14:43:49	4 THE WITNESS: I found those videos -- I 14:45:37
5 asbestos? 14:43:54	5 found those videos -- what's the phrase you guys use? I 14:45:42
6 MR. SATTERLEY: Objection. Beyond the 14:43:54	6 find that they are -- they are prejudicial rather than 14:45:48
7 scope. 14:43:55	7 probative. 14:45:57
8 THE WITNESS: I agree. 14:43:55	8 BY MR. ASHBY: 14:45:58
9 BY MR. ASHBY: 14:43:56	9 Q. Uh-huh. Meaning -- well, let me see if I 14:46:00
10 Q. And the reason for this flaw was they were 14:43:57	10 can put words in your mouth. 14:46:04
11 counting these cleaved tremolite fragments as asbestos 14:43:59	11 A. Well, I'm -- 14:46:04
12 particles? 14:44:02	12 Q. And then you -- you agree with me or 14:46:05
13 MR. SATTERLEY: Beyond the scope. 14:44:03	13 disagree with me. 14:46:07
14 THE WITNESS: Yeah. There may have been 14:44:04	14 I think that means you find them to be 14:46:08
15 not only tremolite but other calcic amphiboles. 14:44:05	15 something that are intended to evoke emotion and rely 14:46:10
16 BY MR. ASHBY: 14:44:17	16 less on science? 14:46:15
17 Q. And at the very last sentence you write, I 14:44:28	17 MR. SATTERLEY: Objection. Beyond the 14:46:17
18 believe it offered -- and what you're talking about 14:44:31	18 scope. Foundation. Calls for legal opinion. 14:46:18
19 there, the it is R. J. Lee's criticism -- offered an 14:44:35	19 THE WITNESS: It is -- you mentioned the 14:46:21
20 honest effort to provide insight into the inherent 14:44:40	20 drywall studies. There is a dust generated. And he 14:46:27
21 complexities of the mineral issues discussed in the EDH 14:44:43	21 looks at this dust in a black box, an exposure chamber, 14:46:36
22 study. 14:44:47	22 with incident light so that the dust is exaggerated. 14:46:45
23 MR. SATTERLEY: Objection. Beyond the 14:44:47	23 But there it is, the dust, a cloud. But the jury looks 14:46:50
24 scope. 14:44:49	24 at that and says, Look at that asbestos cloud. But the 14:46:55
25 BY MR. ASHBY: 14:44:49	25 asbestos content of that dust cloud could have been only 14:47:03
Page 210	Page 212
1 Q. You agree with that, right? 14:44:50	1 1 percent or less, therefore it is prejudicial. But 14:47:07
2 A. Of course. 14:44:51	2 that's just the nature of that. 14:47:19
3 Q. You mentioned -- 14:44:51	3 Yeah, there's asbestos in the dust cloud, 14:47:21
4 MR. SATTERLEY: And let me also place an 14:44:54	4 but not as intense or dramatically concentrated as this 14:47:23
5 objection, improper opinion testimony. 14:44:58	5 video implies. 14:47:29
6 BY MR. ASHBY: 14:44:59	6 BY MR. ASHBY: 14:47:41
7 Q. Okay. You mentioned a minute ago William 14:44:59	7 Q. All right, Dr. Langer. You -- I'm not 14:47:52
8 Longo? 14:45:03	8 paying you for your testimony here today, correct? 14:47:54
9 A. Yes. 14:45:03	9 A. Correct. However, if you change your 14:47:56
10 Q. You're familiar with William Longo? 14:45:03	10 mind... 14:48:05
11 You -- well, I'll strike that. 14:45:06	11 Q. And -- and you came here today and gave 14:48:05
12 Are you familiar with William Longo? 14:45:08	12 your best and most -- most truthful account of your 14:48:07
13 A. Yes, of course. 14:45:09	13 experience in the 1970s, and the 1980s, and 1990s; is 14:48:10
14 MR. SATTERLEY: Beyond the scope. 14:45:11	14 that true? 14:48:14
15 BY MR. ASHBY: 14:45:13	15 A. I -- I think that's a fair representation. 14:48:15
16 Q. And -- and you're familiar with some of 14:45:14	16 MR. ASHBY: All right. I don't have any 14:48:16
17 his work in litigation, preparing reports that he calls 14:45:15	17 other further questions. 14:48:17
18 them work practice simulations? 14:45:20	18 MR. SATTERLEY: I'm -- I'm okay to 14:48:18
19 A. Sure. 14:45:21	19 continue from here if you're okay to continue. 14:48:19
20 MR. SATTERLEY: Objection. Beyond the 14:45:22	20 THE WITNESS: Absolutely. 14:48:21
21 scope. 14:45:23	21 MR. SATTERLEY: Hopefully I won't have a 14:48:23
22 BY MR. ASHBY: 14:45:23	22 lot. 14:48:25
23 Q. And with regard to his findings in 14:45:24	23 EXAMINATION BY COUNSEL FOR THE PLAINTIFF: 14:48:26
24 these -- in these work practice simulations generically, 14:45:26	24 BY MR. SATTERLEY: 14:48:26
25 like for joint compound, for example, you said that his 14:45:30	25 Q. With regards to the compensation question 14:48:27
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1	counsel asked you, when you met with those five	14:48:29
2	attorneys in 2017 for J&J did they compensate you for	14:48:31
3	your time?	14:48:35
4	A. I think they did.	14:48:36
5	Q. And did they at any point in time between	14:48:37
6	2017 and 2023, the last six years, come back to you and	14:48:40
7	say, We want your expert opinion regarding any of the	14:48:45
8	topics Mr. Ashby asked you about on cross-examination?	14:48:50
9	A. No.	14:48:52
10	Q. At any point in time have they asked you	14:48:53
11	to evaluate all the cases of individual mesothelioma	14:48:56
12	after a decades-long consumer talc exposure so that you	14:49:01
13	can give opinion about that?	14:49:07
14	A. No.	14:49:08
15	Q. Have they presented to you the tissue	14:49:08
16	digestion analysis of folks exposed only to talcum	14:49:11
17	powders and say, Look at the mineral assemblages here	14:49:14
18	and give us your opinions about that?	14:49:18
19	A. No.	14:49:20
20	MR. ASHBY: Objection. Calls for	14:49:21
21	speculation. Lacks foundation.	14:49:23
22	BY MR. SATTERLEY:	14:49:25
23	Q. Did -- did -- back in the 1970s when	14:49:26
24	Dr. Gavin Hil -- Hildick-Smith met with you or when you	14:49:28
25	saw Bill Ashton at these meetings, did they ever present	14:49:31
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1	to you any of the J&J internal documents where other	14:49:35
2	scientists documented asbestos in their baby powder?	14:49:39
3	MR. ASHBY: Assumes facts. Lacks	14:49:42
4	foundation. Calls for speculation.	14:49:45
5	THE WITNESS: No.	14:49:46
6	BY MR. SATTERLEY:	14:49:47
7	Q. For example, he mentioned McCrone and Ian	14:49:47
8	Stewart. Have -- have -- have you ever seen the letters	14:49:50
9	in the 1970s from Ian Stewart to Johnson & Johnson's	14:49:53
10	mineral company, called Windsor Minerals, about the	14:50:00
11	presence of asbestos in their baby powder?	14:50:03
12	MR. ASHBY: Objection. Calls for	14:50:06
13	speculation. Lacks --	14:50:07
14	BY MR. SATTERLEY:	14:50:07
15	Q. Have you ever seen those?	14:50:07
16	MR. ASHBY: Lacks foundation. Assumes	14:50:09
17	facts.	14:50:11
18	THE WITNESS: No.	14:50:11
19	BY MR. SATTERLEY:	14:50:11
20	Q. Have you ever seen the letters from Ian	14:50:11
21	Stewart regarding the raw talc from the Vermont talc	14:50:13
22	mines documenting asbestos in their talcum powder	14:50:17
23	products --	14:50:22
24	MR. ASHBY: Lacks foundation. Calls for	14:50:22
25	speculation.	14:50:22
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1	BY MR. SATTERLEY:	14:50:22
2	A. -- from Ian Stewart?	14:50:22
3	MR. ASHBY: Assumes facts.	14:50:29
4	THE WITNESS: Same answer. No.	14:50:29
5	BY MR. SATTERLEY:	14:50:31
6	Q. All right. And with regards to Fred	14:50:31
7	Pooley -- he asked you about Fred Pooley. Had -- had	14:50:32
8	you seen the internal documents between Fred Pooley and	14:50:37
9	J&J regarding his identification of fibrous tremolite in	14:50:40
10	J&J talc?	14:50:47
11	MR. ASHBY: Lacks foundation. Calls for	14:50:47
12	speculation. Assumes facts.	14:50:49
13	THE WITNESS: No.	14:50:50
14	BY MR. SATTERLEY:	14:50:51
15	Q. The -- did you -- did you -- you -- you	14:50:52
16	understood Fred Pooley to be with Cardiff, right?	14:50:56
17	A. Yes.	14:50:59
18	Q. Okay. And have you seen the J -- the J --	14:51:00
19	four or five J&J attorneys that met with you in 2017,	14:51:01
20	did they show you the documents from the 1971 timeframe	14:51:06
21	that required Fred Pooley to let J&J edit his papers?	14:51:09
22	MR. ASHBY: It assumes facts.	14:51:15
23	THE WITNESS: No.	14:51:17
24	MR. ASHBY: Calls for speculation. Lacks	14:51:17
25	foundation.	14:51:17
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1	THE WITNESS: No.	14:51:17
2	BY MR. ASHBY:	14:51:23
3	Q. Counsel asked you about -- about your '76	14:51:23
4	paper. And I -- I think you were suggesting that -- let	14:51:26
5	me just look at my notes here -- that papers -- other	14:51:28
6	papers are potentially edited. You said -- you	14:51:33
7	mentioned that you published roughly 100 papers. How	14:51:37
8	many of those 100 papers, to your knowledge, had been	14:51:41
9	secretly edited by industry?	14:51:45
10	MR. ASHBY: Lacks foundation. Calls for	14:51:48
11	speculation. Assumes facts.	14:51:50
12	THE WITNESS: I have no idea.	14:51:52
13	BY MR. SATTERLEY:	14:51:53
14	Q. Okay. And do you know -- you were not	14:51:54
15	provided any of the changes to your '76 paper that were	14:51:56
16	given to Dr. Mehlman, the editor of the journal, were	14:52:01
17	you?	14:52:06
18	A. No.	14:52:06
19	MR. ASHBY: Lacks foundation. Calls for	14:52:07
20	speculation. Assumes facts.	14:52:09
21	THE WITNESS: No.	14:52:10
22	BY MR. SATTERLEY:	14:52:11
23	Q. Now, with regards to Dr. Selikoff, they	14:52:12
24	show -- he showed you Exhibit 24. I think you never saw	14:52:14
25	this letter written by Dr. Selikoff to this Washington	14:52:17
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1 Post reporter, correct? 14:52:22	1 of asbestos? 14:54:15
2 A. Correct. 14:52:23	2 A. Of course not. 14:54:16
3 Q. All right. And that's dated March the 14:52:24	3 Q. Did he even have the skill set to do so? 14:54:17
4 26th, 1976. Do you recall that? 14:52:26	4 A. No. 14:54:20
5 A. Well, I don't recall it. It's the first 14:52:29	5 Q. He -- he read the retraction or -- not the 14:54:21
6 time I've seen it. 14:52:31	6 retraction. He read -- he read the press release. And 14:54:27
7 Q. I mean, earlier today he showed it to you. 14:52:32	7 he said the Mount Sinai Department of Pediatrics. Did 14:54:30
8 It's been marked -- 14:52:34	8 the Mount Sinai Department of Pediatrics test baby 14:54:35
9 A. Yes, of course. Yes. 14:52:34	9 powder for the presence of asbestos? 14:54:41
10 Q. All right. And did you know how much 14:52:35	10 A. Of course not. 14:54:44
11 pressure Dr. Chalmers put on Dr. Selikoff? 14:52:37	11 Q. Did they even have the skill set that you 14:54:45
12 A. Phew. 14:52:45	12 had? 14:54:47
13 MR. ASHBY: Assumes facts. Calls for 14:52:45	13 A. Had the department -- the department -- 14:54:48
14 speculation. Lacks foundation. 14:52:48	14 there was no -- there was no survey taken amongst the 14:54:53
15 BY MR. SATTERLEY: 14:52:50	15 department members. It was Horace Hodes, H-O-D-E-S, 14:55:00
16 Q. Let me show you -- did you answer the 14:52:51	16 Horace Hodes, who was chair of that department who was a 14:55:08
17 question? 14:52:53	17 recipient of a major grant from Johnson & Johnson. 14:55:10
18 A. No. 14:52:53	18 Q. What was the name, Dr. Hodes? 14:55:14
19 Q. Okay. I -- 14:52:53	19 A. Horace Hodes. Horace Hodes. And he -- he 14:55:16
20 A. I haven't answered that question. I'm 14:52:53	20 fell into line. 14:55:20
21 sitting here -- 14:52:55	21 And so you asked about whether Chalmers 14:55:23
22 Q. All right. 14:52:55	22 had -- whether Chalmers had analyzed talc. Well, 14:55:25
23 A. -- thinking about it. 14:52:56	23 Chalmers, he was responding to his own outward 14:55:32
24 Q. Sure. Let me show you a -- a -- a memo on 14:52:57	24 pressures -- 14:55:36
25 the sec -- excuse me. It's the wrong -- wrong memo. 14:53:00	25 Q. Did -- 14:55:36
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1 Let's see where am I going here. The 14:53:04	1 A. -- from the board of trustees. 14:55:37
2 26th. Oh. The 26th. We're going to mark this as 14:53:07	2 Q. And Dr. Hodes was -- 14:55:39
3 Exhibit 28. 14:53:11	3 MR. ASHBY: Let me -- 14:55:39
4 (Exhibit 28 was marked and 14:53:11	4 BY MR. SATTERLEY: 14:55:39
5 attached to the transcript.) 14:53:11	5 Q. -- on the board of trustees? 14:55:42
6 BY MR. SATTERLEY: 14:53:11	6 MR. ASHBY: Let me -- let me object. 14:55:43
7 Q. This is from D. D. Johnston, the president 14:53:18	7 THE WITNESS: No. He's going to object 14:55:44
8 of Johnson & Johnson, the very same date -- 14:53:20	8 that this is just -- just a guess, just a hypothetical, 14:55:45
9 MR. SATTERLEY: Here you go, counsel. 14:53:23	9 whatever. 14:55:49
10 BY MR. SATTERLEY: 14:53:25	10 But I'm talking about the politics of an 14:55:50
11 Q. The very same date, to Dr. Chalmers. And 14:53:26	11 institution and pressures brought to bear on individuals 14:55:53
12 the president of Johnson & Johnson writes: Dear Dr. 14:53:34	12 who are scientists, doctors, who are part of that 14:55:58
13 Chalmers, attached is a copy of the Washington Post 14:53:37	13 institution under -- who were undertaking research, and 14:56:04
14 treatment of your press release in this morning's paper. 14:53:41	14 pressures from the institution as to how the research is 14:56:09
15 It also was carried in its entirety by the Washington 14:53:43	15 conducted, what are the rules and regulations. 14:56:16
16 Post wire service, which goes on -- goes to 340 14:53:46	16 These were the times -- and let me just 14:56:22
17 newspapers nationally. The article falls short of our 14:53:50	17 close and say these are the times when letters to the 14:56:28
18 mutual goal of reassuring consumers about the safety of 14:53:53	18 editor by individual faculty members first had to go 14:56:32
19 present day talcum powders. 14:53:57	19 through their department chairs before they were 14:56:38
20 I will stop there. Have you ever seen 14:54:00	20 submitted to a newspaper or a journal or any other -- 14:56:41
21 this letter in the past? 14:54:02	21 BY MR. SATTERLEY: 14:56:48
22 A. No. 14:54:03	22 Q. Let's go to Exhibit 28. 14:56:48
23 Q. Okay. Counsel asked you about 14:54:03	23 A. -- form of -- 14:56:49
24 Dr. Chalmers and a press release Dr. Chalmers released. 14:54:04	24 MR. ASHBY: I just need to get my -- there 14:56:50
25 Did Dr. Chalmers ever test baby powder for the presence 14:54:09	25 was no question pending. It lacks foundation and calls 14:56:52
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1 for speculation. 14:56:55	1 (Exhibit 29 was marked and 14:58:56
2 MR. SATTERLEY: Sure there was a question. 14:56:55	2 attached to the transcript.) 14:58:58
3 BY MR. SATTERLEY: 14:56:55	3 BY MR. SATTERLEY: 14:58:58
4 Q. Let's go back to Exhibit 28, the president 14:56:56	4 Q. This is a few days later; March 31st, 14:59:04
5 of Johnson & Johnson Baby Products Company to 14:56:59	5 1976. Meeting with Johnson & Johnson personnel at Mount 14:59:09
6 Dr. Chalmers. The second paragraph: In fact, 14:57:02	6 Sinai School of Medicine. On Monday, March 22nd, 1976 a 14:59:14
7 statements attributed to Dr. Selikoff and his staff 14:57:03	7 meeting was held with Dr. Thomas Chalmers, president of 14:59:18
8 allegedly commented upon your press release serve only 14:57:06	8 Mount Sinai School of Medicine; Dr. S. D. Pomrinse -- 14:59:22
9 to perpetuate increased public anxiety. Dr. Selikoff's 14:57:11	9 that's the same person that's carbon-copied on -- on 14:59:30
10 inflammatory remarks have once again been supported with 14:57:13	10 that -- that one earlier, right? 14:59:33
11 references to data not published or reviewed with other 14:57:17	11 MR. ASHBY: Objection. 14:59:36
12 experts. 14:57:20	12 BY MR. SATTERLEY: 14:59:37
13 Once again there is confusion about simple 14:57:24	13 Q. Pomrinse? 14:59:38
14 facts like whether there are six or 10 recently 14:57:26	14 A. Pomrinse, yeah. 14:59:39
15 purchased samples and whether some of the original 19 14:57:29	15 Q. Okay. 14:59:39
16 samples were purchased more recently than 1973. 14:57:32	16 A. He was president of the hospital -- 14:59:40
17 Dr. Selikoff and staff continue to treat 14:57:35	17 Q. Yeah. 14:59:40
18 their findings as facts, ignoring Dr. Pooley's results, 14:57:37	18 A. -- the medical school. 14:59:42
19 dismissing FDA results, promulgating the 14:57:40	19 Q. And Samuel Rovner, director of personnel 14:59:43
20 no-dose-response thesis, implicating attributing the 14:57:43	20 relations at Mount Sinai. Do you know Dr. Samuel 14:59:45
21 effects of chrysotile to tremolite, et cetera. 14:57:47	21 Rovner? 14:59:48
22 I'm particularly disturbed by 14:57:50	22 A. I knew of him. I didn't have very much 14:59:49
23 Dr. Selikoff's chink in their armor remark, end quote. 14:57:52	23 contact with him when I was there. 14:59:51
24 If the chink exists, in fact it clearly has potential 14:57:56	24 Q. Johnson & Johnson was represented by D. D. 14:59:54
25 for alarming the consumer, embarrassing the industry, 14:58:00	25 Johnston. We saw that he's the president. Mr. J. -- 14:59:56
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1 and publicizing Dr. Selikoff, but its potential for any 14:58:02	1 J. E. Burke, do you know who he is? 15:00:00
2 constructive effect appears nil. Very truly yours, D. 14:58:06	2 A. No. 15:00:01
3 D. Johnson, president. 14:58:09	3 Q. Dr. D. Peterson, Mr. L. Foster, and Dr. G. 15:00:02
4 And then he does PS. After finishing this 14:58:10	4 Hildick-Smith. You knew Dr. Hildick-Smith, right? 15:00:09
5 letter I learned that the New York Post today quotes 14:58:14	5 A. Yes, of course. 15:00:12
6 some additional intemperate remark by Dr. Selikoff 14:58:20	6 Q. All right. Now -- and this is signed off 15:00:13
7 taking exception to the characterization of baby powders 14:58:20	7 by Dr. Gildick -- G. Gil -- Hildick-Smith, right? 15:00:15
8 as useful and safe. 14:58:25	8 A. Yes. 15:00:19
9 MR. ASHBY: That's -- I'll object that it 14:58:27	9 Q. Okay. Right on the third paragraph it 15:00:19
10 lacks foundation. Improper refreshment of recollection. 14:58:28	10 says, and I've highlighted and underlined it, The Mount 15:00:22
11 Calls for speculation. 14:58:31	11 Sinai group indicated that over the weekend the Selikoff 15:00:27
12 BY MR. SATTERLEY: 14:58:32	12 group had been studying six new samples of talc and 15:00:29
13 Q. This is an admission of the president of 14:58:33	13 reported that all of them contained minimal amounts of 15:00:32
14 Johnson & Johnson. This is a statement made by -- at no 14:58:35	14 asbestos. 15:00:34
15 point in time did any J&J attorney ever share this with 14:58:38	15 Do you see that? 15:00:35
16 you, correct? 14:58:42	16 A. Yes. 15:00:35
17 MR. ASHBY: Same -- same objections. 14:58:43	17 Q. Is that a true statement? 15:00:36
18 THE WITNESS: Correct. 14:58:44	18 MR. ASHBY: Objection. 15:00:38
19 BY MR. SATTERLEY: 14:58:44	19 THE WITNESS: Well, it's reported, 15:00:39
20 Q. Either -- either in 2017 or today, 14:58:44	20 although I have no recollection of it. 15:00:40
21 correct? 14:58:46	21 MR. ASHBY: Lacks foundation. Calls for 15:00:42
22 A. Correct. 14:58:46	22 speculation. 15:00:44
23 MR. ASHBY: Same objections. 14:58:50	23 BY MR. SATTERLEY: 15:00:44
24 MR. SATTERLEY: We'll mark this as Exhibit 14:58:54	24 Q. Do -- do you recall in the mid 1970s, at 15:00:45
25 29. 14:58:56	25 this timeframe, testing cosmetic talcum products in your 15:00:48
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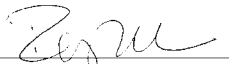
1 laboratory? 15:00:52	1 2017, did they share this with you? 15:03:09
2 A. Yes. We occasionally got some, and we 15:00:52	2 A. No. 15:03:11
3 looked at them. 15:00:56	3 MR. ASHBY: Objection. Lacks foundation. 15:03:11
4 MR. SATTERLEY: The same day -- and we can 15:01:01	4 BY MR. SATTERLEY: 15:03:14
5 put that exhibit to the side. This will be Exhibit 30. 15:01:05	5 Q. And when -- when the attorney today from 15:03:14
6 (Exhibit 30 was marked and 15:01:08	6 Johnson & Johnson showed you the Dr. Selikoff letter, 15:03:16
7 attached to the transcript.) 15:01:10	7 did he share the fact that Dr. Hodes had called on the 15:03:19
8 THE VIDEOGRAPHER: I need to change media 15:01:10	8 same day complaining about Dr. Selikoff? 15:03:23
9 real quick. We've been going for 90 minutes. 15:01:12	9 A. Yes. 15:03:25
10 MR. ASHBY: Okay. 15:01:15	10 MR. ASHBY: Lacks foundation. 15:03:26
11 THE VIDEOGRAPHER: The time is 3:01. This 15:01:16	11 BY MR. SATTERLEY: 15:03:28
12 is the end of media number four. We are off the video 15:01:18	12 Q. Is this the first time you've seen it now 15:03:28
13 record. 15:01:22	13 that I'm showing this to you? 15:03:30
14 All right. The time is 3:01. This is the 15:01:22	14 A. First time I've seen that group of 15:03:32
15 beginning of media number five, and we are back on the 15:01:32	15 documents. 15:03:35
16 video record. 15:01:35	16 Q. Okay. Now, counsel asked you questions 15:03:36
17 BY MR. SATTERLEY: 15:01:35	17 about the FDA. Had -- did J&J attorneys present to you 15:03:41
18 Q. On Exhibit -- Exhibit 30 -- this is a, 15:01:37	18 any of the internal documents of -- of J&J meeting with 15:03:45
19 once again, Johnson & Johnson letterhead from Dr. Gavin 15:01:41	19 the FDA with regards to asbestos in talc? 15:03:49
20 Hildick-Smith. It says, At 3:30 p.m. -- and this is for 15:01:45	20 A. No. 15:03:55
21 the record, telephone call from Dr. Hodes. At 3:30 p.m. 15:01:48	21 Q. Did -- 15:03:55
22 on March 26th, 1976, Dr. Hodes called to inform us that 15:01:52	22 MR. ASHBY: Lacks foundation. Calls for 15:03:56
23 the New York Post had an article that resulted 15:01:58	23 speculation. Assumes facts. 15:03:57
24 apparently from an interview with Dr. Selikoff. 15:02:00	24 BY MR. SATTERLEY: 15:03:59
25 So this phone call on -- on the 26th just 15:02:04	25 Q. Do you know what the -- the concept of 15:03:59
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1 so happens to be on the very same day that Dr. Selikoff 15:02:06	1 revolving door is? 15:04:01
2 writes that letter? 15:02:09	2 A. No. 15:04:03
3 MR. ASHBY: Objection. 15:02:11	3 Q. Where -- where folks will go from industry 15:04:03
4 BY MR. SATTERLEY: 15:02:12	4 to work in the government and then work back in industry 15:04:05
5 Q. Do you see that? 15:02:12	5 again. Have you ever heard of that? 15:04:08
6 A. Yep. 15:02:12	6 A. Yeah. It's called double dipping. 15:04:10
7 MR. ASHBY: Objection. Lacks foundation. 15:02:13	7 Q. And -- and do you know how many J&J former 15:04:12
8 BY MR. SATTERLEY: 15:02:14	8 employees worked at the FDA? 15:04:15
9 Q. And it says, The article incriminated -- 15:02:15	9 A. I have no idea. 15:04:17
10 excuse me -- intimated -- the article intimated that 15:02:17	10 MR. ASHBY: Calls for speculation. 15:04:18
11 Dr. Selikoff disagreed with Dr. Hodes, Chairman of the 15:02:19	11 BY MR. SATTERLEY: 15:04:21
12 Department of Pediatrics, in relationship to the safety 15:02:22	12 Q. With regards to the exhibit, the November 15:04:21
13 of talc and they would live to regret their statement. 15:02:25	13 10th, 1971 letter from you to Dr. Gavin Hildick-Smith, 15:04:24
14 Dr. Hodes considered this a personal 15:02:30	14 you were asked about this document. And -- and I think 15:04:28
15 attack on the -- his integrity and intended to have the 15:02:32	15 there was some suggestion that no diffraction patterns 15:04:31
16 matter corrected. He indicated that perhaps 15:02:35	16 were taken. I think I've underlined -- this is where 15:04:36
17 Dr. Selikoff would "live to regret his actions." 15:02:40	17 you found chrysotile in 1971 in the baby powder. Do you 15:04:41
18 Dr. Hodes indicated he believed that 15:02:45	18 see the reference to diffraction pattern? 15:04:44
19 Dr. Selikoff had approved the retraction statement given 15:02:47	19 A. Yes. 15:04:47
20 the press by Dr. Chalmers and was very concerned about 15:02:51	20 Q. And so, in fact, there was some 15:04:47
21 Dr. Selikoff's change in the attitude towards the safety 15:02:54	21 diffraction patterns that were taken for the 15:04:49
22 of talc. And it's carbon-copied to a number of 15:02:57	22 identification of chrysotile, correct? 15:04:52
23 individuals, including Mr. D. Johnston. 15:03:01	23 A. Yes. 15:04:55
24 At any of the meetings that you met 15:03:03	24 Q. And in addition to chry -- isn't 15:04:58
25 with -- at the meeting you met with the J&J lawyers in 15:03:06	25 chrysotile -- morphologically you're able to identify 15:05:00
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1 what chrysotile looks like in addition to simply 15:05:04	1 A. Yes. 15:08:30
2 diffraction patterns, correct? 15:05:09	2 Q. Okay. And counsel asked you questions 15:08:30
3 A. Of course. 15:05:10	3 about Dr. Longo. You have not evaluated Dr. Longo's 15:08:33
4 Q. Okay. And is that -- which allowed you to 15:05:11	4 testing of talc for the presence of asbestos over the 15:08:39
5 have confidence do -- that you found chrysotile both in 15:05:13	5 last five, six years, have you? 15:08:41
6 the product and in the tissue? 15:05:19	6 A. No. 15:08:43
7 A. The first few years of my work in the 15:05:21	7 Q. You've not evaluated any of his 15:08:43
8 Mount Sinai group I studied asbestos mineral samples 15:05:28	8 publications regarding identifying asbestiform materials 15:08:46
9 that were provided us by Johns-Manville Corporation. 15:05:38	9 in talcum powder products, have you? 15:08:52
10 And I studied -- I have extensively studied chrysotile 15:05:43	10 A. No. In fact, I didn't know that he -- 15:08:56
11 from various deposits in North America and elsewhere; 15:05:47	11 that there was any paper published. 15:08:57
12 overseas, South Africa. And my identification criteria 15:05:52	12 Q. And -- and -- and I -- I believe -- I 15:08:59
13 was developed on the standards that I studied the first 15:06:02	13 believe there has been. 15:09:03
14 several years as a member of the laboratory. 15:06:08	14 And with regards to the opinions you gave 15:09:05
15 Q. Is -- 15:06:14	15 about Dr. Longo and the -- the work practice 15:09:12
16 A. I studied soft and harsh chrysotile. I 15:06:15	16 simulations, you saw those in connection with serving as 15:09:14
17 studied the chrysotile UICC-B and A from Canada and 15:06:18	17 an expert witness? He was -- 15:09:18
18 Rhodesia. Well, it was Rhodesia then. Now it's 15:06:26	18 A. Joint compound. 15:09:19
19 Zimbabwe. And therefore I developed a sense based on 15:06:30	19 Q. Yeah. 15:09:21
20 the behavior of the mineral fiber under an electron 15:06:35	20 For joint compound. Only that had nothing 15:09:22
21 beam, its character and its changes in structure based 15:06:40	21 to do with talcum powder products, correct? 15:09:24
22 on the heating of the object, that the identification of 15:06:48	22 A. Correct. 15:09:26
23 the mineral became -- became easily discernible. 15:06:54	23 Q. Okay. You were a defense expert in a 15:09:27
24 Q. And -- and based upon all of that, were 15:07:03	24 case, and Dr. Longo was a plaintiff's expert in a case? 15:09:28
25 you confident in your identification of chrysotile when 15:07:05	25 A. I believe so. Yes. 15:09:31
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1 you wrote that letter to Dr. Gavin Hildick-Smith? 15:07:09	1 Q. And you guys -- that's -- that's the 15:09:32
2 MR. ASHBY: Objection. 15:07:13	2 context in which you saw that -- that video, correct? 15:09:33
3 THE WITNESS: Oh, absolutely. 15:07:14	3 A. Yes. 15:09:36
4 BY MR. SATTERLEY: 15:07:15	4 Q. Okay. And you have not evaluated any work 15:09:36
5 Q. The -- counsel asked you about several 15:07:16	5 practice simulation -- well, excuse me. Strike that 15:09:43
6 comments or -- or reports, I think Exhibit 26, Exhibit 15:07:21	6 question. 15:09:45
7 19, Exhibit 25. In each of these you were retained as 15:07:31	7 You have not evaluated any simulations 15:09:46
8 an expert witness to assist somebody in litigation, 15:07:37	8 with regard to talcum powder exposures, have you? 15:09:48
9 correct? 15:07:39	9 A. No. 15:09:50
10 A. Yes. 15:07:39	10 Q. And there was a lot of questions posed to 15:09:51
11 Q. And you -- as a matter of fact, one of the 15:07:40	11 you about ambient air. And I think you -- you mentioned 15:09:55
12 reports was written to the -- was it National Stone, 15:07:42	12 that there were some problems with ambient air because 15:10:00
13 Sand & Gravel Association, correct? 15:07:51	13 the source of the exposure causes the ambient air to 15:10:02
14 A. That's right. 15:07:52	14 have asbestos in it, correct? 15:10:06
15 Q. And -- and so that was the 2005. And -- 15:07:54	15 A. Sure. Yes. 15:10:08
16 A. That was the evaluation of the RJ Lee 15:07:58	16 Q. Okay. And you haven't evaluated the 15:10:09
17 Group analysis of the soil samples and the EPA samples 15:08:02	17 ambient air of any place in California where my clients 15:10:13
18 from El Dorado County, yes. 15:08:07	18 lived, correct? 15:10:19
19 Q. And -- and the -- the discussion regarding 15:08:10	19 A. Correct. 15:10:20
20 your -- the major hearing at OSHA, you -- you were an 15:08:13	20 Q. Okay. Let me just look at my notes. I 15:10:21
21 expert consultant for the National Stone, Sand -- Sand 15:08:20	21 think I'm just about -- oh, one last thing. Do you have 15:10:23
22 Gravel Assoc -- 15:08:23	22 your '76 paper, the -- on the talc, the -- I think it's 15:10:27
23 A. And Gravel. Yeah. 15:08:24	23 in that stack. 15:10:35
24 Q. The -- I think back then it was only 15:08:24	24 A. Yes, it is. 15:10:36
25 called the National Stone Association, wasn't it? 15:08:27	25 Q. Can you grab that real quick? 15:10:37
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1	Review of Current Techniques for the	15:10:39	1	Q. And Dr. Selikoff made that exact statement	15:13:17
2	Analysis --	15:10:43	2	back in 1976, did he not?	15:13:21
3	A. That -- that's number 14, isn't it?	15:10:43	3	MR. ASHBY: Objection.	15:13:24
4	Q. I think so. It's got the color copy of	15:10:45	4	THE WITNESS: Yes.	15:13:25
5	the --	15:10:51	5	MR. SATTERLEY: Those are all the	15:13:28
6	A. 14. Okay.	15:10:51	6	questions I have, Dr. Langer. Thank you so much for	15:13:29
7	Q. All right. In the introduction, on page	15:10:52	7	your time today.	15:13:31
8	28 there, it looks like it's the third sentence that	15:10:57	8	MR. ASHBY: All right. Can you give me a	15:13:33
9	says, Some investigators. It says, Some investigators	15:11:02	9	minute to get my stuff together? Can we just take a	15:13:35
10	have suggested fibrous talcs possess greater	15:11:11	10	break?	15:13:38
11	fibrogenicity than the platy varieties. This	15:11:15	11	THE WITNESS: Sure.	15:13:38
12	observation, as well as evidence, suggests that	15:11:19	12	THE VIDEOGRAPHER: Do you have any more	15:13:40
13	talc-associated disease -- diseases resemble asbestos	15:11:22	13	questions on the record?	15:13:41
14	diseases.	15:11:27	14	MR. ASHBY: I do. I've just got to --	15:13:42
15	And you have a citation there at the end	15:11:27	15	THE VIDEOGRAPHER: Okay. Gotcha.	15:13:45
16	of that, correct?	15:11:31	16	(A recess was taken.)	15:13:49
17	A. Yes.	15:11:31	17	THE VIDEOGRAPHER: All right. The time is	15:31:15
18	Q. The first citation, the first sentence	15:11:32	18	3:31, and we are back on the video record.	15:31:16
19	is -- is footnote 5 and 11, right?	15:11:34	19	EXAMINATION BY COUNSEL FOR THE DEFENDANTS JOHNSON &	15:31:16
20	A. Yes. That's correct.	15:11:37	20	JOHNSON AND LTL:	15:31:21
21	Q. If we go over to references, the footnote	15:11:38	21	BY MR. ASHBY:	15:31:21
22	5 is the Porro study from 1942?	15:11:45	22	Q. Okay. Okay. Dr. Langer, Mr. Satterley	15:31:22
23	A. Yes.	15:11:53	23	asked you about some of the documents that expressed	15:31:24
24	Q. And then what's the number 11 reference?	15:11:54	24	some of your beliefs and statements at the time, and he	15:31:26
25	A. It's McLaughlin, Rogers, and Dunham,	15:11:58	25	suggested that they were made in your position as an	15:31:30
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1	British Journal of Industrial Medicine.	15:12:03	1	expert witness capacity in those cases. Do you recall	15:31:34
2	Q. And if we just look at the list of	15:12:05	2	that questioning?	15:31:37
3	references here, we can see that -- and this is	15:12:07	3	A. I recall the questioning.	15:31:38
4	specifically a paper about tech -- techniques for talc,	15:12:12	4	Q. When you say something as an expert	15:31:40
5	correct?	15:12:15	5	witness, do you do it with the belief that you're say --	15:31:45
6	A. Yes. Yes.	15:12:15	6	what you're saying might not be true?	15:31:46
7	Q. And you have 65 citations already by 1976,	15:12:16	7	A. I believe you're asking me if I would make	15:31:48
8	correct?	15:12:26	8	a statement and couch it in some terms that would be	15:31:56
9	A. Yes.	15:12:26	9	less than definite, it would be couched in some terms	15:32:03
10	Q. And so if someone were to look at the	15:12:27	10	that are not as strong as you would like them to be.	15:32:12
11	scientific literature going back to the 1930s to the	15:12:31	11	Q. No. That's not really what -- what I'm	15:32:15
12	1970s, you're going to find at least 65 articles	15:12:35	12	asking you is when -- when you give a -- when you make a	15:32:17
13	relating to this topic, right?	15:12:41	13	statement as an expert, you make -- your statements are	15:32:22
14	A. Yes.	15:12:43	14	still honest even though you're acting as an expert; is	15:32:24
15	Q. Okay. Counsel asked you a -- a --	15:12:44	15	that true?	15:32:28
16	questions about risk. And I think I asked you that	15:12:51	16	A. Of course.	15:32:29
17	earlier. No one in this case has asked you to give any	15:12:58	17	Q. Okay. So the fact that Mr. Satterley was	15:32:29
18	opinions about risk, correct?	15:13:03	18	suggesting you were doing this in some expert capacity	15:32:32
19	A. Correct.	15:13:04	19	when you made a statement doesn't mean you were being	15:32:36
20	Q. And you did say that the regulatory model	15:13:06	20	untruthful at the time?	15:32:38
21	is that there is no safe level of asbestos known,	15:13:10	21	A. No. That's a -- a condition one finds in	15:32:39
22	correct?	15:13:13	22	many experts on both sides of the issue.	15:32:48
23	A. Correct.	15:13:13	23	Q. Okay. But in relation to your statements	15:32:51
24	Q. Using -- using the linear model, right?	15:13:14	24	that you've made in an expert capacity, whether you're	15:32:56
25	A. Correct.	15:13:17	25	being paid or not your statements are true?	15:32:58
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1	A. Absolutely. I give the best possible	15:32:59	1	release --	15:35:03
2	evaluation or answer, yes.	15:33:01	2	MR. SATTERLEY: Let --	15:35:03
3	Q. In -- in fact, you are somebody who	15:33:04	3	BY MR. ASHBY:	15:35:03
4	developed your opinions outside of litigation, and then	15:33:08	4	Q. -- right? Correct?	15:35:03
5	at some point somebody came along and asked you, Hey,	15:33:12	5	MR. SATTERLEY: Let me object.	15:35:06
6	can you give these same opinions in a courtroom; is that	15:33:15	6	Foundation. Beyond the scope. And calls for	15:35:08
7	correct?	15:33:17	7	speculation.	15:35:10
8	A. Right.	15:33:17	8	BY MR. ASHBY:	15:35:13
9	Q. Okay. And whether you're in the courtroom	15:33:18	9	Q. Do you see that?	15:35:14
10	or you're outside the courtroom, the things you say are	15:33:27	10	A. Yes.	15:35:15
11	the same, and they're truthful --	15:33:29	11	Q. And what he says here, Upon my return I	15:35:15
12	A. The same.	15:33:31	12	found out -- or I found that Dr. Selikoff had already	15:35:18
13	Q. -- in both places?	15:33:31	13	sent a letter to Ms. Burros and I quote from the letter.	15:35:20
14	A. Correct.	15:33:33	14	And then he goes on to quote the letter.	15:35:24
15	Q. All right. The -- I wanted to show you a	15:33:40	15	But what we see here is Dr. Selikoff	15:35:27
16	document. He was asking you a lot about Mr. Chalm -- or	15:33:41	16	before even talking to Dr. Chalmers, after getting back,	15:35:30
17	Dr. Chalmers. And I wanted to show you one document	15:33:49	17	had already went out of his way to send that scathing	15:35:33
18	that I didn't show you. We'll have to --	15:33:55	18	letter to Ms. Burros, correct?	15:35:37
19	MR. ASHBY: Did you mark any new exhibits	15:34:01	19	MR. SATTERLEY: Same objection.	15:35:40
20	the last time?	15:34:02	20	THE WITNESS: Correct.	15:35:41
21	MR. SATTERLEY: I did.	15:34:03	21	BY MR. ASHBY:	15:35:43
22	I think we're up to like 32 or 33,	15:34:04	22	Q. Okay. All right. We talked about -- all	15:35:44
23	something like that.	15:34:08	23	right. He -- let's see. He -- he also talked to you	15:35:52
24	MR. SATTERLEY: All right. I'll mark this	15:34:08	24	about risk. And he talked to you about these letters at	15:35:54
25	as Exhibit 33.	15:34:09	25	the time. So I wanted to go back to something we looked	15:35:59
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1	(Exhibit 33 was marked and	15:34:10	1	at before, which was Exhibit 23.	15:36:02
2	attached to the transcript.)	15:34:10	2	And even in your view at the time,	15:36:04
3	BY MR. ASHBY:	15:34:11	3	Dr. Langer, what you -- what we established you were	15:36:08
4	Q. All right. This is a letter from	15:34:11	4	telling people, including the FDA, is that you	15:36:11
5	Dr. Chalmers to D. D. Johnston on March 30th, 1976.	15:34:14	5	considered the chrysotile in the two products where you	15:36:15
6	I'll -- I'll tell you this isn't one that Mr. Satterley	15:34:18	6	found it to be quite low, and in general -- this is the	15:36:19
7	used with you, but it is a document that comes in	15:34:19	7	more important thing -- in general you did not think	15:36:22
8	between some of the ones that he did.	15:34:22	8	that chrysotile was a real problem as far as cosmetic	15:36:25
9	And do you see the word -- this is	15:34:24	9	talcs were concerned, correct?	15:36:29
10	Dr. Chalmers talking -- or writing to D. D. Johnston,	15:34:29	10	A. Correct.	15:36:30
11	correct?	15:34:33	11	Q. And at your last deposition in 2021 you	15:36:31
12	A. Yes.	15:34:33	12	agreed that you had made a public statement that the	15:36:48
13	Q. Okay. Again, it's March 30th, 1976. Do	15:34:34	13	litigations today with Johnson & Johnson have nothing to	15:36:51
14	you see that at the top?	15:34:37	14	do or little to do with science, correct?	15:36:55
15	A. Yes.	15:34:38	15	MR. SATTERLEY: Objection. Beyond the	15:36:58
16	Q. And Chal -- Dr. Chalmers says, I was	15:34:39	16	scope. Foun -- speculation. Improper opinion	15:36:59
17	terribly distressed when I returned from Canada to read	15:34:43	17	testimony.	15:37:02
18	the articles in the Washington and New York Post. I had	15:34:45	18	THE WITNESS: Yes.	15:37:04
19	been confident that the press -- press release with --	15:34:48	19	MR. ASHBY: Okay. No further questions.	15:37:05
20	with which Dr. Selikoff had agreed and my talking to the	15:34:50	20	EXAMINATION BY COUNSEL FOR THE PLAINTIFF:	15:37:05
21	various faculty members involved had ended the matter.	15:34:54	21	BY MR. SATTERLEY:	15:37:05
22	Do you see that?	15:34:58	22	Q. Let me ask you, Dr. Langer, you haven't	15:37:10
23	A. Yes.	15:34:58	23	been testifying as an expert in as -- in talc	15:37:12
24	Q. All right. And so this is Dr. Chalmers	15:34:59	24	litigation, consumer talc litigation, against Johnson &	15:37:14
25	indicating that Dr. Selikoff had agreed with the press	15:35:00	25	Johnson or for -- or for Johnson & Johnson, correct?	15:37:18
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1 A. Correct. 15:37:21 2 Q. And so your knowledge of the talc 15:37:22 3 litigation with regard to individuals having 15:37:25 4 mesothelioma would come from either reading in the press 15:37:28 5 or talking to JJ lawyers, correct? 15:37:31 6 MR. ASHBY: Ob -- ob -- objection. 15:37:35 7 THE WITNESS: Yes. 15:37:35 8 MR. ASHBY: Overbroad. 15:37:39 9 BY MR. SATTERLEY: 15:37:41 10 Q. Because in 2021 you and I had never talked 15:37:42 11 or -- or -- 15:37:44 12 A. Correct. 15:37:44 13 Q. All right. So your -- when you said that 15:37:45 14 in that 2021 deposition about litigation and science, 15:37:47 15 your basis would have been basically either reading it 15:37:52 16 from the press or talking to Mr. Bicks and Mr. Bishop 15:37:55 17 and the other J&J lawyers in 2017? 15:37:59 18 A. Yes. The only -- 15:38:01 19 MR. ASHBY: Calls for speculation. Lacks 15:38:03 20 foundation. 15:38:03 21 THE WITNESS: Yeah. The only sources. 15:38:06 22 Yeah, that's correct. 15:38:07 23 MR. SATTERLEY: Okay. Thank you, 15:38:08 24 Dr. Langer. I appreciate your time. I'm sorry we 15:38:08 25 didn't take a lunch today, but we thought the -- the 15:38:11 Page 242	1 (Signature having not been waived, the 15:34:05 2 videotaped deposition of ARTHUR M. LANGER, Ph.D. was 15:34:06 3 concluded at 3:30 p.m.) 15:34:06 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Page 244
1 process would be shorter. 15:38:13 2 MR. CHARCHALIS: Just real quick since 15:38:15 3 your questions are done. I just want to clarify for the 15:38:17 4 record, I had said that I was appearing for the retailer 15:38:22 5 defendants. Just to be clear, that's Albertsons 15:38:23 6 Companies, Inc., Lucky Stores, Safeway, Save Mart 15:38:26 7 Supermarkets, LLC, Target Corporation, and Walmart, Inc. 15:38:29 8 Thank you. 15:38:32 9 MR. SATTERLEY: And let's put on the 15:38:32 10 record, also, that Exhibits 34, 35, and 36 will be the 15:38:34 11 three videos that I shared with the videographer, 15:38:37 12 defense attorney, and showed it to Dr. Langer. 15:38:41 13 34 will be the Peter Bicks video. 15:38:44 14 35 will be the Alex Calfo video. 15:38:47 15 And 36 will be the Mike Brown video. 15:38:49 16 And we can go off the record. 15:38:53 17 (Exhibits 34, 35, and 36 were 15:38:54 18 marked and attached to the 15:38:54 19 transcript.) 15:38:54 20 THE VIDEOGRAPHER: All right. The time is 15:30:00 21 3:30 p.m. This is the end of media number five. We are 15:30:01 22 off the video record. And this is the end of this 15:30:04 23 deposition. 15:30:08 24 15:34:05 25 15:34:05 Page 243	1 ACKNOWLEDGMENT OF WITNESS 2 3 I, ARTHUR M. LANGER, Ph.D., do hereby 4 acknowledge that I have read and examined the foregoing 5 testimony, and the same is a true, correct and complete 6 transcription of the testimony given by me and any 7 corrections appear on the attached Errata Sheet signed 8 by me. 9 10 _____ 11 (DATE) (SIGNATURE) 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Page 245

1 COMMONWEALTH OF VIRGINIA AT LARGE, to wit: 2 3 I, Penny C. Wile, Registered Merit 4 Reporter, Certified Realtime Reporter, and Notary Public 5 for the Commonwealth of Virginia at large, whose 6 commission expires January 31, 2025, do certify that the 7 aforementioned appeared before me, was sworn by me, and 8 was thereupon examined by counsel; and that the 9 foregoing is a true, correct, and full transcript of the 10 testimony adduced. 11 I further certify that I am neither 12 related to nor otherwise associated with any counsel or 13 party to this proceedings, nor otherwise interested in 14 the event thereof. 15 IN WITNESS WHEREOF, I have hereunto set my 16 hand and affixed my notarial seal this 6th day of April, 17 2023. 18 19 20 21 22  23 Penny C. Wile, Notary Public, #212528 24 Commonwealth of Virginia at Large 25 REGISTERED MERIT REPORTER CERTIFIED REALTIME REPORTER Page 246	1 __ Federal R&S Requested (FRCP 30(e)(1)(B)) – Locked .PDF 2 Transcript - The witness should review the transcript and 3 make any necessary corrections on the errata pages included 4 below, notating the page and line number of the corrections. 5 The witness should then sign and date the errata and penalty 6 of perjury pages and return the completed pages to all 7 appearing counsel within the period of time determined at 8 the deposition or provided by the Federal Rules. 9 __ Federal R&S Not Requested - Reading & Signature was not 10 requested before the completion of the deposition. 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Page 248
1 JOSEPH D. SATTERLEY, ESQ. 2 jsatterley@kazanlaw.com 3 April 6, 2023 4 RE: ANTHONY HERNANDEZ VALADEZ VS. JOHNSON & JOHNSON 5 APRIL 3, 2023, ARTHUR M. LANGER, PH.D., JOB NO. 5806091 6 The above-referenced transcript has been 7 completed by Veritext Legal Solutions and 8 review of the transcript is being handled as follows: 9 __ Per CA State Code (CCP 2025.520 (a)-(e)) – Contact Veritext 10 to schedule a time to review the original transcript at 11 a Veritext office. 12 __X__ Per CA State Code (CCP 2025.520 (a)-(e)) – Locked .PDF 13 Transcript - The witness should review the transcript and 14 make any necessary corrections on the errata pages included 15 below, notating the page and line number of the corrections. 16 The witness should then sign and date the errata and penalty 17 of perjury pages and return the completed pages to all 18 appearing counsel within the period of time determined at 19 the deposition or provided by the Code of Civil Procedure. 20 __ Waiving the CA Code of Civil Procedure per Stipulation of 21 Counsel - Original transcript to be released for signature 22 as determined at the deposition. 23 __ Signature Waived – Reading & Signature was waived at the 24 time of the deposition. 25 Page 247	1 RE: ANTHONY HERNANDEZ VALADEZ VS. JOHNSON & JOHNSON 2 ARTHUR M. LANGER, PH.D., JOB NO. 5806091 3 E R R A T A S H E E T 4 PAGE____ LINE____ CHANGE_____ 5 _____ 6 REASON_____ 7 PAGE____ LINE____ CHANGE_____ 8 _____ 9 REASON_____ 10 PAGE____ LINE____ CHANGE_____ 11 _____ 12 REASON_____ 13 PAGE____ LINE____ CHANGE_____ 14 _____ 15 REASON_____ 16 PAGE____ LINE____ CHANGE_____ 17 _____ 18 REASON_____ 19 PAGE____ LINE____ CHANGE_____ 20 _____ 21 REASON_____ 22 _____ 23 _____ 24 WITNESS Date 25 Page 249

&	223:14 224:5	100 68:2 88:23	150 88:24
& 1:7 3:5,11,12	224:24 226:19	88:23 105:23	152 7:8
3:14,16 4:9	228:6 231:13	168:18 217:7,8	16 6:10,16
7:23 9:13 10:9	236:19 241:13	100cx 25:20	50:21,22,25
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California Code of Civil Procedure

Article 5. Transcript or Recording

Section 2025.520

(a) If the deposition testimony is stenographically recorded, the deposition officer shall send written notice to the deponent and to all parties attending the deposition when the Original transcript of the testimony for each session of the deposition is available for reading, correcting, and signing, unless the deponent and the attending parties agree on the record that the reading, correcting, and signing of the transcript of the testimony will be waived or that the reading, correcting, and signing of a transcript of the testimony will take place after the entire deposition has been concluded or at some other specific time.

(b) For 30 days following each notice under subdivision (a), unless the attending parties and the deponent agree on the record or otherwise in writing to a longer or shorter time period, the deponent may change the form or the substance of the answer to a question, and may either approve the transcript of the deposition by signing it, or

refuse to approve the transcript by not signing it.

(c) Alternatively, within this same period, the deponent may change the form or the substance of the answer to any question and may approve or refuse to approve the transcript by means of a letter to the deposition officer signed by the deponent which is mailed by certified or registered mail with return receipt requested. A copy of that letter shall be sent by first-class mail to all parties attending the deposition.

(d) For good cause shown, the court may shorten the 30-day period for making changes, approving, or refusing to approve the transcript.

(e) The deposition officer shall indicate on the original of the transcript, if the deponent has not already done so at the office of the deposition officer, any action taken by the deponent and indicate on the original of the transcript, the deponent's approval of, or failure or refusal to approve, the transcript. The deposition officer shall also notify in writing the parties attending the deposition of any changes which the deponent timely made in person.

(f) If the deponent fails or refuses to approve the transcript within the allotted period, the

deposition shall be given the same effect as though it had been approved, subject to any changes timely made by the deponent.

(g) Notwithstanding subdivision (f), on a seasonable motion to suppress the deposition, accompanied by a meet and confer declaration under Section 2016.040, the court may determine that the reasons given for the failure or refusal to approve the transcript require rejection of the deposition in whole or in part.

(h) The court shall impose a monetary sanction under Chapter 7 (commencing with Section 2023.010) against any party, person, or attorney who unsuccessfully makes or opposes a motion to suppress a deposition under this section, unless the court finds that the one subject to the sanction acted with substantial justification or that other circumstances make the imposition of the sanction unjust.

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Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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