



1 LOS ANGELES, CALIFORNIA; TUESDAY, APRIL 3RD, 2001

2 9:00 A.M

3 DEPARTMENT 308 HON. CHARLES MC COY, JUDGE

4

5 (THE FOLLOWING PROCEEDINGS

6 WERE HELD IN OPEN COURT IN

7 THE PRESENCE OF THE JURY.)

8

9 THE COURT: GOOD MORNING, LADIES AND

10 GENTLEMEN.

11 GOOD TO SEE ALL OF YOU. OUR JURY

12 IS PRESENT.

13 COUNSEL, GOOD MORNING TO YOU.

14 WE ARE GOING TO CALL OUR FIRST

15 WITNESS THIS MORNING. AND BEFORE WE DO THAT, I

16 WANT TO JUST CHAT WITH YOU FOR A SECOND -- LET ME

17 LOOK OVER THE TOP OF THIS COMPUTER SCREEN AT YOU --

18 ABOUT WITNESSES.

19 THERE'S TWO KINDS OF WITNESSES THAT

20 WE WILL HAVE IN THIS CASE. ONE KIND ARE EXPERT

21 WITNESSES AND I UNDERSTAND THERE'S GOING TO BE

22 QUITE A FEW CALLED BY BOTH PARTIES IN THIS CASE IN

23 THAT CATEGORY. AND THEN THERE WILL BE PERCIPIENT

24 WITNESSES, WITNESSES WHO ARE ACTUALLY THERE,

25 ACTUALLY SAW THINGS, EXPERIENCED THEMSELVES THE

26 EVENTS THAT ARE INVOLVED HERE.

27 SO LET ME TALK ABOUT THOSE

28 WITNESSES AND I WILL TALK ABOUT THE LAST KIND

1 FIRST, THAT IS, THE PERCIPIENT WITNESS OR THE ONE  
2 WHO HAS PERSONAL FIRSTHAND KNOWLEDGE AND THEN I  
3 WILL TALK TO YOU A LITTLE BIT ABOUT EXPERT  
4 WITNESSES.

5                   YOU MUST DECIDE ALL QUESTIONS OF  
6 FACT IN THIS CASE FROM THE EVIDENCE RECEIVED IN  
7 THIS TRIAL AND NOT FROM ANY OTHER SOURCE. OF  
8 COURSE, WE HAVE TALKED ABOUT THAT MANY TIMES.

9                   YOU MUST NOT MAKE ANY INDEPENDENT  
10 INVESTIGATION OF THE FACTS OR THE LAW OR CONSIDER  
11 OR DISCUSS FACTS AS TO WHICH THERE IS NO EVIDENCE.

12                   FOR EXAMPLE, YOU CAN'T DECIDE THAT  
13 IN YOUR OFF TIME YOU WILL INVESTIGATE SOME OF THE  
14 THINGS YOU HEAR IN COURT, GET ON THE INTERNET AND  
15 TRY TO FIGURE THINGS OUT.

16                   IF YOU HEAR A TERM THAT IS USED BY  
17 A PARTICULAR WITNESS, YOU CAN'T GO TO A DICTIONARY  
18 AND FIND OUT THE DEFINITION OF IT. IF YOU NEED A  
19 DEFINITION OF IT, IT HAS TO COME TO YOU THROUGH  
20 EVIDENCE IN THE COURT.

21                   THAT'S ONE THING YOU MIGHT DO IS  
22 WRITE THAT DOWN AND ASK FOR A DEFINITION.

23                   FOR EXAMPLE, WHEN I WENT BACK IN  
24 THE JURY ROOM OR GO BACK INTO THE JURY ROOM TO  
25 DISCUSS THE CASE, WHEN THE CASE IS OVER, YOU CAN'T  
26 TAKE DICTIONARIES AND ENCYCLOPEDIAS OR OTHER THINGS  
27 LIKE THAT. YOU HAVE TO DECIDE THE CASE BASED ON  
28 THE EVIDENCE HERE IN COURT.

1                   THIS MEANS, FOR EXAMPLE, YOU CAN'T  
2 CONDUCT EXPERIMENTS, YOU CAN'T CONSULT REFERENCE  
3 WORKS OR SEEK ADDITIONAL INFORMATION FROM ANY  
4 SOURCE OTHER THAN WHAT IS ALLOWED BY THE COURT HERE  
5 IN THE COURTROOM

6                   NOW, LET ME TALK ABOUT EVIDENCE.

7                   YOU HAVE HEARD ME, I TOLD YOU WHAT  
8 THAT WAS INITIALLY, AND I TOLD YOU I WAS GOING TO  
9 SPEAK TO YOU A LITTLE BIT MORE ABOUT IT AND HERE I  
10 GO.

11                  EVIDENCE MEANS TESTIMONY, WRITINGS,  
12 YOU WILL SEE PLENTY OF THAT, MATERIAL OBJECTS AND  
13 OTHER THINGS THAT ARE PRESENTED TO THE SENSES AND  
14 OFFERED TO PROVE THE EXISTENCE OR THE NONEXISTENCE  
15 OF A FACT.

16                  EVIDENCE IS EITHER DIRECT OR IT'S  
17 CIRCUMSTANTIAL.

18                  DIRECT EVIDENCE PROVES A FACT  
19 WITHOUT ANY INFERENCE, AND IF TRUE, CONCLUSIVELY  
20 ESTABLISHES THAT FACT.

21                  CIRCUMSTANTIAL EVIDENCE PROVES A  
22 FACT FROM WHICH AN INFERENCE OF THE EXISTENCE OF  
23 ANOTHER FACT MAY BE DRAWN.

24                  AN INFERENCE IS A DEDUCTION OF FACT  
25 THAT MAY BE LOGICALLY AND REASONABLY BE DRAWN FROM  
26 ANOTHER FACT OR GROUP OF FACTS ESTABLISHED BY THE  
27 EVIDENCE.

28                  NOW, THE LAW MAKES NO DISTINCTION

1 BETWEEN DIRECT AND CIRCUMSTANTIAL EVIDENCE AS TO  
2 THE DEGREE OF PROOF REQUIRED. EACH IS A REASONABLE  
3 METHOD OF PROOF AND EACH IS RESPECTED FOR SUCH  
4 CONVINCING FORCE AS IT MAY CARRY.

5 NOW, YOU ARE THE SOLE AND EXCLUSIVE  
6 JUDGES OF THE BELIEVABILITY OF THE WITNESSES AND  
7 THE WEIGHT TO BE GIVEN TO THE TESTIMONY OF EACH  
8 WITNESS.

9 IN DETERMINING THE BELIEVABILITY OF  
10 A WITNESS, YOU MAY CONSIDER ANY MATTER THAT HAS A  
11 TENDENCY IN REASON TO PROVE OR DISPROVE THE  
12 TRUTHFULNESS OF THE TESTIMONY OF THE WITNESS,  
13 INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:

14 THE Demeanor AND MANNER OF THE  
15 WITNESS WHILE TESTIFYING;

16 THE CHARACTER AND QUALITY OF THE  
17 TESTIMONY;

18 THE EXTENT OF THE CAPACITY OF THE  
19 WITNESS TO PERCEIVE, TO RECOLLECT OR TO COMMUNICATE  
20 ABOUT THE MATTER FOR WHICH THE WITNESS IS  
21 TESTIFYING;

22 THE OPPORTUNITY OF THE WITNESS TO  
23 PERCEIVE ANY MATTER ABOUT WHICH THE WITNESS  
24 TESTIFIES;

25 THE EXISTENCE OR NONEXISTENCE OF A  
26 BIAS, INTEREST OR OTHER MOTIVE;

27 A STATEMENT PREVIOUSLY MADE BY THE  
28 WITNESS THAT IS CONSISTENT OR INCONSISTENT WITH THE

1 TESTIMONY GIVEN HERE IN COURT;  
2 THE EXISTENCE OR NONEXISTENCE OF  
3 ANY FACT TESTIFIED TO BY THE WITNESS AND THE  
4 ATTITUDE OF THE WITNESS TOWARD THIS ACTION AND  
5 TOWARD THE GIVING OF TESTIMONY.

6 NOW, DISCREPANCIES IN A WITNESS'S  
7 TESTIMONY OR BETWEEN SUCH WITNESS'S TESTIMONY AND  
8 THAT OF OTHER WITNESSES, IF THERE ARE ANY, DO NOT  
9 NECESSARILY MEAN THAT ANY WITNESS SHOULD BE  
10 DISCREDITED.

11 FAILURE OF RECOLLECTION IS COMMON,  
12 INNOCENT MIS-RECOLLECTION IS NOT UNCOMMON.

13 TWO PERSONS WITNESSING AN INCIDENT  
14 OR A TRANSACTION OFTEN WILL SEE OR HEAR IT  
15 DIFFERENTLY.

16 WHETHER A DISCREPANCY PERTAINS TO  
17 AN IMPORTANT MATTER OR ONLY TO SOMETHING TRIVIAL  
18 SHOULD BE CONSIDERED BY YOU.

19 NOW, YOU ARE NOT REQUIRED TO DECIDE  
20 ANY ISSUE ACCORDING TO THE TESTIMONY OF A NUMBER OF  
21 WITNESSES WHICH DOES NOT CONVINCING YOU AS AGAINST  
22 THE TESTIMONY OF A SMALLER NUMBER OR OTHER EVIDENCE  
23 WHICH IS MORE CONVINCING TO YOU.

24 THE TESTIMONY OF ONE WITNESS WORTHY  
25 OF BELIEF IS SUFFICIENT TO PROVE THAT FACT.

26 THIS DOES NOT MEAN THAT YOU ARE  
27 FREE TO DISREGARD THE TESTIMONY OF ANY WITNESS,  
28 MERELY FROM CAPRICE OR PREJUDICE OR FROM A DESIRE

1 TO FAVOR ONE SIDE OR THE OTHER.

2 IT DOES MEAN THAT YOU MUST NOT  
3 DECIDE ANYTHING SIMPLY BY COUNTING THE NUMBER OF  
4 WITNESSES WHO HAVE TESTIFIED ON THE OPPOSING SIDES.  
5 THE TEST, OF COURSE, IS NOT THE NUMBER OF WITNESSES  
6 BUT THE CONVINCING FORCE OF THE EVIDENCE.

7 NOW, HAVE WE HAD ANY EVIDENCE IN  
8 THIS CASE YET?

9 CORRECT, JUROR NUMBER 1 HAS GOT IT.  
10 ABSOLUTELY NONE. THERE HAS BEEN NO EVIDENCE IN  
11 THIS CASE WHATSOEVER.

12 BUT IN JUST A COUPLE MINUTES, THE  
13 EVIDENCE WILL BEGIN.

14 SO, STATEMENTS OF COUNSEL, AND  
15 THEY, OF COURSE, MADE THEIR OPENING STATEMENTS,  
16 WHICH I AM SURE ALL OF YOU FOUND HELPFUL ON BOTH  
17 SIDES OF THIS CASE, STATEMENTS OF COUNSEL ARE NOT  
18 EVIDENCE AT ANY POINT IN THE TRIAL.

19 DON'T SPECULATE AS TO THE ANSWERS  
20 TO QUESTIONS THAT COUNSEL MAY ASK OF WITNESSES TO  
21 WHOM -- TO WHICH OBJECTIONS ARE SUSTAINED. IN  
22 OTHER WORDS, COUNSEL ASKED A QUESTION, ANOTHER  
23 COUNSEL GOES "OBJECTION, YOUR HONOR," SUCH AND  
24 SUCH, IF I GO, "SUSTAINED," DON'T YOU TRY TO FIGURE  
25 OUT WHAT THE ANSWER WOULD HAVE BEEN.

26 YOU JUST -- THAT QUESTION IS OUT  
27 AND ANOTHER QUESTION HAS TO BE ASKED. LISTEN FOR  
28 THE NEXT QUESTION AND THEN LISTEN TO THE ANSWER.

1 THAT'S WHAT COUNTS.

2 IN THE SAME WAY, IF I OVERRULE AN  
3 OBJECTION, DON'T THINK THAT I AM TELLING YOU OR  
4 SAYING ANYTHING ABOUT WHAT I BELIEVE ABOUT THE  
5 BELIEVABILITY OR UNBELIEVABILITY OF THE TESTIMONY.  
6 YOU HAVE TO REMEMBER, I AM NOT SITTING UP HERE  
7 JUDGING THIS TESTIMONY. I AM JUST DECIDING WHETHER  
8 OR NOT IT GETS INTO COURT.

9 YOU ARE THE ONES THAT ARE GOING TO  
10 DECIDE WHETHER IT'S BELIEVABLE OR NOT.

11 DON'T CONSIDER ANY EVIDENCE THAT IS  
12 STRICKEN. STRICKEN EVIDENCE MUST BE TREATED AS  
13 THOUGH YOU HAVE NEVER HEARD OF IT.

14 A SUGGESTION IN A QUESTION IS NOT  
15 EVIDENCE. REMEMBER, THAT'S THE LAWYER, WHEN THE  
16 LAWYER ASKS THE QUESTION, THAT'S THEIR WORDS,  
17 RIGHT, THAT'S NOT EVIDENCE, UNLESS IT'S ADOPTED IN  
18 THE ANSWER THAT'S GIVEN BY THE WITNESS.

19 A QUESTION, BY ITSELF, IS NOT  
20 EVIDENCE. CONSIDER IT ONLY TO THE EXTENT THAT IT  
21 IS ADOPTED IN THE ANSWER OF THE WITNESS, HIM OR  
22 HERSELF.

23 NOW LET ME SHIFT GEARS FOR JUST A  
24 SECOND AND TALK ABOUT EXPERT WITNESSES.

25 WITNESSES WHO HAVE SPECIAL  
26 KNOWLEDGE, SKILL, EXPERIENCE, TRAINING AND  
27 EDUCATION IN PARTICULAR SUBJECTS WILL TESTIFY TO  
28 CERTAIN OPINIONS IN THIS CASE.

1 ANY SUCH WITNESS IS REFERRED TO AS  
2 AN EXPERT WITNESS.

3 IN DETERMINING WHAT WEIGHT TO GIVE  
4 ANY SUCH OPINION, YOU SHOULD CONSIDER THE  
5 QUALIFICATIONS AND BELIEVABILITY OF THE WITNESS,  
6 THE FACTS OR MATERIALS UPON WHICH EACH OPINION IS  
7 BASED, AND THE REASONS GIVEN FOR EACH OPINION.

8 AN OPINION IS ONLY AS GOOD AS THE  
9 FACTS AND REASONS ON WHICH IT IS BASED.

10 IF YOU FIND THAT ANY SUCH FACT HAS  
11 NOT BEEN PROVED OR HAS BEEN DISPROVED, YOU MUST  
12 CONSIDER THAT IN DETERMINING THE VALUE OF AN  
13 OPINION.

14 LIKEWISE, YOU MUST CONSIDER THE  
15 STRENGTHS AND WEAKNESSES OF THE REASONS ON WHICH  
16 OPINIONS ARE BASED.

17 YOU ARE NOT BOUND BY AN OPINION.  
18 GIVE EACH OPINION THE WEIGHT THAT YOU FIND IT  
19 DESERVES.

20 HOWEVER, YOU MAY NOT ARBITRARILY OR  
21 UNREASONABLY DISREGARD THE EXPERT OPINION TESTIMONY  
22 IN THIS CASE.

23 NOW, IN RESOLVING ANY CONFLICT IN  
24 THE TESTIMONY OF OPPOSING EXPERTS WITNESSES, YOU  
25 SHOULD WEIGH THE OPINIONS OF ONE EXPERT AGAINST  
26 THOSE OF THE OTHER. IN DOING THIS, YOU SHOULD  
27 CONSIDER THE QUALIFICATIONS AND BELIEVABILITY OF  
28 EACH WITNESS AND THE REASONS FOR EACH OPINION THAT

1 EACH WITNESS GIVES ON THE MATTER TO WHICH THEY  
2 TESTIFY.

3 OKAY. THAT HAVING BEEN SAID, I  
4 WILL TURN TO THE PLAINTIFF.

5 PLAINTIFF MAY MAKE THEIR CASE.

6 MR. PIUZE, YOU MAY CALL YOUR FIRST  
7 WITNESS.

8 MR. PIUZE: ALL RIGHT, YOUR HONOR.

9 THANKS, I WANT TO CALL DR. RICHARD DOLL AS MY FIRST  
10 WITNESS.

11

12 PLAINTIFF'S CASE IN CHIEF

13

14 THE COURT: SIR, IF YOU WOULD FACE MY  
15 CLERK RIGHT NOW, RAISE YOUR RIGHT HAND AND BE SWORN  
16 AS A WITNESS IN THIS MATTER.

17

18

19 **RICHARD DOLL, M.D.**,

20 CALLED AS A WITNESS BY THE PLAINTIFF, WAS SWORN  
21 AND TESTIFIED AS FOLLOWS:

22 THE CLERK: YOU DO SOLELY STATE THE  
23 TESTIMONY YOU MAY GIVE IN THE CAUSE NOW PENDING  
24 BEFORE THIS COURT SHALL BE THE TRUTH, THE WHOLE  
25 TRUTH AND NOTHING BUT THE TRUTH SO HELP YOU GOD.

26 THE WITNESS: I DO.

27 THE CLERK: THANK YOU, SIR. YOU MAY BE  
28 SEATED.

1                   SIR, FOR THE RECORD, IF YOU COULD  
2 STATE YOUR NAME AND SPELL YOUR LAST NAME, PLEASE.

3                   THE WITNESS: MY NAME IS RICHARD DOLL,  
4 D-O-L-L.

5                   THE CLERK: THANK YOU VERY MUCH.

6

7                   DIRECT EXAMINATION

8

9 BY MR. PIUZE:

10                  Q.     GOOD MORNING.

11                  A.     GOOD MORNING.

12                  Q.     WHERE DO YOU LIVE?

13                  A.     IN OXFORD, ENGLAND.

14                  Q.     WHERE DO YOU WORK?

15                  A.     IN OXFORD, ENGLAND.

16                  Q.     WHAT DO YOU DO?

17                  A.     I DO EPIDEMIOLOGICAL RESEARCH AND I

18 DO QUITE A LOT OF WORK FOR NATIONAL RADIOLOGICAL

19 PROTECTION BOARD IN ASSESSING THE EFFECTS OF

20 IONIZING AND NON-IONIZING RADIATION ON THEIR

21 BEHALF.

22                  Q.     THANK YOU. WE GOT TO THE THIRD

23 QUESTION OF THE TRIAL AND WE GOT OUR FIRST REALLY

24 BIG WORD, "EPIDEMIOLOGICAL." SO TELL US WHAT

25 "EPIDEMIOLOGICAL" MEANS, PLEASE.

26                  A.     "EPIDEMIOLOGY" IS THE SCIENCE OF

27 STUDYING THE DISTRIBUTION OF DISEASE IN COMMUNITIES

28 IN PEOPLE AND TRYING TO COMPARE DIFFERENCES IN

1 INCIDENTS IN DIFFERENT GROUPS TO GET AN INDICATION  
2 OF THE CAUSES OF DISEASE.

3 Q. SO WITH EPIDEMIOLOGICAL RESEARCH,  
4 YOU ARE STUDYING RELATIVELY LARGE POPULATIONS OF  
5 PEOPLE?

6 A. YES.

7 Q. HOW LONG HAVE YOU BEEN INTO  
8 EPIDEMIOLOGY, PLEASE?

9 A. OH, FOR 53 YEARS.

10 Q. YOU REMEMBER THE DAY EXACTLY?

11 A. I REMEMBER THE YEAR.

12 Q. WHAT YEAR WAS IT, PLEASE?

13 A. I HAVE ACTUALLY CALCULATED  
14 INCORRECTLY. IT'S 1946. THAT'S 55.

15 Q. THAT SOUNDS LIKE 55 YEARS?

16 A. 55, YES.

17 Q. WHY DON'T YOU TELL US HOW YOU GOT  
18 INTO EPIDEMIOLOGICAL -- I HOPE I SAID THAT RIGHT,  
19 EPIDEMIOLOGICAL RESEARCH IN THE YEAR '45 AND THEN I  
20 WILL GO BACK TO YOUR QUALIFICATIONS LATER.

21 A. I CAME OUT OF THE BRITISH ARMY IN  
22 1945 AND DID A YEAR'S FRESHER IN MEDICINE IN  
23 HOSPITAL WHERE I HAD TRAINED BECAUSE I WAS A  
24 PHYSICIAN AND I HAD BEEN A PHYSICIAN IN THE ARMY.  
25 AND THEN I WAS LOOKING AROUND FOR A CAREER IN -- I  
26 HOPED TO BE CONSULTING PHYSICIAN, LOOKING AROUND  
27 FOR A CAREER IN GENERAL MEDICINE.

28 AND AT THAT TIME, WE DIDN'T HAVE A

1 NATIONAL HEALTH SERVICE AND THERE WAS A LOT OF  
2 COMPETITION FOR WORTHWHILE JOBS. AND I DIDN'T LIKE  
3 THE WHOLE ATMOSPHERE IN WHICH YOU HAD TO TRY TO  
4 BECOME, OR SUCK UP TO SENIOR PEOPLE IN ORDER TO GET  
5 A JOB.

6 AND I HAD ALWAYS WANTED TO DO  
7 RESEARCH. AND I WAS FORTUNATELY OFFERED THE  
8 OPPORTUNITY OF WORKING WITH A PHYSICIAN TO DO SOME  
9 RESEARCH INTO THE CAUSES OF GASTRIC AND DUODENAL  
10 ULCERS. SO I STARTED WITH DR. AVERY JONES IN 1946  
11 ON AN EPIDEMIOLOGICAL STUDY OF GASTRIC DUODENAL  
12 ULCERS, TRYING TO FIND OUT THEIR CAUSE.

13 Q. THANK YOU.

14 NOW, OVER THE YEARS, WHAT OTHER  
15 EP -- SAY IT FOR ME.

16 A. EPIDEMIOLOGICAL.

17 Q. -- EPIDEMIOLOGICAL STUDIES HAVE YOU  
18 DONE?

19 AND I DON'T WANT YOU TO LIST THEM  
20 ALL. I JUST LIKE THE SUBJECT MATTER. WE ALL KNOW  
21 TOBACCO IS ONE OF THEM FOR SURE, BUT TELL US ABOUT  
22 SOME OF THE OTHERS.

23 A. WELL, I HAVE STUDIED THE EFFECTS OF  
24 IONIZING RADIATION, DID EARLY STUDY TO FIND OUT  
25 WHETHER SMALL DOSES OF RADIATION WOULD CAUSE  
26 LEUKEMIA. THAT WAS A MAJOR STUDY.

27 BUT I HAVE ALSO STUDIED A LOT OF  
28 OCCUPATIONAL HAZARDS TO SEE WHETHER PEOPLE GOT

1 DISEASES AS A RESULT OF WHAT THEY WERE EXPOSED TO  
2 IN INDUSTRY, IN PARTICULAR, ASBESTOS.

3 I DID, I THINK, THE FIRST STUDY TO  
4 SHOW CONCLUSIVELY THAT ASBESTOS CAUSED CANCER OF  
5 THE LUNG.

6 AND THEN A FEW YEARS AFTER THAT I  
7 STUDIED ORAL CONTRACEPTIVES AND THE EFFECTS THAT  
8 THEY MIGHT HAVE. AND WE SHOWED THAT THEY COULD  
9 PRODUCE THROMBOSIS OF VEINS. THOSE ARE SOME OF THE  
10 SUBJECTS WHICH I HAVE BEEN, WORKED ON IN THE COURSE  
11 OF MY LIFE.

12 Q. ALL RIGHT, THANK YOU.

13 NOW, COMING UP TO THE PRESENT, YOU  
14 MENTIONED THAT YOU ARE EITHER ON A NATIONAL BOARD  
15 OR A CONSULTANT TO A NATIONAL BOARD. LET'S JUST  
16 TOUCH ON THAT BRIEFLY. PLEASE, TELL US ABOUT THAT.

17 A. YES, I ACTED AS A CONSULTANT TO THE  
18 NATIONAL RADIOLOGICAL PROTECTION BOARD, WHICH IS AN  
19 INDEPENDENT PARTY SET UP BY GOVERNMENT TO ADVISE ON  
20 THE HAZARDS OF IONIZING RADIATION, X-RAYS, GAMMA  
21 RAYS, NUCLEAR RADIATION AND TO RECOMMEND  
22 PRECAUTIONS NECESSARY TO PREVENT UNDUE EFFECTS FROM  
23 SUCH EXPOSURE.

24 AND ONCE WORKING AS A CONSULTANT TO  
25 THE BOARD ON THAT SUBJECT, I GOT TO HEAR THAT THE  
26 E. P. A. IN AMERICA WAS GOING TO MAKE A REPORT THAT  
27 MAGNETIC FIELDS FROM THE PASSAGE OF ELECTRICITY AND  
28 ELECTRICITY TRANSMISSION LINES WERE -- COULD BE A

1 CAUSE OF CANCER. AND I SAID TO THE DIRECTOR, I  
2 THINK YOU BETTER BE PREPARED TO EXPRESS AN OPINION  
3 IF THE E. P. A. REPORT COMES OUT. AND HE SAID, YES,  
4 I SHOULD. YOU SET UP A COMMITTEE AND TELL ME WHAT  
5 OPINION TO EXPRESS.

6 AND I GOT INVOLVED, THEREFORE, BACK  
7 IN 1990 AND HAVE BEEN, THAT'S BEEN A MAJOR COURSE  
8 OF SUBJECT OF STUDY FOR ME EVER SINCE.

9 Q. THANK YOU.

10 WHEN DID YOU START, FIRST, TO GET  
11 INVOLVED WITH EPIDEMIOLOGICAL RESEARCH REGARDING  
12 TOBACCO, PLEASE?

13 A. IN 1947. I HAD BEEN DOING WORK  
14 WITH DR. AVERY JONES ON THE CAUSES OF GASTRIC AND  
15 DUODENAL ULCER, AND IN THE COURSE OF THAT, I  
16 ATTENDED A STATISTICS COURSE AT THE LONDON SCHOOL  
17 OF HYGIENE UNDER PROFESSOR BRADFORD HILL AND HE  
18 EVIDENTLY LIKED MY WORK ON THAT COURSE BECAUSE,  
19 TOWARDS THE END OF THAT YEAR, 1947, HE ASKED ME IF  
20 I WOULD HELP HIM IN A STUDY TO TRY TO FIND OUT WHY  
21 THE MORTALITY FROM LUNG CANCER HAD INCREASED SO  
22 DRAMATICALLY IN ENGLAND.

23 Q. ALL RIGHT. THANK YOU.

24 BEFORE WE GO FURTHER, WHY DON'T YOU  
25 TELL THE JURY, BY THE LATE 1940'S, AT LEAST IN  
26 ENGLAND, HOW DRAMATICALLY HAD THE INCIDENTS OF LUNG  
27 CANCER INCREASED AND INCREASED OVER WHAT, PLEASE?

28 A. AT THE BEGINNING OF THE 20TH

1 CENTURY, LUNG CANCER WAS A VERY RARE DISEASE, AND,  
2 INDEED, WHEN I WAS A STUDENT, MEDICAL STUDENT IN  
3 THE 1930'S, IF A PATIENT WITH LUNG CANCER WAS  
4 ADMITTED TO THE WARD, WE WOULD SAY, OH, YOU BETTER  
5 GO AND SEE THAT PATIENT BECAUSE YOU WON'T SEE  
6 ANOTHER PATIENT WITH LUNG CANCER FOR A LONG TIME.

7 I REMEMBER THAT I SAW THREE  
8 PATIENTS WITH LUNG CANCER QUITE CLOSE TOGETHER AND  
9 EVERYBODY WAS VERY SURPRISED THAT IT WAS BECOMING  
10 SO MUCH MORE COMMON.

11 AND BY THIS TIME, THE DEATH RATE,  
12 RECORDED NATIONALLY FROM THIS DECEASED, HAD BEGUN  
13 TO GO UP.

14 IT WENT UP SO NOTABLY THAT MANY  
15 PATHOLOGISTS TRIED TO REVIEW THE EVIDENCE IN THE  
16 HOSPITAL TO FIND OUT IF IT REALLY WAS INCREASING OR  
17 WHETHER IT WAS JUST THAT DOCTORS WERE DIAGNOSING  
18 THE DISEASE BETTER.

19 AND IN THE 1920'S AND EARLY 1930'S,  
20 WE MOSTLY THOUGHT THAT IT WAS JUST IMPROVING  
21 MEDICAL DIAGNOSIS.

22 BUT, OF COURSE, DURING THE WAR,  
23 PEOPLE HAD OTHER THINGS TO THINK ABOUT THAN THE  
24 MORTALITY OF LUNG CANCER, AND IT WAS SUDDENLY  
25 REALIZED AFTER THE WAR THAT THE INCREASE HAD  
26 CONTINUED THROUGHOUT THAT PERIOD AND NOW THE DEATH  
27 RATE WAS MORE THAN 20 TIMES WHAT IT HAD BEEN IN THE  
28 1920'S.

1                   THERE WAS THIS ENORMOUS INCREASE IN  
2 THE MORTALITY FROM THE DISEASE AND IT REALLY SEEMED  
3 NECESSARY TO TRY TO FIND OUT WHAT THE CAUSE OF THIS  
4 INCREASE WAS.

5                   Q.     ALL RIGHT.  THANKS.

6                   SO BETWEEN, ROUGHLY, THE 1920' S AND  
7 ROUGHLY THE LATE 1940' S, THE INCIDENTS OF LUNG  
8 CANCER IN ENGLAND HAD GONE UP 20 TIMES?

9                   A.     IT HAD.

10                  Q.     SO WHAT DID YOU AND DR. HILL  
11 PROPOSE TO DO AS FAR AS STUDYING WHY, PLEASE.

12                  A.     WE PROPOSED TO INTERVIEW A LOT OF  
13 PATIENTS IN LONDON HOSPITALS THAT WERE ADMITTED  
14 WITH LUNG CANCER AND A NUMBER OF OTHER PATIENTS  
15 WITH OTHER DISEASES FOR COMPARISON IN PATIENTS WITH  
16 CANCER OF THE STOMACH AND LARGE BOWEL AND ALSO  
17 PATIENTS WITH NON-MALIGNANT DISEASES, ALL TOGETHER,  
18 DISEASES, NOTHING TO DO WITH CANCER, AND TO INQUIRE  
19 ABOUT THEIR PAST HISTORY AND EXPOSURE TO DIFFERENT  
20 THINGS THAT WE THOUGHT MIGHT HAVE, CONCEIVABLY HAVE  
21 SOMETHING TO DO WITH THE RISK OF LUNG CANCER.

22                  WE DREW UP A BIG QUESTIONNAIRE AND  
23 ARRANGED FOR PATIENTS TO BE INTERVIEWED BY SOCIAL  
24 WORKERS AND THAT QUESTIONNAIRE INCLUDED QUESTIONS  
25 ABOUT THEIR SMOKING HABITS.  THOUGH, I MUST SAY, AT  
26 THE TIME, I DIDN' T THINK THAT THAT WAS LIKELY TO BE  
27 AN IMPORTANT FACTOR.

28                  Q.     DR. DOLL, WE DREW UP A BIG

1 QUESTIONNAIRE HERE FOR THIS TRIAL, TOO, A COUPLE  
2 WEEKS AGO.

3                   WHY WERE YOU LOOKING AT PEOPLE IN  
4 HOSPITALS WHO DID NOT HAVE LUNG CANCER, IF THE  
5 PURPOSE OF YOUR STUDY WAS TO CHECK INTO LUNG  
6 CANCER, WHY WERE YOU LOOKING AT PEOPLE WHO HAD  
7 STOMACH CANCER, GASTROINTESTINAL CANCER OR OTHER  
8 THINGS THAT WERE NOT LUNG CANCER?

9                   A.     WELL, IN ORDER TO DRAW ANY  
10 CONCLUSION ABOUT WHAT THE CAUSE OF THE DISEASE  
11 MIGHT BE, IT WAS ESSENTIAL TO FIND IF THERE WAS ANY  
12 DIFFERENCE BETWEEN THE EXPOSURES OF PEOPLE WITH  
13 LUNG CANCER AND OTHER PEOPLE WHO WERE  
14 REPRESENTATIVE OF THE POPULATION AS A WHOLE.

15                   AND IN ENGLAND, AT THAT TIME, THE  
16 NATIONAL HEALTH SERVICE HAD JUST BEEN INTRODUCED.  
17 IT WAS INTRODUCED, ACTUALLY, IN 1948, WE BEGAN.  
18 BUT WE HAD A NATIONAL HOSPITAL SYSTEM CARRIED ON  
19 FROM THE WAR AND PEOPLE ADMITTED TO HOSPITALS WERE  
20 REPRESENTATIVE OF THE WHOLE POPULATION.

21                   WE ALSO WANTED TO INTERVIEW  
22 PATIENTS WITH OTHER CANCERS BECAUSE IF WE FOUND ANY  
23 DIFFERENCE BETWEEN THOSE WITH LUNG CANCER AND  
24 PATIENTS WHO DIDN'T HAVE ANY CANCER, WE WANTED TO  
25 KNOW IF IT WAS SPECIFIC, SOMETHING SPECIAL TO LUNG  
26 CANCER OR WHETHER IT WAS JUST SOMETHING THAT  
27 RELATED TO CANCER OF ALL SORTS.

28                   Q.     THANK YOU.

1                   NOW, ABOUT TWO ANSWERS BACK, YOU  
2 MADE A STATEMENT AS PART OF YOUR ANSWER THAT AT THE  
3 BEGINNING, YOU DIDN'T BELIEVE THAT SMOKING WAS  
4 RELATED TO LUNG CANCER.

5                   DO YOU RECALL THAT?

6           A.     YES, I DID.

7           Q.     HOW WAS SMOKING EVEN ON THE TABLE  
8 AS ONE OF THE POSSIBILITIES? HOW DID SMOKING COME  
9 EVEN TO BE DISCUSSED AS A POSSIBILITY?

10          A.     WELL, IT HAD BECOME MORE COMMON  
11 SINCE THE BEGINNING OF THE CENTURY. BUT THERE WAS  
12 AN INCREASE IN CONSUMPTION OF TOBACCO, BUT THE  
13 REALLY STRIKING THING WAS THE SWITCH FROM PIPE  
14 SMOKING AND CIGAR SMOKING TO CIGARETTE SMOKING. SO  
15 THERE HAD BEEN A VERY BIG INCREASE IN THE  
16 CONSUMPTION OF CIGARETTES. A SMALLER INCREASE IN  
17 THE CONSUMPTION OF TOBACCO ALL TOGETHER. SOME  
18 WHICH USED TO BE CHEWED, FOR EXAMPLE, WAS NO LONGER  
19 CHEWED IN THE 1940'S.

20                   AND SO THIS WAS, OBVIOUSLY, ONE OF  
21 THE THINGS THAT WE PUT ON OUR LIST THAT HAD  
22 CHANGED. BUT SOMETIME BEFORE THE LUNG CANCER  
23 EPIDEMIC BEGAN, BECAUSE WE HAD TO LOOK FOR  
24 SOMETHING, FOR A CAUSE, IT HAD TO BE SOMETHING THAT  
25 HAD INCREASED BEFORE THE LUNG CANCER INCREASED.

26          Q.     WHY WOULD THAT BE, PLEASE.

27          A.     BECAUSE IT TAKES TIME, THIS WAS  
28 KNOWN EVEN THEN AND IS KNOWN NOW BY EVERYBODY THAT

1 STUDIES CANCER, IT TAKES, USUALLY TAKES MANY YEARS  
2 OF EXPOSURE TO AN AGENT THAT CAUSES CANCER BEFORE  
3 CANCER IS ACTUALLY PRODUCED.

4 CERTAINLY 10, USUALLY 20 AND OFTEN  
5 30 YEARS OF EXPOSURE BEFORE A CANCER DEVELOPS.

6 Q. THANK YOU.

7 SO AT THE BEGINNING OF YOUR STUDY,  
8 BESIDES TOBACCO WHICH YOU HAVE MENTIONED, WHAT WERE  
9 SOME OF THE OTHER POSSIBILITIES THAT WERE ON THE  
10 TABLE THAT YOU THOUGHT MIGHT BE A REASON THAT LUNG  
11 CANCER HAD INCREASED SO MUCH?

12 A. WELL, I WAS PARTICULARLY INTERESTED  
13 IN THE EFFECTS OF MOTOR CARS AND MOTOR CAR  
14 EXHAUSTS.

15 THERE HAD BEEN AN ENORMOUS INCREASE  
16 IN THE USE OF MOTOR CARS FROM THE BEGINNING OF THE  
17 20TH CENTURY. AND THEY HAD ALSO, AS A RESULT OF  
18 THE INCREASE IN MOTOR CARS, THE ROADS HAD BEEN  
19 TARRED, THE SURFACE OF THE ROADS HAD BEEN CHANGED.  
20 INSTEAD OF COBBLE OR STONE, THEY WERE SMOOTH,  
21 COVERED WITH TAR. AND WE KNEW THAT THE TAR THAT  
22 WAS PUT ON ROADS DID CONTAIN CHEMICALS THAT CAUSED  
23 CANCER. AND I THOUGHT THAT ROAD DUST WAS, INDEED,  
24 A POSSIBLE CAUSE OF THE INCREASE IN LUNG CANCER.

25 Q. OKAY. THANK YOU.

26 SO WHY DON'T YOU TELL US, NOW THAT  
27 YOU HAD A GOAL AND YOU HAD A COUPLE THOUGHTS IN  
28 ADVANCE, HOW YOU HAVE CONDUCTED THE STUDY ALONG

1 WITH DR. HILL, PLEASE.

2 A. WELL, I SHOULD, OF COURSE, ALSO ADD  
3 OCCUPATION AS A POSSIBLE CAUSE AND PREVIOUS LUNG  
4 DISEASES. SO THERE WERE A LOT OF OTHER THINGS, NOT  
5 JUST THE MOTOR CARS AND THE TOBACCO.

6 Q. WELL, LET'S STAY THERE. I DIDN'T  
7 MEAN TO PRECLUDE THAT DISCUSSION. I APOLOGIZE.  
8 LET'S STAY THERE.

9 JUST TELL US A LITTLE BIT ABOUT  
10 THOSE TWO POSSIBILITIES, PLEASE.

11 A. WELL, THERE WERE SUGGESTIONS, FOR  
12 EXAMPLE, THAT SCARRING RESULTING FROM TUBERCULOSIS,  
13 HEALED TUBERCULOSIS, MIGHT BE A CAUSE OF LUNG  
14 CANCER. THAT WAS ONE POSSIBLE ILLNESS, PAST  
15 ILLNESS, WHICH MIGHT CAUSE A DISEASE.

16 AND CERTAINLY OCCUPATIONAL HAZARDS  
17 WERE KNOWN TO BE A CAUSE OF CANCER, RADIATION IN  
18 PARTICULAR.

19 SO WE WANTED -- AND THERE WERE  
20 SEVERAL OTHER CAUSES OF LUNG CANCER EXPOSURE TOO.  
21 CHROMATES WAS ONE.

22 SO WE HAD DETAILED OCCUPATIONAL  
23 HISTORY AND, OF COURSE, WE ALSO MADE A FAMILY  
24 HISTORY BECAUSE THERE WAS ALWAYS A POSSIBILITY THAT  
25 GENETIC FACTOR MIGHT BE RELATED TO RISK OF A  
26 DISEASE.

27 Q. THANK YOU.

28 SO YOU PASSED OUT THESE DETAILED

1 QUESTIONNAIRES TO THE PEOPLE IN THE HOSPITAL?

2 A. YES.

3 Q. AND WHAT DID YOU FIND, PLEASE?

4 A. WELL, WE I HAD FOUR SOCIAL WORKERS  
5 WORKING WITH ME AND THEY WOULD GO AND INTERVIEW  
6 PATIENTS AS SOON AS THEY WERE ADMITTED TO HOSPITAL  
7 WITH A SUSPICION OF LUNG CANCER OR STOMACH OR LARGE  
8 BOWEL CANCER. AND THEN, OF COURSE, IT TURNED OUT  
9 THAT AFTER ADMISSION TO HOSPITAL AND INVESTIGATION,  
10 SOME OF THOSE PATIENTS WERE PROVED NOT TO HAVE THE  
11 DISEASE FOR WHICH THEY HAD BEEN ADMITTED.

12 AND I WENT AROUND TO ALL THE  
13 HOSPITALS, PERSONALLY, AND LOOKED AT THE NOTES,  
14 HOSPITAL NOTES, THE RECORDS, OF ALL THE PATIENTS  
15 AND CLASSIFIED THEM ACCORDING TO WHETHER THEY HAD  
16 BEEN PROVED TO HAVE LUNG CANCER OR WHETHER THEY HAD  
17 BEEN SHOWN TO HAVE OTHER DECEASES.

18 AND ONE OF THE MOST STRIKING  
19 THINGS, TO ME, AS I DID THAT, AS I DID THAT WAS  
20 THAT IF THE PATIENTS HAD BEEN NON-SMOKERS, THE  
21 DIAGNOSIS WAS NEARLY ALWAYS CHANGED. WHEREAS IF  
22 THEY HAD BEEN A HEAVY SMOKER, IT VERY SELDOM WAS,  
23 THE LUNG CANCER WAS CONFIRMED.

24 BUT THIS WAS A PARTICULARLY  
25 IMPORTANT PART OF OUR STUDY BECAUSE WE WERE ABLE TO  
26 SHOW THAT OUR RESULTS, WHEN WE FOUND THAT PATIENTS  
27 WITH LUNG CANCER WERE OFTEN, MORE OFTEN SMOKERS  
28 THAN PATIENTS WITH OTHER DISEASES. AND IN

1 PARTICULAR, PATIENTS THAT WERE HEAVY SMOKERS WERE,  
2 PATIENTS WITH LUNG CANCER WERE MUCH MORE LIKELY TO  
3 BE HEAVY SMOKERS.

4 WE WERE ABLE TO SHOW THAT OUR  
5 RESULTS WERE NOT BIASED BY SOCIAL WORKERS. THE WAY  
6 THEY INTERVIEWED PATIENTS, PERHAPS, THERE WAS  
7 ALWAYS A POSSIBILITY THAT THEY MIGHT SUGGEST TO AN  
8 INDIVIDUAL THAT THEY HAD BEEN A SMOKER WHEN THEY  
9 SAID THEY WERE A NON-SMOKER. THEY MIGHT HAVE  
10 PRESSED THEM DIFFERENTLY. AND IT WAS IMPORTANT TO  
11 MAKE SURE THAT THEY HAD ALL BEEN QUESTIONED IN THE  
12 SAME WAY.

13 AND ONE OF THE STRIKING RESULTS WAS  
14 THAT WHEN WE ANALYZED THE DATA, PATIENTS WITH LUNG  
15 CANCER HAD THIS VERY MUCH, MANY MORE OF THEM WERE  
16 HEAVY SMOKERS THAN IN THE CONTROLLED POPULATION.

17 BUT IF THE DIAGNOSIS HAD BEEN  
18 CHANGED, THEN THE DISTRIBUTION TO SMOKING HABITS  
19 WAS JUST THE SAME AS IT WAS FOR PATIENTS WITH  
20 GASTRIC CANCER OR LARGE BOWEL CANCER OR  
21 NON-MALIGNANT DISEASES. SO THERE WAS NO  
22 POSSIBILITY OF BIAS HAVING CAUSED OUR RESULTS.

23 Q. LET ME JUST DIGRESS HERE FOR A  
24 SECOND AND JUST TALK GENERALLY.

25 IF SCIENTIFIC STUDIES, AND I WILL  
26 INCLUDE MEDICAL STUDIES AS SCIENTIFIC STUDIES,  
27 AREN'T DONE RIGHT, CAN THERE BE BIASED RESULTS?

28 A. OH, INDEED, YES.

1                   AND ONE HAS TO BE VERY CAREFUL AND  
2 ALWAYS ASK IN EPIDEMIOLOGICAL STUDIES WHETHER THE  
3 RESULTS COULD BE BIASED BY AN ATYPICAL SELECTION OF  
4 THE CONTROL PATIENTS OR IN THE WAY THE QUESTIONS  
5 WERE ASKED AND ANSWERED.

6                   Q.     THANK YOU.

7                   PEOPLE INTERESTED IN DOING REAL  
8 SCIENCE, LOOKING FOR REAL ANSWERS, ARE THEY ON  
9 GUARD FOR THE POSSIBILITY OF BIAS IN THEIR STUDIES?

10                  A.     WE CERTAINLY ARE.

11                  Q.     IN EXPLAINING TO THE JURY IN YOUR  
12 LAST LONG ANSWER, PART OF THE ANSWER, I THINK, HAD  
13 TO DO WITH THE FACT THAT SOME PEOPLE ORIGINALLY HAD  
14 BEEN STATED TO HAVE LUNG CANCER BUT IT TURNED OUT  
15 THEY REALLY DIDN' T AFTER ALL.

16                  DO YOU RECALL THAT?

17                  A.     THAT IS CORRECT, YES.

18                  Q.     JUST TELL US A LITTLE BIT ABOUT WHO  
19 HAD MADE THE ORIGINAL STATEMENT THAT THE PATIENT  
20 HAD LUNG CANCER AND THEN IT TURNED OUT TO BE WRONG?  
21 WAS IT THE PATIENT THAT SAYS IT OR A DOCTOR OR  
22 SOCIAL WORKER OR WHO?

23                  A.     OH, NO.  THEY WERE ADMITTED TO  
24 HOSPITAL FOR THE PURPOSE OF CHECKING WHETHER THEY  
25 HAD LUNG CANCER OR NOT.  PROBABLY THE GENERAL  
26 PRACTITIONER OR ONE OF THE HOSPITAL CONSULTANTS WHO  
27 SAW THE PATIENT AS AN OUTPATIENT, HE KNEW HE HAD A  
28 CHEST DISEASE AND HE THOUGHT IT MIGHT BE LUNG

1 CANCER, AND HE WANTED TO ADMIT THE PATIENT SO THAT  
2 HE COULD CARRY OUT SPECIAL STUDIES TO FIND OUT IF  
3 HE DID OR DID NOT HAVE LUNG CANCER.

4 I SAY "HE," BUT, OF COURSE, THERE  
5 WERE ALSO WOMEN WITH THE DISEASE.

6 Q. THANK YOU.

7 AND THAT'S A POINT TOO. LUNG  
8 CANCER, CORRECT ME IF I AM WRONG, WAS A HECK OF A  
9 LOT MORE COMMON IN MEN THAN IN WOMEN BACK THEN?

10 A. IT WAS AT THAT TIME. OF COURSE,  
11 THAT HAS CHANGED SINCE.

12 Q. YES.

13 OKAY. SO ON THIS ISSUE OF THE  
14 ORIGINAL DIAGNOSIS BEING MAYBE LUNG CANCER AND IT  
15 TURNED OUT THAT SOME OF THE PATIENTS DID NOT HAVE  
16 LUNG CANCER, DID YOU SAY THAT OF THOSE PATIENTS  
17 THAT WERE ORIGINALLY MISDIAGNOSED, PROBABLY CANCER  
18 AND IT TURNED OUT THEY DIDN'T HAVE IT, MOST OF THEM  
19 WERE NON-SMOKERS AND ALL THE PEOPLE THAT REMAINED  
20 WERE SMOKERS? DID I HEAR THAT RIGHT?

21 A. NO, I WOULDN'T SAY THERE WERE  
22 NON-SMOKERS. BUT THEY HAD THE SAME SMOKING HABITS  
23 AS THE GENERAL POPULATION, AS PEOPLE WERE -- WELL,  
24 PEOPLE THAT DIDN'T HAVE CANCER. A FAIRLY HIGH  
25 PROPORTION OF THEM OR A HIGH PROPORTION OF THEM  
26 WERE NON-SMOKERS AND THERE WEREN'T MANY HEAVY  
27 SMOKERS AMONG THEM

28 IT IS THE SAME AS THE GENERAL

1 POPULATION.

2 Q. I AM SORRY I MESSED THAT UP THEN.  
3 IS THE POINT THAT OUT IN THE  
4 GENERAL POPULATION, THE PEOPLE WITH LUNG CANCER  
5 TEND TO BE HEAVY SMOKERS?

6 A. YES, INDEED.  
7 IN OUR STUDY WE FOUND THAT ONLY  
8 HALF OF ONE PERCENT OF THE LUNG CANCER PATIENTS  
9 WERE LIFE-LONG NON-SMOKERS WHEREAS IN THE GENERAL  
10 POPULATION, IN ENGLAND, AT THAT TIME, IT WAS ABOUT  
11 TEN TIMES AS MUCH, ABOUT 5 PERCENT.

12 Q. ALL RIGHT, THANK YOU.  
13 SO WE ARE STILL IN THE 1940'S NOW,  
14 ARE WE?

15 A. YES, YES. LATE 1940'S.

16 Q. LATE 1940'S.  
17 IT LOOKS LIKE AFTER YOU DID A  
18 LITTLE BIT OF WORK IN THE HOSPITALS, YOUR ORIGINAL  
19 SUSPICION ABOUT TAR ON THE ROAD DIDN'T PAN OUT?

20 A. THAT IS RIGHT, IT DIDN'T PAN OUT.

21 Q. WHAT YEAR WAS IT THAT YOU SAID TO  
22 YOURSELF, WELL, LOOK AT ALL THIS STUFF IN FRONT OF  
23 ME, IT SURE LOOKS LIKE CIGARETTE SMOKING CAUSES  
24 LUNG CANCER, WHAT YEAR WAS THAT?

25 A. WELL, I FELT IT WAS SUFFICIENTLY  
26 LIKELY IN 1949 TO STOP SMOKING MYSELF. BUT WE --  
27 OF COURSE, IT TOOK US SOME MONTHS TO WRITE A PAPER  
28 AND IT WASN'T PUBLISHED UNTIL 1950.

1                   BUT IN 1950, WE WROTE A PAPER  
2 DESCRIBING WHAT WE HAD FOUND IN THE PATIENTS WITH  
3 AND WITHOUT LUNG CANCER, AND WE DREW THE CONCLUSION  
4 FROM THAT STUDY THAT CIGARETTE SMOKING WAS AN  
5 IMPORTANT CAUSE OF LUNG CANCER.

6                   OF COURSE, IN DRAWING THAT  
7 CONCLUSION, REACHING THAT CONCLUSION, WE HAD MUCH  
8 MORE EVIDENCE THAN JUST THE EVIDENCE OF THE  
9 PATIENTS WITH AND WITHOUT THE DISEASE.

10                Q.     WHAT OTHER EVIDENCE DID YOU HAVE,  
11 PLEASE?

12                A.     WE HAD THE EVIDENCE THAT THE  
13 DISEASE WAS MUCH COMMONER IN MEN THAN IN WOMEN,  
14 GENERALLY. AND WE KNEW THAT MEN SMOKED MORE THAN  
15 WOMEN. AND WE LOOKED AROUND THE WORLD TO SEE --  
16 WHEN I SAY "WE" PROFESSOR BRAD HILL AND MYSELF, WE  
17 LOOKED AROUND THE WORLD TRYING TO FIND COUNTRIES  
18 WHERE SMOKING WAS NOT COMMON, TO SEE WHETHER THERE  
19 WAS LUNG CANCER IN THOSE COUNTRIES.

20                   AND WE FOUND THAT IN NORWAY AND  
21 ICELAND WHERE CIGARETTE SMOKING WAS VERY UNCOMMON,  
22 LUNG CANCER WAS VERY UNCOMMON.

23                   WHEREAS IN FINLAND, WHERE CIGARETTE  
24 SMOKING HAD BECOME COMMON EARLIER THAN ANY OTHER  
25 COUNTRY IN EUROPE, APART FROM ENGLAND, LUNG CANCER  
26 WAS EXTREMELY COMMON.

27                   AND WE EVEN FOUND ONE REALLY  
28 STRIKING DIFFERENCE THAT THERE WAS ONE GROUP OF

1 WOMEN IN THE WORLD WHO HAD A HIGH INSTANCE OF LUNG  
2 CANCER, ONLY ONE GROUP, AND THAT WAS THE MAORI  
3 WOMEN IN NEW ZEELAND. AND MAORI WOMEN IN NEW  
4 ZEELAND HAD BEEN SMOKING REGULARLY SINCE 1890,  
5 WHEREAS WOMEN IN OTHER COUNTRIES HAD NOT BEEN  
6 SMOKERS.

7 SO WE FOUND ALL THIS WHAT WE CALL  
8 ECOLOGICAL EVIDENCE, EVIDENCE OF WHAT WAS HAPPENING  
9 IN WHOLE COMMUNITIES, STRONGLY SUPPORTED THE  
10 CONCLUSION THAT CIGARETTE SMOKING WAS A CAUSE OF  
11 THE DISEASE.

12 Q. ALL RIGHT, THANK YOU.

13 NOW, WE ARE A LONG WAY FROM 1949.  
14 IN 1949, YOU WERE A MEDICAL DOCTOR FOR HOW LONG,  
15 PLEASE?

16 A. I QUALIFIED FOR MEDICINE IN 1937.

17 Q. WELL, YOU HAD BEEN A MEDICAL DOCTOR  
18 FOR 12 YEARS, AND YOU HAD BEEN SMOKING CIGARETTES  
19 FOR 12 YEARS -- FOR HOW LONG, I AM SORRY?

20 A. I STARTED SMOKING CIGARETTES WHEN I  
21 WAS ABOUT 19.

22 Q. WELL, I GUESS WE ARE GOING TO HAVE  
23 TO INQUIRE INTO YOUR AGE THEN.

24 A. I WAS 37 WHEN I GAVE UP SMOKING, SO  
25 I HAD BEEN SMOKING FOR 18 YEARS.

26 Q. WASN'T IT INCONGRUOUS THAT A  
27 MEDICAL DOCTOR WAS SMOKING FOR 18 YEARS?

28 MR. CARLTON: OBJECTION, LEADING.

1 THE COURT: SUSTAINED. JUST REPHRASE.  
2 HOLD ON.

3 MR. PIUZE: I AM GOING TO ASK A BETTER  
4 QUESTION. BETTER THAN THAT.

5 Q BY MR. PIUZE: DID YOU KNOW OTHER  
6 DOCTORS THAT SMOKED?

7 A. OH, DOCTORS AS A WHOLE WERE SMOKING  
8 MORE THAN THE GENERAL POPULATION. RATHER, DOCTORS  
9 UP TO THE AGE OF 65 WERE SMOKING ABOUT THE SAME AS  
10 MEN GENERALLY IN THE COUNTRY, BUT THE OLDER DOCTORS  
11 WERE SMOKING MORE THAN THE REST OF THE POPULATION.

12 Q. JUST WHY DON'T WE TALK ABOUT THE  
13 GENERAL POPULATION IN ROUND NUMBERS. IN THE LATE  
14 1940'S IN BRITON, WHAT PERCENTAGE OF MALE ADULTS  
15 SMOKED?

16 A. WELL, IT WAS ENORMOUSLY HIGH, 80  
17 PERCENT. I HAD A FIGURE OF 86 PERCENT BUT THAT  
18 WAS, THAT WAS EXAGGERATED. 80 PERCENT OF ADULT  
19 MALES WERE REGULAR CIGARETTE SMOKERS AS SHOWN BY  
20 NATIONAL SURVEYS. AND IN OUR STUDY OF PATIENTS IN  
21 HOSPITAL, IT WAS SLIGHTLY MORE THAN 80 PERCENT OF  
22 THOSE THAT WERE NOT WITH LUNG CANCER.

23 Q. THANK YOU.

24 THEN TO PROVE I HAVE BEEN  
25 LISTENING, IS IT CORRECT THAT 80 PERCENT OF THE  
26 MALE MEDICAL DOCTORS WERE SMOKERS TOO?

27 A. OH, YES. YES. ACTUALLY, ACTUALLY,  
28 IT WOULD HAVE BEEN -- I AM SORRY, I CAN'T GIVE A

1 PRECISE FIGURE, BUT ABOUT 80 PERCENT, YES.

2 Q. THAT'S FINE. THAT'S GOOD ENOUGH  
3 FOR ME.

4 SO IN 1949, THE FIRST PHASE OF YOUR  
5 RESEARCH WAS DONE, YOU TOOK CIGARETTES AND PUT THEM  
6 ASIDE AS A RESULT OF WHAT YOU HAD SEEN?

7 A. I DID.

8 Q. WHEN DID YOU AND DR. HILL PUBLISH  
9 THE RESULTS OF YOUR STUDY, PLEASE?

10 A. IN 1950. WE HAD THE RESULTS  
11 EARLIER, THE END OF 1949. AND WE TOOK THEM TO THE  
12 SECRETARY OF THE MEDICAL RESEARCH COUNCIL, WHICH  
13 HAD BEEN FUNDING OUR RESEARCH, A PROFESSOR  
14 HEMSWORTH, A PHYSICIAN, A SCIENTIFIC PHYSICIAN WHO  
15 WE GREATLY RESPECTED. AND WE SHOWED HIM OUR  
16 RESULTS. AND HE SAID, WELL, THIS IS SO IMPORTANT  
17 THAT I THINK YOU OUGHT TO SHOW THAT IT APPLIES  
18 THROUGHOUT THE COUNTRY AND NOT JUST IN LONDON. WE  
19 JUST HAD ONLY BEEN INTERVIEWING PATIENTS IN THE  
20 LONDON AREA.

21 AND SO WE DIDN'T PUBLISH THE PAPER  
22 IN THE END OF 1949. WE SET OUT TO REPEAT OUR STUDY  
23 ON PATIENTS IN FOUR OTHER CITIES IN ENGLAND.

24 Q. ALL RIGHT. AND MAYBE IT'S EVIDENT  
25 TO A LOT OF US, BUT TELL US WHY ONLY INTERVIEWING  
26 PATIENTS IN THE LONDON AREA MIGHT HAVE MESSED UP  
27 THE REPORT OR GIVEN YOU SOME RESULTS THAT WEREN'T  
28 ACCURATE?

1           A.     WELL, I NEVER THOUGHT IT WAS A  
2 REASONABLE OBJECTION, MYSELF.

3                     BUT AS PROFESSOR HEMSWORTH WAS A  
4 SCIENTIST WITH SUCH REPUTE, I THINK HE WAS JUST  
5 CONCERNED THAT PEOPLE IN LONDON MIGHT HAVE HAD  
6 DIFFERENT HABITS TO OTHER PARTS OF THE COUNTRY AND  
7 HE WANTED TO KNOW IF IT WAS REPRESENTATIVE OF THE  
8 WHOLE COUNTRY.

9           Q.     SO WHAT DID YOU DO ABOUT THAT,  
10 PLEASE?

11           A.     WE REPEATED OUR STUDY, INTERVIEWING  
12 PATIENTS WITH LUNG CANCER AND WITH OTHER DISEASES  
13 IN NEW CASTLE, LEEDS, CAMBRIDGE AND BRISTOL, WHICH  
14 ARE FOUR CITIES SCATTERED OVER DIFFERENT PARTS OF  
15 ENGLAND.

16           Q.     AND DID THE RESULTS OF YOUR STUDIES  
17 CHANGE THE ORIGINAL CONCLUSIONS OF THE LONDON  
18 STUDY?

19           A.     NO, THEY WERE EXACTLY THE SAME.

20           Q.     ARMED WITH THIS INFORMATION, DID  
21 YOUR RESEARCH AND DR. BRADFORD HILL'S RESEARCH GET  
22 PUBLISHED?

23           A.     YES.

24           Q.     WHEN, PLEASE?

25           A.     IN SEPTEMBER 1950.

26           Q.     SO IN SEPTEMBER 1950, LET'S SEE IF  
27 I JUST HAVE A COPY OF IT, HERE.

28                     I AM JUST GOING TO SHOW YOU THIS,

1 IT'S FOR YOUR USE ONLY.

2 IN SEPTEMBER, 1950, DID YOUR  
3 STUDIES GET PUBLISHED IN THE BRITISH MEDICAL  
4 JOURNAL?

5 A. YES, THEY DID.

6 Q. NOW, I AM GOING TO -- THANK YOU.

7 I AM GOING TO CHANGE SUBJECTS HERE  
8 A LITTLE BIT. AND I AM GOING TO ASK YOU IN ADVANCE  
9 TO PUT SOME MODESTY ASIDE, BECAUSE I WANT THE JURY  
10 TO GET AN IDEA OF SOME OF YOUR ACCOMPLISHMENTS  
11 HERE, OKAY?

12 A. YES.

13 Q. NOW, IS THE "BRITISH MEDICAL  
14 JOURNAL" A VERY PRESTIGIOUS PUBLICATION?

15 A. YES.

16 Q. IS THE "BRITISH MEDICAL JOURNAL"  
17 ONE OF THE MOST PRESTIGIOUS MEDICAL JOURNALS THERE  
18 IS ANYWHERE?

19 MR. CARLTON: OBJECTION, LEADING.

20 THE COURT: OVERRULED.

21 THE WITNESS: YES.

22 Q BY MR. PIUZE: AND WAS IT AT THE  
23 TIME?

24 A. YES.

25 Q BY MR. PIUZE: AS A RESULT OF SOME  
26 OF THE WORK THAT YOU HAVE DONE WITH TOBACCO  
27 RESEARCH, HAVE YOU PUBLISHED THE RESULTS OF SOME OF  
28 YOUR WORK IN VARIOUS MEDICAL JOURNALS?

1           A.     YES.   MOSTLY IN THE "LANCET" AND  
2 THE "BRITISH MEDICAL JOURNAL. "

3           Q.     TELL THE JURY, WHAT THE "LANCET, "  
4 L-A-N-C-E-T IS?

5           A.     THE "LANCET" IS A MEDICAL JOURNAL  
6 COMPARABLE, I SUPPOSE, TO THE "NEW ENGLAND JOURNAL  
7 OF MEDICINE" IN THIS COUNTRY.  A VERY  
8 LONG-ESTABLISHED ONE.  IT WAS STARTED IN THE  
9 BEGINNING OF THE 19TH CENTURY AND IS REGARDED IN  
10 THE UNITED KINGDOM AS BEING THE PREMIER SCIENTIFIC,  
11 MEDICAL SCIENTIFIC JOURNAL THAT APPEARS WEEKLY SO  
12 THAT YOU GET UP TO DATE WITH THE MOST RECENT  
13 DEVELOPMENTS.

14          Q.     AND I KNOW THAT THE COMPETITION  
15 BETWEEN THE U. S. AND ENGLAND IS PRETTY MUCH OVER  
16 BUT THE "NEW ENGLAND JOURNAL" OF MEDICINE APPEARS  
17 HOW OFTEN?

18          A.     THAT'S WEEKLY TOO.

19          Q.     SO FOR THE JURY, IT'S GENERALLY --  
20 EXCUSE ME -- I AM TRYING TO STREAMLINE IT.

21                THE COURT:  I WILL ALLOW A LITTLE BUT NOT  
22 A LOT.

23                MR. PIUZE:  I APOLOGIZE.  I CAUGHT  
24 MYSELF.  I WAS ABOUT TO ASK YOU A LEADING QUESTION.

25           Q     BY MR. PIUZE:  WHAT'S GENERALLY  
26 CONSIDERED TO BE THE MOST PRESTIGIOUS MEDICAL  
27 JOURNAL IN AMERICA?

28           A.     THE "NEW ENGLAND JOURNAL OF

1 MEDICINE. "

2 Q. SO YOUR WORK THAT HAS BEEN  
3 PUBLISHED IN ENGLAND IN REGARDS TO TOBACCO RESEARCH  
4 HAS APPEARED PREDOMINANTLY IN THE "LANCET" AND THE  
5 "BRITISH MEDICAL JOURNAL"?

6 A. YES.

7 Q. THANKS.

8 ROUGHLY HOW MANY ARTICLES HAVE YOU  
9 PUBLISHED OVER THE YEARS REGARDING TOBACCO AND ITS  
10 DELETERIOUS BAD HEALTH EFFECTS?

11 A. I COULDN'T SAY PRECISELY BUT IT  
12 WOULD RUN INTO THREE FIGURES. OH, IT MIGHT BE 150,  
13 200.

14 Q. THANK YOU.

15 AND WHY DON'T YOU TELL THE JURY,  
16 TAKING INTO ACCOUNT ALL OF THE SCIENTIFIC WORK THAT  
17 YOU HAVE DONE, ROUGHLY HOW MANY SCIENTIFIC  
18 PUBLICATIONS DO YOU HAVE TO YOUR CREDIT?

19 A. I CAN ANSWER THAT PRECISELY, THE  
20 LAST ONE WAS 475.

21 Q. 475?

22 A. 475, YES.

23 Q. ARE YOU FAMILIAR WITH THE TERM  
24 "PEER REVIEW"?

25 A. YES.

26 Q. TELL THE JURY WHAT "PEER REVIEW"  
27 MEANS, PLEASE.

28 A. THAT MEANS THAT YOUR ARTICLE,

1 BEFORE IT IS PUBLISHED IN A JOURNAL IS REFERRED BY  
2 THE EDITORS TO SCIENTISTS THAT THEY THINK, THAT THE  
3 EDITORS THINK CAN JUDGE WHETHER IT IS A RELIABLE  
4 ARTICLE AND DESERVES PUBLICATION.

5 Q. JUST BECAUSE YOU SEND SOMETHING  
6 INTO THE PUBLISHER DOESN'T MEAN IT IS GOING TO GET  
7 PUBLISHED?

8 A. IT CERTAINLY DOESN'T, NO.

9 Q. HAVE YOU, I DON'T KNOW IF I CAN  
10 SPLIT THIS UP BETWEEN TOBACCO AND NON-TOBACCO, BUT  
11 I CAN TRY.

12 AS A RESULT OF SOME OF YOUR TOBACCO  
13 RELATED RESEARCH, HAVE YOU BEEN GIVEN VARIOUS  
14 HONORS, PLEASE?

15 A. YES.

16 Q. TELL US, PLEASE.

17 A. WELL, I THINK THE FIRST IMPORTANT  
18 ONE I WAS GIVEN WAS THE UNITED NATIONS' AWARD FOR  
19 CANCER RESEARCH. THEY ONLY MADE THE AWARD, TO MY  
20 KNOWLEDGE, IN ONE YEAR. AND THEY GAVE ME THE AWARD  
21 IN, I THINK, 1957, I AM NOT SURE, ABOUT THEN. BUT  
22 IT WAS FOR MY WORK ON TOBACCO, IONIZING RADIATION  
23 AND ASBESTOS, THOSE THREE SUBJECTS WERE CITED IN  
24 THE AWARD.

25 I HAVE HAD QUITE A NUMBER OF  
26 PRIZES, INCLUDING THE U. S. GENERAL MOTORS PRIZE,  
27 WHICH I WAS GIVEN IN 1979 BY PRESIDENT CARTER.

28 I HAVE HAD PRIZES FOR RESEARCH IN

1 WHICH THE TOBACCO HAS ALWAYS BEEN A LEADING  
2 COMPONENT FROM GERMANY, ITALY, FRANCE, SWITZERLAND  
3 AND THAILAND.

4 Q. OKAY. THANK YOU.

5 LET ME MENTION A COUPLE OF  
6 SPECIFICS, IF I COULD.

7 DO YOU HAVE THE ROYAL MEDAL FROM  
8 THE ROYAL SOCIETY OF GREAT BRITON?

9 A. YES, I DO.

10 Q. AND THE GOLD MEDAL FROM THE BRITISH  
11 MEDICAL ASSOCIATION?

12 A. YES, I COULD.

13 Q. AND THE PRESIDENTIAL AWARD FROM THE  
14 NEW YORK ACADEMY OF SCIENCES?

15 A. YES.

16 Q. AND HAVE YOU BEEN AWARDED THE  
17 COMPANION OF HONOR AWARD?

18 A. YES, I HAVE.

19 Q. TAKE A MINUTE OR TWO, BECAUSE, IN  
20 AMERICA, WE DON'T KNOW WHAT THAT IS, AN JUST TELL  
21 US A LITTLE BIT ABOUT IT.

22 A. WELL, YOU ASKED ME TO TRY TO  
23 SUPPRESS MY NATURAL MODESTY, AND I HAVE TO IN  
24 REFERENCE TO THE COMPANION OF HONOR BECAUSE IT IS  
25 ALMOST THE HIGHEST AWARD YOU CAN GET FOR WORK FOR  
26 THE COUNTRY IN THE U. K. BUT THERE ARE ONLY 65  
27 PEOPLE AT ANY TIME THAT HAVE THIS SO-CALLED  
28 COMPANION OF HONOR AWARD WHICH IS PRESENTED BY THE

1 MONARCH, BY THE QUEEN. AND I WAS, FORTUNATELY,  
2 GIVEN IT A FEW YEARS AGO.

3 Q. THANK YOU.

4 NOW, WHEN IT COMES TO THE CAUSE,  
5 RELATIONSHIP, BETWEEN TOBACCO AND LUNG CANCER, DO  
6 YOU BELIEVE THAT YOU GOT A PRETTY GOOD IDEA OF WHAT  
7 YOU ARE TALKING ABOUT?

8 A. YES, I DO.

9 Q. IN 1950, WHEN YOU PUBLISHED YOUR  
10 PAPER, DID IT AROUSE SOME TYPE OF DEBATE OR  
11 CRITICISM OR WAS IT JUST UNANIMOUSLY ACCEPTED BY  
12 EVERYBODY HERE?

13 A. NO. IT CERTAINLY WAS NOT  
14 UNANIMOUSLY ACCEPTED BY EVERYBODY, AND, INDEED, IT  
15 AROUSED VERY MUCH LESS ATTENTION IN THE NATIONAL  
16 PRESS THAN PROFESSOR HEMSWORTH, THE SECRETARY OF  
17 THE MEDICAL RESEARCH COUNCIL, THOUGHT IT MIGHT.

18 IT WAS, OF COURSE, REPORTED BUT  
19 WHENEVER IT WAS REPORTED, THERE WERE, TENDED TO BE  
20 OTHER REPORTS BY SOME SPOKESMAN FOR THE TOBACCO  
21 INDUSTRY SAYING THAT --

22 MR. CARLTON: OBJECTION, YOUR HONOR, BEST  
23 EVIDENCE.

24 THE COURT: OVERRULED, HE' D KNOW  
25 PERSONAL KNOWLEDGE.

26 THE WITNESS: -- SAYING THAT THIS WAS A  
27 CONTROVERSIAL SUBJECT AND WAS NOT PROVED AND  
28 PEOPLE, HE PERSONALLY, DISAGREED.

1                   AND THE NEWSPAPERS, INDEED, THE  
2 RADIO, WHEN THEY REPORTED WOULD NEARLY ALWAYS  
3 REPORT THAT IT WAS CONSIDERED A CONTROVERSIAL  
4 SUBJECT. AND NOT INFREQUENTLY, ON TELEVISION, THE  
5 ANNOUNCER IN REPORTING OUR RESULTS IN THE COURSE OF  
6 THE NEXT FEW YEARS WOULD BE SMOKING A CIGARETTE  
7 WHEN HE WAS ANNOUNCING IT.

8                   SO IT CERTAINLY DIDN' T GET VERY  
9 WIDELY ACCEPTED. AND IT WASN' T EVEN ACCEPTED BY  
10 THE CANCER ADVISORY COMMITTEE TO OUR DEPARTMENT OF  
11 HEALTH. THEY THOUGHT WE HAD SHOWN AN ASSOCIATION  
12 BUT THEY WERE NOT CONVINCED THAT THIS WAS THE CAUSE  
13 AND THEY ADVISED THE GOVERNMENT AGAINST PUBLICIZING  
14 IT, AS THEY THOUGHT IT MIGHT CAUSE ANXIETY.

15                   BUT IN THE COURSE OF THE NEXT THREE  
16 OR FOUR YEARS, THERE WERE FURTHER REVIEWS AND THERE  
17 WAS A COMMITTEE SET UP UNDER THE CHAIRMANSHIP OF  
18 THE GOVERNMENT ACTUARY WHO WOULD BE THE SENIOR  
19 STATISTICAL ADVISOR TO THE GOVERNMENT WHO WAS ASKED  
20 TO REVIEW OUR REPORT AND THE COUNTER EVIDENCE WHICH  
21 THE TOBACCO INDUSTRY SUBMITTED AND TO REPORT TO THE  
22 DEPARTMENT OF HEALTH --

23                   MR. CARLTON: OBJECTION, YOUR HONOR,  
24 NON-RESPONSIVE.

25                   THE WITNESS: -- ON THEIR FINDING.

26                   THE COURT: CUT THE NARRATIVE SLIGHTLY.

27                   MR. PIUZE: OKAY.

28                   THE WITNESS: AND --

1 THE COURT: JUST A SECOND, HE IS GOING TO  
2 ASK A QUESTION.

3 MR. PIUZE: IT'S MY TURN.

4 Q BY MR. PIUZE: I JUST WANT TO  
5 STOP. I AM GOING TO GET BACK TO THERE, RIGHT WHERE  
6 WE WERE.

7 NOT EVERYONE ACCEPTED YOUR FINDINGS  
8 RIGHT OFF THE BAT?

9 A. THAT'S TRUE.

10 Q. NOW, WERE THERE FURTHER STUDIES  
11 THAT YOU AND YOUR PARTNER DID, ASIDE FROM THE ONE  
12 THAT WE HAVE JUST TALKED ABOUT?

13 A. YES. BECAUSE WE THOUGHT, WELL, IF  
14 THIS STUDY, WHICH HAS CONVINCED US, HAS NOT  
15 CONVINCED ALL OUR COLLEAGUES, THEN WE MUST TRY TO  
16 FIND SOME OTHER APPROACH AND OBTAIN EVIDENCE OF A  
17 DIFFERENT SORT, PARTLY TO CHECK OUR CONCLUSIONS,  
18 BUT ALSO TO PROVIDE A DIFFERENT SORT OF EVIDENCE.

19 AND WE DECIDED THE THING TO DO WAS  
20 TO ASK PEOPLE WHAT THEIR SMOKING HABITS WERE AND  
21 THEN FOLLOW THEM UP TO SEE WHAT DISEASES THEY  
22 DEVELOPED.

23 AND WE SAID, IF OUR BELIEF IS  
24 CORRECT, WE SHALL FIND THAT THOSE PEOPLE THAT SAID  
25 THEY WERE HEAVY CIGARETTE SMOKERS OVER THE COURSE  
26 OF THE NEXT FEW YEARS WILL HAVE, A LOT OF THEM WILL  
27 DEVELOP LUNG CANCER. WHEREAS THOSE WHO SAID THEY  
28 WERE NON-SMOKERS, VERY FEW OF THEM WOULD DEVELOP

1 LUNG CANCER.

2 AND WE DECIDED TO ASK BRITISH  
3 DOCTORS THROUGHOUT THE WHOLE COUNTRY IF THEY WOULD  
4 TELL US WHAT THEIR SMOKING HABITS WERE. AND WE DID  
5 THAT. WE THEN FOLLOWED THEM UP TO SEE WHAT  
6 DISEASES THEY DEVELOPED.

7 Q. ALL RIGHT, THANK YOU.

8 NOW, ARE YOU FAMILIAR WITH THE  
9 TERMS "CASE STUDY" AND "COHORT STUDY" PLEASE?

10 A. YES, I AM

11 Q. PLEASE TELL THE JURY, FIRST, WHAT A  
12 CASE STUDY IS, AND THEN WHAT A COHORT STUDY IS.

13 A. A CASE STUDY IS A STUDY BASED ON  
14 PEOPLE THAT ACTUALLY HAVE THE DISEASE IN WHICH YOU  
15 ARE INTERESTED IN AND, OF COURSE, ONE HAS CONTROLS  
16 AT THE SAME TIME FOR PEOPLE THAT DON'T HAVE THAT  
17 DISEASE. SO YOU REFER TO A CASE CONTROL STUDY.  
18 BUT THE PEOPLE HAVE THE DISEASE AT THE TIME YOU  
19 INVESTIGATE THEM

20 A COHORT STUDY, WHICH IS A  
21 TECHNICAL TERM FOR A GROUP OF PEOPLE FROM WHOM ONE  
22 OBTAINS INFORMATION ABOUT THEIR EXPOSERS OF  
23 INTEREST, IN THIS CASE, THEIR SMOKING HABITS, MIGHT  
24 BE THEIR INDUSTRIAL EMPLOYMENT, IT MIGHT BE GENETIC  
25 FACTORS, IT MIGHT BE ANYTHING, BUT IN THIS CASE, WE  
26 WERE CONCERNED WITH THEIR SMOKING HABITS.

27 AND THEN YOU FOLLOW THEM FORWARD  
28 AND FIND OUT WHAT DISEASES THEY GET. AND COMPARE

1 THE INSTANCE OF DISEASE OR, IN OUR CASE, THE  
2 MORTALITY FROM DISEASE IN THE PEOPLE WITH, THAT  
3 WERE SMOKERS, COMPARED WITH THOSE WHO WERE  
4 NON-SMOKERS.

5 Q. ALL RIGHT, THANK YOU.

6 SO THEREFORE, THE STUDY YOU DID IN  
7 THE LONDON HOSPITAL YOU HAVE ALREADY TOLD US ABOUT,  
8 THAT WAS A CASE CONTROL STUDY?

9 A. THAT WAS A CASE CONTROL STUDY.

10 Q. PEOPLE WHO ARE ALREADY SICK?

11 A. YES.

12 Q. AND YOU WERE COMPARING THEM TO  
13 OTHER PEOPLE THAT WEREN'T SICK?

14 A. YES.

15 Q. AND AS FAR AS A COHORT STUDY,  
16 THAT'S SORT OF LOOKING INTO THE FUTURE TO FIND OUT  
17 WHAT'S GOING TO HAPPEN?

18 A. YES.

19 Q. HOW MANY BRITISH DOCTORS WERE IN  
20 YOUR COHORT STUDY, PLEASE.

21 A. THERE WERE 40,000. 6,000 WERE  
22 WOMEN, 34,000 WERE MEN. AND MOST OF OUR STUDIES,  
23 SUBSEQUENT STUDIES HAVE BEEN ON THE 34,000 MALE  
24 DOCTORS. THE 6,000 FEMALE WE HAVE STUDIED, BUT  
25 THEY ARE TOO FEW, REALLY, TO GIVE US VERY MUCH  
26 USEFUL INFORMATION.

27 Q. ARE YOUR STUDIES ON THESE DOCTORS  
28 STILL GOING ON RIGHT NOW, 50 SOMETHING YEARS, 50

1 YEARS LATER?

2 A. YES, THEY ARE.

3 I AM HOPING TO CONCLUDE IT IN  
4 NOVEMBER OF THIS YEAR WHICH WILL BE THE 50TH  
5 ANNIVERSARY OF STARTING THE STUDY.

6 Q. THANK YOU.

7 SO LET' S MOVE BACK INTO THE VERY  
8 EARLY 1950' S NOW CAN YOU TELL US, YOU HAVE TOLD  
9 US HOW YOU PICKED YOUR SUBJECTS, IT WAS DOCTORS,  
10 AND YOU HAVE ALREADY TOLD US WHAT PERCENTAGE OF  
11 THEM SMOKED.

12 WHEN DID YOU FIRST PUBLISH SOME  
13 KNOWLEDGE ON THAT STUDY?

14 A. WE PUBLISHED THAT IN 1954.

15 WE HADN' T EXPECTED TO HAVE USED THE  
16 INFORMATION QUITE SO SOON. WE THOUGHT IT MIGHT  
17 TAKE FIVE YEARS. BUT THREE YEARS' OBSERVATION,  
18 ACTUALLY AFTER TWO YEARS' OBSERVATION, WE HAD CLEAR  
19 EVIDENCE THAT THE HEAVY CIGARETTE SMOKERS HAD A  
20 HIGH RISK OF LUNG CANCER AND THE NON-SMOKERS DIDN' T  
21 GET LUNG CANCER.

22 IT WAS WHAT WE CALL STATISTICALLY  
23 SIGNIFICANT. AND WE THOUGHT THAT EVEN THOUGH THERE  
24 WERE ONLY, I THINK, ABOUT 35 PEOPLE WHO DIED OF  
25 LUNG CANCER, THAT THE RESULT WAS SO CLEAR THAT WE  
26 SHOULD PUBLISH IT STRAIGHT AWAY AND WE DID.

27 Q. NOW WHAT WAS THAT CALLED, PLEASE?

28 A. THAT WAS, THAT WAS IN THE BRITISH

1 MEDICAL JOURNAL -- I FORGET THE TITLE.

2 Q. THIS IS A MEMORY TEST ON THE TITLE.  
3 IT WAS ONLY 48 YEARS AGO.

4 A. THE STUDY OF BRITISH DOCTORS. I  
5 FORGET WHAT IT WAS CALLED.

6 Q. IS THAT IT?

7 A. "THE MORTALITY OF DOCTORS IN  
8 RELATION TO THEIR SMOKING HABITS, A PRELIMINARY  
9 REPORT." YES, THIS WAS IT.

10 Q. THANKS.

11 WHAT RECEPTION DID THAT DOCUMENT  
12 RECEIVE, PLEASE?

13 A. OH, THAT CHANGED MANY PEOPLE'S  
14 VIEWS. THIS HAD SCIENTIFICALLY HAD A DRAMATIC  
15 EFFECT. IT SHOWED THAT WE HAD BEEN ABLE TO PREDICT  
16 CORRECTLY WHAT WOULD HAPPEN.

17 I SHOULD SAY THAT NOWADAYS, OF  
18 COURSE, THE SORT OF STUDY I DESCRIBED,  
19 EPIDEMIOLOGICAL CASE CONTROL STUDY, IS AN EVERY DAY  
20 STUDY THAT IS BEING CARRIED OUT THROUGHOUT THE  
21 WORLD BY SCIENTISTS.

22 BUT IN 1950, WHEN WE DID THIS  
23 STUDY, IT WAS NOT A COMMON WAY OF INVESTIGATING THE  
24 CAUSES OF DISEASE. AND PEOPLE WERE NOT ACCUSTOMED,  
25 OTHER SCIENTISTS, LABORATORY WORKERS, WERE NOT  
26 ACCUSTOMED TO INTERPRETING THE RESULTS OF SUCH CASE  
27 CONTROL STUDIES.

28 SO THAT WHEN WE THEN PRODUCED THIS

1 NEW COHORT STUDY, WHICH WE SHOWED THAT WE COULD  
2 PREDICT CORRECTLY WHAT WOULD HAPPEN, HOW -- TO THE  
3 RELATIVE RISKS OF NON-SMOKERS AND CIGARETTES  
4 SMOKERS, THIS HAD A BIG IMPACT ON SCIENTISTS,  
5 CERTAINLY IN THE U. K.

6 Q. ALL RIGHT, THANK YOU VERY MUCH.  
7 IF I SUGGESTED THAT THIS 1954 WORK  
8 GOT ACCEPTED MUCH MORE READILY IN THE SCIENTIFIC  
9 COMMUNITY THAN THE 1950 WORK, WOULD YOU AGREE OR  
10 DISAGREE?

11 A. THIS WAS --  
12 MR. CARLTON: OBJECTION, LEADING.  
13 THE COURT: OVERRULED.

14 THE WITNESS: IT CERTAINLY WAS. IT  
15 CHANGED ATTITUDES QUITE NOTABLY.

16 Q BY MR. PIUZE: OKAY. NOW, I WANT  
17 TO MOVE OUR DISCUSSION RIGHT NOW OUT OF ENGLAND AND  
18 OVER TO A COUPLE OF OTHER COUNTRIES SO WE CAN TALK  
19 ABOUT WHAT WAS GOING ON THERE AS FAR AS RESEARCH  
20 INTO THE CAUSES OF LUNG CANCER.

21 READY TO DO THAT?

22 A. YES.

23 Q. OKAY. AND THIS IS THE TIME FOR ME  
24 TO DISPLAY THIS THING.

25 CAN YOU SEE THAT CHART FROM WHERE  
26 YOU ARE?

27 I WILL TELL YOU WHAT, I HAVE A  
28 SMALL VERSION OF IT.

1           A.     I CAN SEE THE CHART BUT I CAN'T  
2 READ THE WRITING ON IT.

3           Q.     IF I GIVE YOU A SMALL VERSION, IS  
4 THAT GOING TO HELP YOU TO READ IT?

5           A.     YES.

6           Q.     I WANT TO MOVE BACKWARDS NOW  
7                   PRIOR TO YOUR 1950 STUDY, HAD THERE  
8 BEEN SOME RESEARCH DONE IN GERMANY WHICH YOU CAME  
9 TO LATER THINK WAS RELATIVELY SIGNIFICANT?

10          A.     YES.

11                   THERE HAD, OF COURSE, BEEN RESEARCH  
12 DONE IN ENGLAND AND IN THE UNITED STATES OVER THE  
13 PREVIOUS 50 YEARS. THE FIRST SUGGESTION THAT  
14 CIGARETTE SMOKING MIGHT BE THE CAUSE OF LUNG CANCER  
15 WAS MADE IN A TEXTBOOK IN THE UNITED STATES IN, I  
16 THINK, 1902.

17                   BUT THERE WAS REALLY NO SCIENTIFIC  
18 EVIDENCE IN SUPPORT. AND OVER THE NEXT 30 OR 40  
19 YEARS, SEVERAL PEOPLE WROTE ARTICLES SAYING, I  
20 THINK CIGARETTE SMOKING HAS SOMETHING TO DO WITH  
21 LUNG CANCERS BECAUSE I HAVE SO MANY PATIENTS I HAVE  
22 SEEN WHO WERE SMOKERS AND CIGARETTE SMOKING HAS  
23 INCREASED.

24                   BUT THIS WAS WHAT WE CALL ANECDOTAL  
25 EVIDENCE. IT WASN'T SCIENTIFIC EVIDENCE.

26                   THE FIRST EVIDENCE THAT YOU COULD  
27 CALL SCIENTIFIC EVIDENCE, AND IT WAS VERY WEAK, BUT  
28 IT WAS SCIENTIFIC, IT WAS IN GERMANY IN 1939 BY A

1 MAN CALLED MULLER WHO HAD A SMALL SERIES OF 86  
2 PATIENTS WITH LUNG CANCER AND NOT VERY SATISFACTORY  
3 CONTROL SERIES AND HE FOUND THE LUNG CANCER  
4 PATIENTS WERE MUCH HEAVIER SMOKERS THAN HIS  
5 CONTROLS.

6 AND THEN IN 1943, THERE WAS A  
7 SOMEWHAT LARGER AND SOMEWHAT BETTER STUDY BY  
8 SCHAIRER SCHONIGER IN GERMANY.

9 AGAIN, THEY FOUND EXACTLY THE SAME  
10 THING, THE PATIENTS WITH LUNG CANCER TENDED TO BE  
11 HEAVY SMOKERS WHEREAS THEIR CONTROL PATIENTS AND  
12 PATIENTS WITH CANCER OF THE STOMACH WHICH THEY ALSO  
13 STUDIED WERE NOT HEAVY SMOKERS, TENDED NOT TO BE  
14 HEAVY SMOKERS.

15 BUT AGAIN, THESE STUDIES WERE NOT  
16 SCIENTIFICALLY VERY CONVINCING BECAUSE THE CONTROLS  
17 WERE NOT CLEARLY REPRESENTATIVE OF THE POPULATION  
18 AND THEY WEREN'T AGE -- I CAN GIVE YOU A NUMBER OF  
19 TECHNICAL REASONS FOR WHY THEY WEREN'T, DIDN'T  
20 CARRY VERY MUCH WEIGHT.

21 BUT CERTAINLY THEY HAD RAISED THE  
22 POSSIBILITY. THE ONE BY SCHAIRER AND SCHONIGER IN  
23 1943 ACTUALLY WAS IN A JOURNAL IN THE WARTIME WHICH  
24 DIDN'T GET TO ENGLAND OR THE UNITED STATES UNTIL  
25 AFTER THE WAR. THAT WAS IGNORED.

26 AND THEN THERE WAS A PAPER BY A  
27 DUTCH MAN WASSINK IN 1948, WHICH REALLY SHOWED  
28 ESSENTIALLY THE SAME RESULTS AND WE HAD --

1 THE COURT: HOLD ON. WE ARE KIND --

2 MR. PIUZE: I APOLOGIZE DOCTOR.

3 THE COURT: PEOPLE ARE LOSING TRACK HERE.

4 MR. PIUZE: I AM MESSING UP. GIVE ME A  
5 SECOND.

6 MR. LEITER: YOUR HONOR, COULD WE MAYBE  
7 MOVE OVER THERE?

8 THE COURT: YOU CERTAINLY CAN, COUNSEL.  
9 AT ANY TIME YOU WISH TO DO THAT TO SEE WHAT THE  
10 JURY IS WATCHING, FEEL FREE TO STEP UP.

11 MR. PIUZE: SO I AM GOING TO APOLOGIZE  
12 FOR THE CONFUSION I HAVE CAUSED HERE.

13 READY?

14 THE WITNESS: YES, THANK YOU.

15 Q BY MR. PIUZE: WHEN DID THE TWO  
16 GERMAN STUDIES FIRST COME TO YOUR ATTENTION,  
17 PLEASE?

18 A. 1939 STUDY CAME TO MY ATTENTION IN  
19 1949 WHEN WE WERE WRITING UP OUR PAPER. AND I  
20 SEARCHED IN WHAT'S CALLED THE INDEX MEDICAL TEXT, A  
21 BIG BOOK WHICH GIVES A RECORD OF ALL THE SCIENTIFIC  
22 PUBLICATIONS OVER THE PREVIOUS YEARS, AND I FOUND  
23 REFERENCE TO THIS ARTICLE BY DOCTOR MULLER.

24 I DIDN'T KNOW ABOUT THE ARTICLE BY  
25 SCHAIRER AND SCHONIGER UNTIL 1951, UNTIL AFTER WE  
26 HAD PUBLISHED OUR FIRST PAPER.

27 Q. OKAY, THANK YOU.

28 NOW, I AM JUST GOING TO GO

1 CHRONOLOGICALLY HERE FOR A BIT. IT LOOKS LIKE THE  
2 NEXT ONE IS BY WASSINK IN THE NETHERLANDS. CAN YOU  
3 TELL THE JURY A LITTLE BIT ABOUT THAT STUDY,  
4 PLEASE.

5 A. YES. IT WAS A CASE CONTROL STUDY,  
6 VERY SIMILAR TO OURS. IT SHOWED VERY SIMILAR  
7 RESULTS, SOME SMALLER NUMBERS. IT WAS PUBLISHED IN  
8 DUTCH, IN A DUTCH PAPER, AND IN A DUTCH MEDICAL  
9 JOURNAL. AND NOT MANY PEOPLE ACTUALLY READ DUTCH.  
10 AND IT WASN'T NOTICED UNTIL AFTER WE HAD PUBLISHED  
11 OUR PAPER.

12 Q. THANK YOU.  
13 NOW, LET'S MOVE OVER TO THE UNITED  
14 STATES. DO YOU KNOW WYNDER, W-Y-N-D-E-R, AND  
15 GRAHAM?

16 A. I DID KNOW THEM. THEY ARE BOTH,  
17 UNFORTUNATELY, DEAD NOW.

18 Q. I APOLOGIZE FOR THE DEATHS.  
19 TELL THE JURY WHO THEY WERE,  
20 PLEASE.

21 A. WYNDER, AT THE TIME HE DID HIS  
22 STUDY ON CIGARETTE SMOKING AND LUNG CANCER, WAS A  
23 MEDICAL STUDENT. AND HE HAD HAD THE IDEA, BECAUSE  
24 HE KNEW THAT, HE BELIEVED THAT CIGARETTE SMOKE  
25 CONTAINED CHEMICALS THAT CAUSE CANCER, HE THOUGHT  
26 IT MIGHT BE, CIGARETTE SMOKING MIGHT BE A CAUSE OF  
27 LUNG CANCER, AND HE INTERVIEWED A FEW PATIENTS IN,  
28 I THINK, NEW YORK.

1                   GRAHAM WAS A LEADING AMERICAN CHEST  
2 SURGEON WHO SMOKED HEAVILY AND WHO DIDN' T THINK  
3 THAT SMOKING WAS A CAUSE OF LUNG CANCER. BUT WHEN  
4 WYNDER SHOWED HIM HIS RESULTS, HE WAS A SURGEON AT  
5 THE MEDICAL SCHOOL WHERE WYNDER WAS A STUDENT. HE  
6 SAID, WELL, THIS COULD BE IMPORTANT, I WILL SUPPORT  
7 YOU IN INTERVIEWING MORE PATIENTS.

8                   AND THEY PUBLISHED A PAPER ACTUALLY  
9 IN JUNE 1950, A FEW YEARS BEFORE -- A FEW MONTHS  
10 BEFORE WE DID, ON A SLIGHTLY SMALLER SERIES BUT  
11 STILL A VERY BIG SERIES OF PATIENTS WITH LUNG  
12 CANCER AND CONTROLS WHICH, ESSENTIALLY, SHOWED THE  
13 SAME RESULTS AS WE HAD OBTAINED.

14                 Q.     ALL RIGHT, THANK YOU.

15                   NOW, WE HAVE EXTRACTED FOR THE  
16 PURPOSE OF THIS CHART JUST SORT OF A ONE SENTENCE  
17 CAPTURE FOR THE DOLL AND HILL STUDY AND A ONE  
18 SENTENCE CAPTURE FOR THE WYNDER AND GRAHAM STUDY  
19 AND I' D LIKE TO JUST -- FIRST I AM GOING TO READ  
20 THEM SO WE ALL KNOW WE ARE ON THE SAME PAGE AND  
21 THEN I AM GOING TO ASK YOU TO DISCUSS THE  
22 DIFFERENCES BETWEEN THE TWO, IF YOU WOULD.

23                   SO I WILL START LIKE THIS "IN  
24 ENGLAND, DOLL AND HILL SAID SMOKING IS A FACTOR AND  
25 AN IMPORTANT FACTOR IN THE PRODUCTION OF CARCINOMA  
26 OF THE LUNG. "

27                   AND OVER HERE IN THE UNITED STATES,  
28 WYNDER AND GRAHAM, SAME YEAR SAID, "EXCESSIVE AND

1 PROLONGED USE OF TOBACCO, ESPECIALLY OF CIGARETTES,  
2 SEEMS TO BE AN IMPORTANT FACTOR IN THE INDUCTION OF  
3 BRONCHOGENIC CANCER. "

4 NOW, IS THERE A DIFFERENCE BETWEEN  
5 THOSE STATEMENTS, PLEASE, IF SO, WHAT?

6 A. WELL, FIRSTLY, BRONCHOGENIC CANCER,  
7 OF COURSE, IS THE SAME AS CARCINOMA OF THE LUNG.

8 Q. OKAY.

9 A. ACTUALLY, WYNDER AND GRAHAM S TERM  
10 WAS SCIENTIFICALLY THE MORE CORRECT TERM BUT OURS  
11 WAS THE ONE THAT PEOPLE UNDERSTAND, I THINK, MORE  
12 EASILY.

13 BUT THERE IS A DIFFERENCE. WYNDER  
14 AND GRAHAM THOUGHT THAT THEIR RESULTS STRONGLY  
15 SUGGESTED THAT CIGARETTE SMOKING WAS AN IMPORTANT  
16 FACTOR IN THE PRODUCTION OF THE DISEASE. BUT THEY  
17 DIDN'T SAY THAT THEY CONCLUDED THAT IT DEFINITELY  
18 WAS.

19 THE DIFFERENCE BETWEEN THE TWO  
20 STATEMENTS IS THAT WE, HAVING REVIEWED A LOT OF  
21 OTHER EVIDENCE AS WELL, WE BELIEVED WE WERE  
22 JUSTIFIED IN SAYING THAT IT WAS A, AN IMPORTANT  
23 FACTOR IN CAUSING THE DISEASE.

24 Q. THANK YOU.

25 NOW, I AM GOING TO CONTINUE  
26 CHRONOLOGICALLY HERE. IN 1952, THERE'S ANOTHER  
27 DOLL AND HILL CASE CONTROL STUDY. AND I DON'T  
28 THINK WE HAVE DISCUSSED THAT WITH THE JURY HERE.

1                    WOULD YOU DO SO, PLEASE.

2                    A.     THIS WAS MERELY AN EXTENSION OF THE  
3 FIRST STUDY WHICH SHOWED THE RESULTS OBTAINED  
4 THROUGH PATIENTS IN THE OTHER CITIES, OTHER THAN IN  
5 LONDON. THE FIRST ONE WAS JUST THE PATIENTS IN  
6 LONDON. THE LATER ONE WAS TWICE THE SIZE AND  
7 INCLUDED PATIENTS IN FOUR OTHER CITIES.

8                    Q.     ALL RIGHT, THANK YOU.

9                    AND NOW, THE NEXT ONE, AS WE GO  
10 ALONG HERE, LOOKS LIKE IT'S AROUND 1953. AND,  
11 AGAIN, IT'S WYNDER IN THE UNITED STATES. AND WE  
12 HAVE CAPSULIZED IT AS AN EXPERIMENTAL  
13 DEMONSTRATION.

14                    COULD YOU TELL THE JURY ABOUT THAT,  
15 PLEASE.

16                    A.     YES.

17                    WYNDER WENT ON TO DO SOME  
18 EXPERIMENTS IN WHICH HE APPLIED TOBACCO TARS TO THE  
19 SKIN OF MICE AND HE FOUND THAT BY APPLYING THEM FOR  
20 MANY MONTHS, EVERY DAY, THAT HE WOULD EVENTUALLY,  
21 HE EVENTUALLY PRODUCED CANCER ON THE SKIN OF MICE.  
22 AND THAT WAS THE FIRST TIME THAT THIS WAS  
23 DEFINITELY SHOWN.

24                    THERE HAD BEEN CLAIMS BACK IN THE  
25 1930'S THAT CANCER COULD BE PRODUCED BY PAINTING  
26 CIGARETTE -- TARS FROM CIGARETTES ON THE SKIN OF  
27 ANIMALS, BUT THOSE EXPERIMENTS DID NOT OBTAIN THE  
28 TARS IN THE WAY TAR IS OBTAINED IN THE NORMAL

1 PROCESS OF SMOKING. THEY WERE BURNED AT VERY HIGH  
2 TEMPERATURES SO THEY WERE NOT RELEVANT.

3 IN WYNDER'S STUDY THE TARS WERE  
4 OBTAINED AT THE TEMPERATURE AT WHICH TOBACCO IS  
5 BURNED IN SMOKING.

6 Q. THANK YOU.

7 AND NOW I WANT TO COME TO 1954. I  
8 WANT TO DISCUSS A COUPLE THINGS THAT HAPPENED IN  
9 '54 AND STAY ON THAT YEAR A BIT.

10 FIRST OF ALL, IT SAYS, "AMERICAN  
11 CANCER SOCIETY COHORT STUDY, 190,000 AMERICANS."

12 PLEASE TELL THE JURY ABOUT THAT  
13 STUDY.

14 A. THAT WAS A STUDY WHICH WAS STARTED  
15 BY DR. CUYLER HAMMOND, THE SCIENTIST OF THE --  
16 WORKING FOR THE AMERICAN CANCER SOCIETY, AND HE DID  
17 NOT BELIEVE THAT WE WERE CORRECT IN THINKING, IN  
18 SAYING THAT CIGARETTE SMOKING CAUSED LUNG CANCER.  
19 AND HE SET OUT, WITH THE HELP OF THE AMERICAN  
20 CANCER SOCIETY, TO OBTAIN INFORMATION ABOUT THE  
21 SMOKING HABITS OF A VERY LARGE NUMBER, 190,000  
22 AMERICANS, WITH THE INTENTION OF FOLLOWING THEM UP  
23 IN THE SAME WAY AS WE FOLLOWED UP THE BRITISH  
24 DOCTORS.

25 AND THE ONLY DIFFERENCE WAS THAT HE  
26 THOUGHT THAT WOULD SHOW NO RELATIONSHIP BETWEEN  
27 SMOKING AND THE RISK OF LUNG CANCER WHEREAS WE  
28 THOUGHT IT WOULD SHOW A RELATIONSHIP.

1                   IN FACT, HIS STUDY SHOWED A VERY  
2 SIMILAR RELATIONSHIP TO THE ONE WE OBTAINED.

3                   AND HE CONCLUDED IN HIS STUDY THAT  
4 CIGARETTE SMOKING WAS A CAUSE OF LUNG CANCER.

5                   Q.     HOW LONG -- THANK YOU.

6                   ROUGHLY, HOW LONG HAD THAT STUDY  
7 INVOLVING 190,000 AMERICANS BEEN GOING ON BEFORE  
8 THE RESULTS WERE PUBLISHED IN '54?

9                   A.     ONLY TWO YEARS. HE HAD BEGUN -- AT  
10 THE BEGINNING OF 1952, WE HAD BEGUN OUR DOCTORS'  
11 COHORT, OUR FOLLOWUP OF DOCTORS AT THE END OF 1951.  
12 HE STARTED AT THE BEGINNING OF 1952. AND IT WAS IN  
13 1953 AT A MEETING THAT HE TOLD ME WHY HE HAD  
14 STARTED THE STUDY, THE AMERICAN CANCER SOCIETY HAD  
15 BEEN STARTED.

16                  Q.     SO BACK IN THE EARLY 1950'S, THE  
17 AMERICAN CANCER SOCIETY ORIGINALLY WASN'T BUYING  
18 YOUR IDEA THAT LUNG CANCER WAS CAUSED BY CIGARETTE  
19 SMOKING?

20                  A.     THAT IS RIGHT.

21                  Q.     AND AFTER THE AMERICAN CANCER  
22 SOCIETY SPENT A COUPLE YEARS RESEARCHING IT,  
23 DR. HAMMOND SAID, YOU ARE RIGHT, AND I WAS WRONG?

24                  A.     THAT IS RIGHT.

25                  Q.     OKAY. THANKS.

26                         AND NOW, I AM GOING TO GO BELOW THE  
27 LINE, SO TO SPEAK, BECAUSE SO FAR, EVERYTHING I  
28 HAVE TALKED ABOUT HAS BEEN ABOVE THIS TIME LINE.

1 BUT NOW I WANT TO DISCUSS A COUPLE OF THINGS THAT  
2 ARE BELOW THE TIME LINE.

3 THE COURT: WOULD THIS BE AN APPROPRIATE  
4 TIME FOR US TO TAKE A BREAK NOW?

5 MR. PIUZE: RIGHT ON THE TIME LINE, YOUR  
6 HONOR.

7 THE COURT: ALL RIGHT.

8 LADIES AND GENTLEMEN, WE WILL SEE  
9 AT TEN TILL.

10

11 (AT THIS TIME, A RECESS  
12 WAS TAKEN.)

13

14 THE COURT: WELCOME BACK, LADIES AND  
15 GENTLEMEN.

16 SIR, PLEASE BE SEATED.

17 MR. PIUZE.

18 MR. PIUZE: THANK YOU, YOUR HONOR.

19

20

21 RICHARD DOLL, M D. ,  
22 CALLED AS A WITNESS BY THE PLAINTIFF, HAVING BEEN  
23 PREVIOUSLY DULY SWORN, RESUMED THE WITNESS STAND  
24 AND TESTIFIED FURTHER AS FOLLOWS:

25 /// /// ///

26 /// /// ///

27 /// /// ///

28 /// /// ///

1 DIRECT EXAMINATION (RESUMED)

2

3 BY MR. PIUZE:

4 Q. DR. DOLL, I AM GOING TO DRAW YOUR  
5 ATTENTION NOW TO THE TIME LINE, 1950, AND GO BELOW  
6 THE LINE. AND THERE'S AN AREA THERE LABELED  
7 "WATERSHED." FOR OPENERS, IS "WATERSHED" YOUR  
8 TERM?

9 A. YES.

10 Q. WHY DO YOU BELIEVE 1950 WAS THE  
11 WATERSHED?

12 A. BECAUSE THE PUBLICATION OF FIVE  
13 CASE CONTROL STUDIES IN ADDITION TO THE ONE BY  
14 WYNDER AND GRAHAM AND BRAD HILL AND MYSELF, THERE  
15 WERE THREE OTHER STUDIES FROM THE UNITED STATES ALL  
16 WITH LARGE NUMBERS OF PATIENTS, ALL SHOWING SIMILAR  
17 RESULTS OF A CONCENTRATION OF HEAVY SMOKERS AMONG  
18 PATIENTS WITH LUNG CANCER. AND THIS DRAMATICALLY  
19 CHANGED THE WEIGHT OF EVIDENCE AVAILABLE.

20 Q. OKAY. I WANT TO GO WAY BACK JUST  
21 FOR A MINUTE HERE SO I DON'T FORGET IT LATER ON.  
22 AS PART OF ALL OF YOUR RESEARCH AND STUDIES INTO  
23 THE HISTORY OF LUNG CANCER AND THE LUNG CANCER  
24 EPIDEMIC AND HOW IT SORT OF FOLLOWED THE USE OF  
25 CIGARETTES, CAN YOU TELL US ABOUT LAWS IN EFFECT  
26 THAT EITHER ENCOURAGED OR PROHIBITED THE USE OF  
27 TOBACCO PRODUCTS HERE IN THE UNITED STATES AND IN  
28 THE EARLY PART OF THE CENTURY?

1           MR. LEITER: OBJECTION, LACKS OF  
2 FOUNDATION.

3           THE COURT: I WILL LET HIM PROCEED AND WE  
4 WILL SEE IF THERE'S FOUNDATION HERE.

5           THE WITNESS: YES. THE SALE OF TOBACCO  
6 WAS PROHIBITED IN, I THINK, 10 OR 11 U.S. STATES --

7           THE COURT: ALL RIGHT, SIR, WOULD YOU  
8 PLEASE STOP.

9           MR. PIUZE, A LITTLE FOUNDATION.

10          MR. PIUZE: YES, SIR.

11          THE COURT: THANK YOU.

12          Q     BY MR. PIUZE: BEFORE YOU TELL US  
13 ABOUT IT, TELL US HOW YOU KNOW ABOUT IT AND WHAT  
14 YOUR -- WE WANT TO KNOW THAT THIS IS VALID  
15 INFORMATION YOU ARE GIVING US. SO TELL US THE  
16 SOURCE OF THE INFORMATION AND HOW YOU CAME UPON IT,  
17 PLEASE.

18          A.    YES. I MADE A REVIEW A FEW YEARS  
19 AGO OF THE DEVELOPMENT OF KNOWLEDGE ABOUT THE  
20 EFFECTS OF TOBACCO. AND IN DOING THAT, I REVIEWED  
21 THE, WHAT WAS BEING DONE IN THE PRINCIPLE COUNTRIES  
22 CONCERNED IN BRITAIN, IN GERMANY, THE UNITED STATES  
23 AND BROADLY ON THE CONTINENT AS TO THE DEVELOPMENT  
24 OF INTEREST IN THE EFFECTS OF TOBACCO.

25                   AND IN PARTICULAR, I LOOKED,  
26 INTERESTED MYSELF IN THE DEVELOPMENT OF SOCIETIES  
27 THAT WERE SET UP TO DISCOURAGE THE USE OF TOBACCO  
28 WHICH WERE SET UP PARTICULARLY IN GERMANY AND IN

1 THE UNITED STATES.

2 Q. OKAY. I'D LIKE TO STICK WITH THE  
3 UNITED STATES. NOTHING AGAINST GERMANY, BUT I WANT  
4 TO STICK WITH THE UNITED STATES HERE.

5 AS A RESULT OF THE RESEARCH YOU  
6 DID, IS THAT HOW YOU CAME UPON THE INFORMATION THAT  
7 YOU ARE ABOUT TO TALK ABOUT?

8 A. YES.

9 THE COURT: PROCEED.

10 MR. PIUZE: THANK YOU.

11 Q BY MR. PIUZE: SO TELL US  
12 APPROXIMATELY WHEN AND APPROXIMATELY WHAT WAS  
13 INVOLVED IN -- YOU KNOW WHAT, THAT'S A BAD  
14 QUESTION. I APOLOGIZE. I WITHDRAW IT.

15 AS FAR AS THE UNITED STATES IS  
16 CONCERNED, EXPLAIN TO THE JURY WHAT YOU LEARNED  
17 OCCURRED HERE IN THE EARLY PART OF THE CENTURY AS  
18 FAR AS THE REGULATION OF TOBACCO PRODUCTS?

19 A. I LEARNED THAT IN SEVERAL OF THE  
20 U. S. STATES, I THINK 11, THE SOCIETIES THAT WERE  
21 OPPOSED TO THE USE OF TOBACCO WERE ALSO SOCIETIES  
22 THAT WERE OR WERE ASSOCIATED WITH SOCIETIES THAT  
23 WERE OPPOSED TO THE USE OF ALCOHOL AND THEY THOUGHT  
24 THAT THESE SUBSTANCES WERE BAD FOR YOU,  
25 PARTICULARLY BECAUSE THEY WERE ADDICTIVE, NOT  
26 BECAUSE THEY CAUSED PARTICULAR DISEASES.

27 AND THEY AGITATED TO GET THE SALE  
28 OF TOBACCO PROHIBITED. AND TO MY SURPRISE, I FOUND

1 THAT IT WAS PROHIBITED IN SEVERAL OF THE UNITED  
2 STATES, THE STATES OF THE UNITED STATES, IN THE  
3 EARLY PART OF THE 20TH CENTURY.

4 AND THE LAWS PROHIBITING THE SALE  
5 OF TOBACCO WERE GRADUALLY REPEALED, I THINK THE  
6 LAST ONE WAS IN KANSAS IN ABOUT THE TIME OF THE  
7 FIRST WORLD WAR. I FORGET THE EXACT DATE NOW

8 Q. ALL RIGHT. THANK YOU VERY MUCH.  
9 AND YOU SAID THE REASONS FOR THAT  
10 WASN'T BECAUSE OF LUNG CANCER OR ANYTHING, IT WAS  
11 BECAUSE OF THE THOUGHT THAT IT MIGHT BE ADDICTIVE?

12 A. BECAUSE THEY BELIEVED IT WAS  
13 ADDICTIVE.

14 MR. CARLTON: OBJECTION.

15 THE COURT: OVERRULED.

16 MR. PIUZE: YOU CAN ANSWER.

17 THE WITNESS: IT WAS BECAUSE THEY  
18 BELIEVED IT WAS ADDICTIVE.

19 Q BY MR. PIUZE: WHEN YOU WERE DOING  
20 YOUR COHORT STUDY, MEANING LOOKING IN ADVANCE STUDY  
21 WITH THE BRITISH DOCTORS TO SEE WHAT WOULD HAPPEN  
22 TO THE ONES WHO SMOKE AND DIDN'T SMOKE, WAS PART OF  
23 YOUR SURVEY THAT YOU PRESENTED TO THESE DOCTORS  
24 SOMETHING ALONG THE LINES OF, WHY ARE YOU SMOKING?

25 A. NOT ORIGINALLY, NO.

26 WE JUST ASKED THEM QUESTIONS ABOUT  
27 WHETHER THEY DID SMOKE, AND IF SO, HOW MUCH THEY  
28 SMOKED AND WHETHER THEY INHALED.

1 I DID, AT A SUBSEQUENT DATE, A  
2 LOT -- A GOOD DEAL LATER ASK THEM ABOUT WHY THEY  
3 WERE CONTINUING TO SMOKE.

4 Q. ALL RIGHT. WELL, IF THAT WAS  
5 LATER, I WILL ASK ABOUT IT LATER.

6 NOW I AM UP TO 1954, WE'RE OFF OF  
7 THE WATERSHED AND WE ARE UP TO 1954.

8 DO YOU KNOW WHAT THE FRANK  
9 STATEMENT IS?

10 A. YES, I DO.

11 Q. WHAT IS IT, PLEASE?

12 A. IT WAS A STATEMENT PUT OUT BY THE  
13 TOBACCO INDUSTRY IN THE UNITED STATES TO, AND  
14 PUBLICIZED TO MAKE PEOPLE, TO LEAD PEOPLE TO  
15 THINK --

16 MR. CARLTON: OBJECTION, LACK OF  
17 FOUNDATION.

18 THE COURT: LET'S NOT DRAW THE CONCLUSION  
19 ABOUT WHAT IT WAS INTENDED TO DO. JUST TELL US  
20 WHAT IT WAS.

21 THE WITNESS: IT WAS A STATEMENT WHICH  
22 SAID THAT THEY WERE CONCERNED ABOUT THE PUBLIC,  
23 ABOUT THE POSSIBLE HEALTH EFFECTS OF TOBACCO, THAT  
24 IF THEY THOUGHT THAT IT WAS -- THEY WERE DOING  
25 RESEARCH TO FIND OUT IF IT WAS HARMFUL AND THAT, OF  
26 COURSE, IF THEY THOUGHT IT WAS HARMFUL, THEY WOULD  
27 TELL PEOPLE IMMEDIATELY.

28 Q BY MR. PIUZE: OKAY, THANK YOU.

1                   NOW, I HAVE BLOWN UP -- I HAVE GOT  
2 SEVERAL BLOW-UPS OF THIS FRANK STATEMENT, BUT THIS  
3 PARTICULAR ONE DEALS WITH A PARTICULAR TOPIC. AND  
4 I'D LIKE JUST TO DRAW YOUR ATTENTION TO IT BEFORE I  
5 PUT IT UP ON THE BOARD FOR THE JURY HERE.

6                   IS THIS OKAY TO DO THIS?

7                   THE COURT: FAIR ENOUGH.

8                   MR. PIUZE: OKAY.

9                   Q     BY MR. PIUZE: IN THE LEFT-HAND  
10 COLUMN, THERE'S A PARAGRAPH THAT STARTS WITH  
11 "DISTINGUISHED AUTHORITIES POINT OUT," AND THEN IT  
12 GOES, ONE, TWO, THREE, FOUR, AND I HAVE TAKEN  
13 NUMBER FOUR, AND BLOWN IT UP OVER HERE, AND I AM  
14 GOING TO BE DISCUSSING NUMBER FOUR WITH YOU.

15                   YOU GOT THAT IN MIND NOW?

16                   A.    YES.

17                   Q.    OKAY.

18                   "DISTINGUISHED AUTHORITIES  
19 POINT OUT THAT STATISTICS PURPORTING  
20 TO LINK THE DISEASE COULD APPLY WITH  
21 EQUAL FORCE TO ANY ONE OF THE MANY  
22 OTHER ASPECTS OF MODERN LIFE. INDEED,  
23 THE VALIDITY OF THE STATISTICS  
24 THEMSELVES IS QUESTIONED BY NUMEROUS  
25 SCIENTISTS. "

26                   SO THAT'S WHAT I WANT TO DISCUSS  
27 WITH YOU. OKAY?

28                   A.    YES.

1 Q. OKAY.

2 NOW, TO START WITH, BACK IN 1954,  
3 DID YOU HAVE SOME IDEA ABOUT WHO THE DISTINGUISHED  
4 AUTHORITIES WERE ON THE SUBJECT OF TOBACCO SMOKE  
5 AND LUNG CANCER?

6 A. THERE WERE MANY SUCH AUTHORITIES  
7 THROUGHOUT THE WORLD, YES.

8 Q. YOU HAD AN IDEA WHO THEY WERE THEN  
9 IS WHAT I AM GETTING AT?

10 A. INDIVIDUALS, DO YOU MEAN?

11 Q. YES.

12 A. YES. YES.

13 Q. DO YOU AGREE OR DISAGREE, AND I AM  
14 NOT TALKING ABOUT 2001, I AM TALKING ABOUT BACK IN  
15 1954, IN JANUARY OF 1954, DID YOU AGREE WITH THE  
16 FOLLOWING: "STATISTICS PURPORTING TO LINK THE  
17 DISEASE COULD APPLY WITH EQUAL FORCE TO ANY ONE OF  
18 THE MANY OTHER ASPECTS OF MODERN LIFE"?

19 A. IT IS A LUDICROUS STATEMENT.

20 Q. OKAY.

21 THAT'S A STRONG WORD. WHY DO YOU  
22 USE A STRONG WORD?

23 A. BECAUSE IT'S SO EXTRAORDINARILY  
24 UNTRUE.

25 Q. EXPLAIN.

26 A. THERE WERE CERTAIN STATISTICS  
27 WHICH, OF WHICH THIS COULD BE SAID. FOR EXAMPLE,  
28 THERE WAS AN INCREASE IN CIGARETTE SMOKING

1 NATIONALLY IN MANY COUNTRIES AND AN INCREASE IN  
2 LUNG CANCER.

3 AND OF COURSE, THAT SORT OF  
4 STATISTICS COULD APPLY TO MANY OTHER ASPECTS OF  
5 MODERN LIFE, THE NUMBER OF MOTOR CARS ON THE  
6 STREET.

7 I AM NOT SURE IN 1954 THAT  
8 TELEVISIONS WERE -- HOW COMMON THEY WERE, BUT RADIO  
9 CERTAINLY HAD INCREASED COMPARABLY.

10 AND THERE WERE OTHER ASPECTS OF  
11 LIFE, OF MODERN LIFE WHICH HAD INCREASED AT THE  
12 SAME TIME AS THE MORTALITY FROM LUNG CANCER HAD  
13 INCREASED.

14 AND THOSE -- FOR THOSE STATISTICS,  
15 THAT REMARK WOULD APPLY.

16 BUT THE STATISTICS THAT WERE  
17 LINKING SMOKING TO LUNG CANCER WERE OF AN ENTIRELY  
18 DIFFERENT SORT.

19 THEY WERE STATISTICS RELATING TO  
20 INDIVIDUALS' KNOWN SMOKING HABITS AND THE DISEASE  
21 THEY DEVELOPED.

22 AND THERE WERE NO SUCH STATISTICS  
23 LINKING LUNG CANCER TO ANY OF THE OTHER ASPECTS OF  
24 MODERN LIFE.

25 THOSE WERE PARTICULARLY WHAT  
26 PROFESSOR BRADFORD HILL AND I HAD LOOKED FOR AND  
27 WHAT WYNDER AND GRAHAM HAD LOOKED FOR AND FAILED TO  
28 FIND.

1 SO IT WAS JUST A BALD UNTRUTH.

2 Q. WELL, I REMEMBER -- I REMEMBER  
3 TELEVISION IN '54. IF THERE WERE MORE TELEVISIONS  
4 IN '54 THAN THERE USED TO BE IN 1901 WHEN THERE  
5 WERE NO TELEVISIONS AT ALL, AND IF LUNG CANCER WENT  
6 UP OVER THE YEARS, YOU ARE SAYING YOU CAN'T LINK  
7 LUNG CANCER TO TELEVISION JUST BECAUSE SOMEONE HAD  
8 INVENTED TELEVISION?

9 A. THAT IS RIGHT.

10 Q. OR IF, I AM REALLY STRETCHING NOW,  
11 BUT IF THE GIANTS AND THE INDIANS PLAYED IN THE  
12 WORLD SERIES IN 1954, THAT DOESN'T MEAN THAT  
13 BECAUSE THOSE TWO TEAMS --

14 MR. CARLTON: OBJECTION, LEADING.

15 MR. PIUZE: I WITHDRAW THE QUESTION.

16 THE COURT: FAIR ENOUGH.

17 Q BY MR. PIUZE: IF I ASKED YOU TO  
18 JUST ASSUME THAT OVER THE COURSE OF TIME MORE  
19 PEOPLE, MORE LADIES WORE BLUE DRESSES THAN THEY DID  
20 EARLIER IN THE CENTURY, AND THERE WAS MORE LUNG  
21 CANCER AS WE WENT ALONG, WOULD YOU CONCLUDE THAT  
22 BLUE DRESSES AND LUNG CANCER WENT TOGETHER?

23 A. I CERTAINLY WOULD NOT.

24 Q. SO THIS STATEMENT, "STATISTICS  
25 PURPORTING TO LINK THE DISEASE COULD APPLY WITH  
26 EQUAL FORCE TO ANY ONE OF THE MANY OTHER ASPECTS OF  
27 MODERN LIFE," GIVEN THE RESEARCH THAT WENT ON, YOU  
28 THOUGHT WAS A BALD-FACED --

1           A.     I HESITATED TO USE THE WORD "LIE. "  
2 BUT IT DOES SEEM TO ME TO BE A LIE.

3           Q.     NEXT SENTENCE, "INDEED, THE  
4 VALIDITY OF THE STATISTICS THEMSELVES IS QUESTIONED  
5 BY NUMEROUS SCIENTISTS. "

6                     NOW, WAS THAT A CORRECT STATEMENT?

7           A.     SAYING "NUMEROUS," PROBABLY NOT.  
8 BUT THE VALIDITY WAS QUESTIONED BY SOME LEADING  
9 SCIENTISTS, YES.

10          Q.     ALL RIGHT.  NOW, AS FAR AS YOU ARE  
11 CONCERNED, AS OF 1954, IN JANUARY OF 1954, WAS THE  
12 WEIGHT OF THE SCIENTIFIC COMMUNITY BEHIND THE  
13 PROPOSITION THAT SMOKING CAUSED LUNG CANCER OR WAS  
14 IT NOT BEHIND THAT PROPOSITION?

15          A.     IN JANUARY 1954, I WOULD SAY THE  
16 OPINION WAS PRETTY DIVIDED.  IT WASN'T UNTIL THE  
17 PUBLICATION OF THE COHORT STUDIES, OUR STUDY OF  
18 BRITISH DOCTORS AND THE AMERICAN CANCER SOCIETY'S  
19 STUDY OF 190,000 AMERICANS THAT CAME OUT IN 1954  
20 THAT OPINION CONGEALED.

21          Q.     ALL RIGHT.  THANK YOU.

22                     THEN BACK TO THIS TIME LINE.  SO  
23 LATER IN THE YEAR OF 1954 ONE OF THE STUDIES CAME  
24 OUT?

25          A.     LATER IN THAT YEAR, OPINION WAS  
26 FIRING UP QUITE DEFINITELY THAT SMOKING WAS A  
27 CAUSE OF LUNG CANCER.

28          Q.     OKAY.  THANK YOU.

1                   NOW, I WANT TO MOVE ON TO 1956  
2   HERE.

3                   AND 1956 IS THE COHORT STUDY OF  
4   34,000 BRITISH MALE DOCTORS.   HAVE WE ALREADY  
5   DISCUSSED THE RESULTS OF THAT PARTICULAR STUDY?

6                   A.   NO.   WE DISCUSSED THE EARLIER  
7   RESULTS IN 1954.

8                   1956 WAS THE SAME STUDY BECAUSE WE  
9   HAD FIVE YEARS' OBSERVATION INSTEAD OF TWO AND A  
10   HALF YEARS AND MUCH FIRMER EVIDENCE THAT THE  
11   FINDINGS ARE BASED ON MUCH LARGER AND STATISTICALLY  
12   HIGHLY SIGNIFICANT, MUCH LARGER NUMBERS AND  
13   STATISTICALLY HIGHLY SIGNIFICANT DIFFERENCES.

14                  Q.   OKAY, SAME RESULTS?

15                  A.   SAME RESULT.

16                  Q.   PUBLISHED IN VERY HIGHLY RESPECTED  
17   PLACE?

18                  A.   YES.

19                  Q.   PAST 1956, AND IT WOULD SEEM TO ME  
20   '56, '57 WOULD BE THE APPROPRIATE YEARS, THIS CHART  
21   SHOWS SUGIURA, AM I PRONOUNCING THAT CORRECTLY?

22                  A.   NEAR ENOUGH.   I CALL HIM SUGIURA,  
23   BUT I DON'T KNOW HOW THE JAPANESE ACTUALLY CALL IT.

24                  Q.   ENGLBRETH?

25                  A.   ENGLBRETH-HOLM

26                  Q.   IN EUROPE, IN FRANCE, COULD YOU  
27   JUST SPEND A COUPLE MINUTES AND TELL THE JURY WHAT  
28   EACH OF THOSE STUDIES SHOWED, PLEASE.

1           A.     THESE WERE THE -- WERE SOCIAL  
2 WORKERS WHO HAD CARRIED OUT EXPERIMENTS TO SEE IF  
3 THEY COULD PRODUCE CANCER IN ANIMALS BY EXPOSING  
4 THEM TO TARS OBTAINED FROM TOBACCO SMOKE.  AND ONE  
5 AFTER ANOTHER THEY DID SUCCEED IN SO DOING AND SO  
6 REPORTING.

7           Q.     AND THAT HOLDS TRUE FOR ALL OF  
8 THEM?

9           A.     YES.  
10                   SUGIURA WAS A LEADING CANCER  
11 RESEARCH WORKER IN JAPAN.

12                   AND ENGLEBRETH-HOLM I KNEW  
13 PERSONALLY WAS ONE OF THE LEADING CANCER RESEARCH  
14 WORKERS IN DENMARK.  I DIDN' T KNOW THE FRENCH.

15          Q.     THANK YOU.

16                   I GUESS THAT TIME LINE, IF WE WANT  
17 TO, WE COULD KEEP DRAWING ALL THE WAY UNTIL IT WENT  
18 OUT THE SIDE OF THE BUILDING THERE.

19                   BUT I WOULD LIKE TO KNOW FROM YOU,  
20 AND I WOULD LIKE YOU TO TELL THE JURY, PLEASE, WHAT  
21 YEAR WAS IT THAT YOU, IN YOUR VIEW, SCIENCE, HAD  
22 ACCEPTED THAT CIGARETTE SMOKING CAUSES LUNG CANCER?

23          A.     1957.  I SPECIFY THAT DATE BECAUSE  
24 THE ESSENTIAL EVIDENCE WAS IN BY THEN OF THE COHORT  
25 STUDIES AS WELL AS THE CASE CONTROL STUDIES.  THE  
26 DEMONSTRATION OF PRODUCING CANCER IN ANIMALS WITH  
27 TOBACCO TARS AND THE ISOLATION OF WELL-KNOWN  
28 CHEMICAL CARCINOGENS IN TOBACCO SMOKE HAD ALL BEEN

1 REPEATEDLY REPORTED. AND WE HAD, FOR THE FIRST  
2 TIME IN 1957, A FORMAL REPORT BY A SCIENTIFIC GROUP  
3 AT THE REQUEST OF THE GOVERNMENT WHO HAD REVIEWED  
4 THE EVIDENCE AT THE REQUEST OF THE GOVERNMENT, A  
5 FORMAL REPORT THAT THE GOVERNMENT SHOULD ACCEPT  
6 THAT CIGARETTE SMOKING WAS A CAUSE OF THE INCREASE  
7 IN THE MORTALITY FROM LUNG CANCER THAT HAD  
8 OCCURRED.

9 THAT COMMITTEE WAS A COMMITTEE OF  
10 THE BRITISH MEDICAL RESEARCH COUNCIL.

11 Q. THANK YOU.

12 REMEMBERING WHERE YOU STARTED,  
13 WHICH WAS, I THINK, AROUND '48, WOULD IT BE FAIR TO  
14 SAY, IN ABOUT TEN YEARS OF RESEARCH, NOT JUST BY  
15 YOU BUT BY SCIENTISTS AROUND THE WORLD, IT HAD  
16 BECOME ESTABLISHED THAT SMOKING CAUSES LUNG CANCER?

17 A. YES.

18 Q. NOW, THAT WAS THE BRITISH  
19 GOVERNMENT YOU WERE JUST TALKING ABOUT THAT  
20 ACCEPTED THAT FINDING.

21 I'D LIKE TO TALK A LITTLE BIT ABOUT  
22 OTHER GOVERNMENTS AND OTHER GOVERNMENTAL  
23 ORGANIZATIONS, IF WE COULD.

24 ARE YOU READY TO DO THAT?

25 A. YES.

26 Q. WHAT IS THE WORLD HEALTH  
27 ORGANIZATION, PLEASE?

28 A. THE WORLD HEALTH ORGANIZATION IS A

1 BRANCH OF THE UNITED NATIONS THAT SET UP AFTER THE  
2 SECOND WORLD WAR AS A CONTINUATION OF THE BODY THAT  
3 HAD EXISTED UNDER THE LEAGUE OF NATIONS THAT  
4 MAINTAINED SPECIFICS FOR COUNTRIES THROUGHOUT THE  
5 WORLD AND STIMULATED, TRIED TO STIMULATE RESEARCH  
6 TO DEAL WITH THE MOST IMPORTANT DISEASES THAT WERE  
7 AFFECTING THE WORLD AS A WHOLE.

8 Q. OKAY. THANK YOU.

9 DID THE WORLD HEALTH ORGANIZATION  
10 LEND ITS NAME AND THE WEIGHT OF ITS AUTHORITY ON  
11 THE ISSUE OF WHETHER OR NOT SMOKING TOBACCO CAUSES  
12 LUNG CANCER?

13 A. YES, IT DID. IN 1960, IT ISSUED A  
14 REPORT WHICH STATED THAT SMOKING, CIGARETTE SMOKING  
15 WAS A CAUSE OF LUNG CANCER.

16 Q. THANK YOU.

17 NOW, WHAT ABOUT IN THE UNITED  
18 STATES, THE LAST TIME WE TALKED ABOUT THE U. S. , AT  
19 LEAST ON THIS CHART, IT LOOKS TO BE ABOUT '54.

20 CAN YOU, AND THEN '54 WAS THE  
21 AMERICAN CANCER SOCIETY STUDY AND THE FRANK  
22 STATEMENT.

23 I'D LIKE YOU TO JUST TELL US ABOUT  
24 OUR OWN HISTORY HERE IN REGARD TO WHO PUBLISHED  
25 WHAT ABOUT THE CAUSES OF LUNG CANCER AS IT RELATED  
26 TO TOBACCO.

27 LET'S JUST GO FROM '54 FOR ABOUT  
28 SIX OR SEVEN YEARS, IF YOU COULD, OR EIGHT YEARS.

1           A.     YES.  WELL, OF COURSE, THE MAIN  
2 COHORT STUDY, FOLLOW-UP STUDY WAS THE ONE CARRIED  
3 OUT BY THE AMERICAN CANCER SOCIETY WHICH PUBLISHED  
4 A FINAL REPORT IN 1957, FOLLOWING IT'S EARLIER  
5 REPORT IN 1954.  THE REPORT BY HAMMOND AND HORN, AS  
6 THEY WERE THE AUTHORS OF IT.

7                     BUT THERE WERE, BY THAT TIME,  
8 SEVERAL OTHER COHORTS HAD BEEN STUDIED BY  
9 INDIVIDUAL CANCER RESEARCH WORKERS, THERE WERE, I  
10 AM NOT SURE THE ACTUAL DATES WHEN THEY WERE  
11 PUBLISHED, THERE WAS ONE IN CANADA AND THERE WERE  
12 ANOTHER FOUR IN THE UNITED STATES ALSO, SHOWING  
13 SIMILAR RESULTS.

14                    BUT IT WAS IN 1957 THAT A MAJOR  
15 SCIENTIFIC COMMITTEE IN THE UNITED STATES FOR THE  
16 FIRST TIME REPORTED THAT ON REVIEWING ALL THE DATA,  
17 IT SHOULD BE ACCEPTED, ACKNOWLEDGED THAT SMOKING  
18 WAS A CAUSE OF LUNG CANCER.

19           Q.     OKAY.  AND BEFORE I LEAVE '57 NOW,  
20 THAT MAJOR ORGANIZATION WAS --

21           A.     IT WAS A COMMITTEE OF THE HEART AND  
22 LUNG INSTITUTE OF THE NATIONAL INSTITUTES OF  
23 HEALTH, OF THE NATIONAL CANCER INSTITUTE, OF THE  
24 NATIONAL INSTITUTES OF HEALTH AND OF THE AMERICAN  
25 CANCER SOCIETY.  THEY JOINTLY APPOINTED A COMMITTEE  
26 TO ADVISE ON THE STATE OF THE SCIENCE.  AND THAT  
27 COMMITTEE, IN 1957, REACHED A FIRM CONCLUSION THAT  
28 CIGARETTE SMOKING WAS A CAUSE OF LUNG CANCER.

1 Q. THANK YOU.

2 JUST GIVE ME A MINUTE TO MOVE THIS  
3 OUT OF THE WAY NOW

4 THIS IS FROM THE TOBACCO INSTITUTE,  
5 INC. AND IT'S DATED, IT'S A PRESS RELEASE, FOR A  
6 RELEASE MARCH 17, 1961.

7 AND IT'S CALLED "A TOBACCO  
8 INSTITUTE STATEMENT. "

9 THIS IS HERE IN THE U. S. ?

10 A. YES.

11 Q. AND I AM DRAWING YOUR ATTENTION TO  
12 THE BOTTOM HERE.

13 "THE REPETITION BY  
14 DR. WYNDER OF HIS FIRM OPINIONS DOES  
15 NOT ALTER THE FACT THAT THE CAUSE OR  
16 CAUSES OF LUNG CANCER CONTINUE TO BE  
17 UNKNOWN AND ARE SUBJECT OF CONTINUING  
18 EXTENSIVE SCIENTIFIC RESEARCH BY MANY  
19 AGENCIES. "

20 AND I AM GOING TO BREAK THAT UP  
21 BECAUSE THERE'S TWO PIECES TO IT AND I WOULD LIKE  
22 TO ASK YOU SOME QUESTIONS ABOUT EACH.

23 "THE REPETITION BY  
24 DR. WYNDER OF HIS FIRM OPINIONS DOES  
25 NOT ALTER THE FACT THAT THE CAUSE OR  
26 CAUSES OF LUNG CANCER CONTINUE TO BE  
27 UNKNOWN. "

28 TRUE OR FALSE?

1           A.     FALSE.

2                     IN 1961, THERE WERE HALF A DOZEN  
3 ESTABLISHED CAUSES OF LUNG CANCER AND, FORTUNATELY,  
4 OTHER INDUSTRIES HAD REACTED TO THEM AND PROTECTED  
5 PEOPLE FROM EXPOSURE.

6           MR. CARLTON:  OBJECTION.

7           THE COURT:  SUSTAINED, NON-RESPONSIVE.

8           MR. PIUZE:  MAY I GUIDE THE WITNESS A  
9 BIT.

10          THE COURT:  SURE.

11          Q     BY MR. PIUZE:  DR. DOLL, MAKE YOUR  
12 ANSWERS A LITTLE BIT SHORTER.  I GET TO ASK MORE  
13 QUESTIONS AND IT WILL ALL HAPPEN.  OKAY?

14          A.     YES.

15          Q.     ALL RIGHT.  LET ME DO IT AGAIN.  
16 THIS OBVIOUSLY REQUIRES ONE WORD.

17                     TRUE OR FALSE?

18          A.     FALSE.

19                     I PRESUMED IT WAS THE PREVIOUS  
20 QUESTION YOU HAD ASKED ME.

21          Q.     AND IS THAT LIKE FALSE OR IS THAT  
22 LIKE FALSE?

23          A.     FALSE IS FALSE IS FALSE.

24          Q.     NOW, BY 1961, WERE THERE SEVERAL  
25 KNOWN CAUSES OF LUNG CANCER?

26          A.     YES.

27          Q.     WHAT, PLEASE?

28          A.     ASBESTOS, FOR EXAMPLE, WAS A KNOWN

1 CAUSE.

2 RADON IN MINES WAS A WELL

3 ESTABLISHED CAUSE.

4 THE FUMES FROM COAL TAR IN

5 MANUFACTURING OF COAL GAS WAS A WELL ESTABLISHED

6 CAUSE.

7 THE REFINING OF CHROME TO MAKE

8 CHROMATES AND THE REFINING OF NICKELS TO MAKE

9 NICKEL WERE WELL ESTABLISHED CAUSES OF LUNG CANCER.

10 Q. I DIDN'T HEAR TOBACCO SMOKE.

11 A. TOBACCO, WE HAD ESTABLISHED

12 SOMETIME EARLIER.

13 Q. THE CHEMICALS THAT YOU JUST

14 MENTIONED THAT WERE USED IN MANUFACTURING, FOR

15 OPENERS, WAS THE PERCENTAGE OF LUNG CANCERS THAT

16 THESE CHEMICALS CAUSED VERY, VERY SMALL OR VERY,

17 VERY LARGE OR WHAT COMPARED TO TOBACCO, PLEASE?

18 A. IN SOME INSTANCES, IT WAS LARGE,

19 DEPENDING UPON THE EXTENT OF THE EXPOSURE.

20 RADON, FOR EXAMPLE, IN MINES, HAD,

21 AT ONE TIME, CAUSED THE DEATH OF MINERS FROM LUNG

22 CANCER, FOR THREE-QUARTERS OF ALL DEATHS IN THE

23 MINERS WERE DUE TO LUNG CANCER AS A RESULT OF THEIR

24 EXPOSURE TO RADON.

25 AND THE NICKEL REFINING WAS ALSO A

26 VERY MAJOR CAUSE OF LUNG CANCER, CAUSING ABOUT 10

27 PERCENT OF THE WORKERS TO, OF THE PROCESS WORKERS

28 TO DIE OF THAT DISEASE. 10, 20 PERCENT, I THINK.

1 ASBESTOS, OF COURSE, HAD KILLED  
2 MANY, HUNDREDS, IF NOT THOUSANDS OF INSULATION  
3 WORKERS. AND ALTHOUGH, AT THAT TIME, THIS WAS  
4 BEFORE SELIKOFF'S WORK ON SHIPYARD  
5 WORKERS, IT WAS -- THE EVIDENCE WAS STRONG, PEOPLE  
6 THAT MANUFACTURED ASBESTOS ARTICLES OUT OF  
7 ASBESTOS. SO I MUST TAKE BACK THE THOUSANDS,  
8 HUNDREDS OF CASES OF LUNG CANCER FROM SUCH  
9 EXPOSURE.

10 Q. OKAY, THANK YOU.

11 IF WE DON'T CONCENTRATE ON PEOPLE  
12 WHO HAPPEN TO WORK IN MINES OR PEOPLE WHO HAPPEN TO  
13 WORK IN NICKEL REFINERIES OR PEOPLE THAT HAPPEN TO  
14 BE WORKING WITH ASBESTOS AND JUST TAKE ALL THE  
15 PEOPLE, COULD YOU COMMENT ON HOW MANY FELL INTO THE  
16 CHEMICALS DEPARTMENT AND HOW MANY FELL INTO THE  
17 TOBACCO DEPARTMENT?

18 A. OH, VERY SMALL PROPORTION INTO THE  
19 INDUSTRIAL CHEMICAL DEPARTMENT.

20 THE VAST MAJORITY OF LUNG CANCER IN  
21 THE GENERAL POPULATION WERE AS A RESULT OF EXPOSURE  
22 TO TOBACCO SMOKE.

23 THE OTHERS WERE ONE PERCENT, TWO  
24 PERCENT, THAT SORT OF THING.

25 Q. THANK YOU.

26 NOW, AS OF 1961, I HAD ASKED YOU TO  
27 COMMENT ON WHETHER THAT WAS A TRUE OR FALSE. LET'S  
28 JUST STAY WITH THE CHEMICALS JUST FOR A SECOND AND

1 GO AWAY FOR GOOD.

2 IN 1961, IN ADDITION TO THESE  
3 CHEMICALS BEING A KNOWN CAUSE OF LUNG CANCER, HAD  
4 THE INDUSTRIES IN WHICH THESE CHEMICALS WERE USED  
5 TRIED TO GUARD PEOPLE AGAINST --

6 A. YES, INDEED.

7 MR. CARLTON: OBJECTION, LACK OF  
8 FOUNDATION.

9 THE COURT: FOUNDATION, PLEASE.

10 MR. PIUZE: OKAY.

11 Q BY MR. PIUZE: BEFORE YOU CAN  
12 ANSWER, THEN I HAVE TO ASK YOU HOW YOU KNOW HOW  
13 DO YOU KNOW WHETHER THESE INDUSTRIES TOOK  
14 PRECAUTIONS TO GUARD THEIR WORKERS AGAINST LUNG  
15 CANCER, HOW DO YOU KNOW ONE WAY OR ANOTHER?

16 A. BECAUSE I WAS WORKING WITH SOME OF  
17 THE INDUSTRIES AND ADVISING THEM THE ASBESTOS  
18 INDUSTRY, IN PARTICULAR, BUT ALSO THE NICKEL  
19 INDUSTRY.

20 AND THE MANUFACTURERS OF COAL GAS I  
21 HAD PERSONAL FRIENDS WHO WERE THEIR MEDICAL  
22 OFFICERS AND TOLD ME OF THE PRECAUTIONS TAKEN.

23 Q. WELL, WITH THAT IN MIND THEN, I  
24 DON'T WANT TO GET WAY OFF ON A TANGENT HERE, DID  
25 THOSE MANUFACTURERS TRY TO GUARD THEIR WORKERS FROM  
26 THE RISK OF LUNG CANCER USING THOSE CHEMICALS BY  
27 1961?

28 A. YES.

1           MR. CARLTON:  OBJECTION, YOUR HONOR,  
2 BEYOND THE SCOPE AND HEARSAY.

3           THE COURT:  ARE THOSE INDUSTRIES  
4 SPECIFICALLY, BEFORE YOU ANSWER THE QUESTION, ONES  
5 THAT YOU KNOW ABOUT?

6           THE WITNESS:  YES, YOUR HONOR.

7           THE COURT:  THANK YOU, SIR.

8                         WOULD YOU HAVE TO STATE THE  
9 SPECIFIC INDUSTRIES THAT YOU ARE TALKING ABOUT, THE  
10 ONES THAT YOU KNOW ABOUT.

11           THE WITNESS:  ASBESTOS, NICKEL INDUSTRY,  
12 CHROMATE INDUSTRY, THE MANUFACTURE OF COAL GAS.  I  
13 DID NOT, AT THAT TIME, HAVE PERSONAL EXPERIENCE  
14 WITH RADON.

15           THE COURT:  THANK YOU, SIR.

16           MR. PIUZE:  ALL RIGHT, THANK YOU.

17           THE COURT:  PROCEED.

18           Q     BY MR. PIUZE:  SO THE POINT I AM  
19 TRYING TO MAKE OR GET TO IS THE FOLLOWING:  THE  
20 FACT THAT THE CAUSE OR CAUSES OF LUNG CANCER  
21 CONTINUES TO BE UNKNOWN, IT WASN'T JUST YOU THAT  
22 WOULD HAVE SAID FALSE TO THAT IN 1961?

23           MR. CARLTON:  OBJECTION.

24           THE COURT:  LEADING.

25           Q     BY MR. PIUZE:  WOULD YOU TELL US  
26 YOUR VIEW, IN PERCENTAGES, IF YOU COULD, OF  
27 RESPECTED MEDICAL RESEARCHERS BY 1961, CAN YOU TELL  
28 US WHETHER IT BE ONE PERCENT OR 90 PERCENT OR ANY

1 PERCENT OF RESPECTED MEDICAL RESEARCHERS THAT, IN  
2 1961, WOULD SAY THE CAUSE OR CAUSES OF LUNG CANCER  
3 CONTINUES TO BE UNKNOWN?

4 A. OH, I WOULD SAY BY THEN 100 PERCENT  
5 OF CANCER RESEARCH WORKERS THAT WERE CONCERNED WITH  
6 LUNG CANCER WOULD HAVE SAID THAT WAS FALSE.

7 Q. SECOND PART OF THIS, TO GET IT IN  
8 CONTEXT, "THE CAUSE OR CAUSES OF LUNG CANCER ARE  
9 THE SUBJECT OF CONTINUING EXTENSIVE SCIENTIFIC  
10 RESEARCH BY MANY AGENCIES." THAT IS PART TRUE?

11 A. I AM TRYING TO THINK WHAT THEY  
12 COULD HAVE BEEN DOING.

13 IN THE SENSE THAT MORE DATA WERE  
14 BEING COLLECTED, AS WE WERE COLLECTING MORE DATA ON  
15 THE BRITISH DOCTORS, YES, IT WAS TRUE.

16 AND PEOPLE WERE LOOKING AT  
17 DIFFERENT INDUSTRIES TO SEE IF THERE WERE HAZARDS  
18 OF LUNG CANCER IN THOSE INDUSTRIES AND SEVERAL  
19 OTHERS HAD BEEN FOUND SINCE. I AM PARTICULARLY  
20 THINKING OF THE COAL INDUSTRY AND THE RISKS  
21 ASSOCIATED WITH SILICOSIS, WITH CHEST DISEASE  
22 FOLLOWING EXPOSURE TO DUST IN COAL MINES.

23 SO A NUMBER OF PEOPLE WERE  
24 CONTINUING TO LOOK FOR CAUSES OF LUNG CANCER, YES.

25 Q. ALL RIGHT, THANK YOU.

26 SEEING THAT THIS PARTICULAR  
27 DOCUMENT WAS PUT OUT BY THE TOBACCO INSTITUTE,  
28 INC. --

1           MR. CARLTON:  OBJECTION TO THE COMMENT,  
2 THE FORM OF THE QUESTION.

3           THE COURT:  JUST THE WORD "SEEING" IS THE  
4 ONLY OBJECTIONABLE WORD.

5           MR. PIUZE:  SORRY.

6           Q       BY MR. PIUZE:  IN LIGHT OF THE  
7 FACT THAT THIS PARTICULAR PRESS RELEASE WAS PUT OUT  
8 BY THE TOBACCO INSTITUTE, INC.  -- LET ME REWORD THE  
9 QUESTION SLIGHTLY.

10                   AS OF 1961, THE FACT THAT THE CAUSE  
11 OR CAUSES OF LUNG CANCER DOES NOT INCLUDE  
12 TOBACCO -- I AM MAKING THAT UP.  IT IS NOT HERE.  I  
13 AM MAKING THAT UP.

14                   IS THAT A STATEMENT TO WHICH ANY  
15 MEDICAL RESEARCHER OF WHOM YOU WERE AWARE IN 1961,  
16 WOULD AGREE?

17           A.     NO.

18           Q.     OKAY.  I WANT TO JUMP YOU AHEAD A  
19 BIT, IF WE COULD, TO 1965.  FIRST I AM GOING TO  
20 SHOW THE JURY THE COVER PAGE, AS BEST I CAN.  IT'S  
21 DATED A PRESS RELEASE FOR WEDNESDAY, DECEMBER 29,  
22 1965, YEAR END STATEMENT BY GEORGE ALLEN, PRESIDENT  
23 OF THE TOBACCO INSTITUTE, INC.

24                   AND I AM INTERESTED IN THE SECOND  
25 PAGE OF THIS RELEASE, WHICH DISCUSSES AN ARTICLE IN  
26 THE JOURNAL OF AMERICAN STATISTICAL ASSOCIATION,  
27 WRITTEN BY PROFESSOR K. A. BROWNLEE OF THE  
28 UNIVERSITY OF CHICAGO.  AND IT DISCUSSES THE FACT,

1 THIS HAS TO DO WITH SMOKING, THAT PROFESSOR  
2 BROWNLEE BELIEVES "ANOTHER THEORY WHICH HE BELIEVES  
3 IS THE MAIN ALTERNATIVE TO THE SMOKING THEORY, IS  
4 CALLED THE GENETIC THEORY. "

5 NOW, EVERYBODY FORGIVE ME IN  
6 ADVANCE, FIRST DEFINE "GENETIC," PLEASE.

7 A. IT MEANS HEREDITARY FACTOR, CAUSING  
8 THE DISEASE OR THE BEHAVIOR, WHATEVER IT MIGHT BE.

9 Q. ARE YOU, THE WAY THIS IS USED, THE  
10 GENETIC THEORY, WERE YOU FAMILIAR WITH THE GENETIC  
11 THEORY AS IT APPLIED TO SMOKING?

12 A. YES, I WAS. IT WAS A HYPOTHESIS  
13 PUT FORWARD BY RONALD FISHER, A VERY WELL-KNOWN  
14 STATISTICIAN.

15 Q. AND WHAT WAS THAT HYPOTHESIS,  
16 PLEASE?

17 A. THIS HYPOTHESIS WAS THAT, THAT  
18 THERE WAS A GENETIC FACTOR WHICH BOTH CAUSED PEOPLE  
19 TO WANT TO SMOKE AND QUITE INDEPENDENTLY MADE THEM  
20 SUSCEPTIBLE TO THE DEVELOPMENT OF LUNG CANCER.

21 SO THAT THE CONNECTION BETWEEN  
22 SMOKING AND LUNG CANCER WAS PURELY THROUGH THEM  
23 HAVING A COMMON HEREDITARY ORIGIN.

24 Q. ALL RIGHT. IF I -- LET ME SAY THAT  
25 DIFFERENTLY. TELL ME IF THIS IS CORRECT.

26 GENETICALLY, SOME PEOPLE, JUST BY  
27 COINCIDENCE, MAY HAVE SOMETHING IN THEM THAT WOULD  
28 MAKE THEM WANT TO SMOKE AND SOMETHING TOTALLY

1 DIFFERENT IN THEM, JUST BY COINCIDENCE, THAT MAKES  
2 THEM SUSCEPTIBLE TO LUNG CANCER?

3 A. NO, THAT WAS NOT THE THEORY.  
4 IT WAS THE SAME GENETIC MAKEUP  
5 WHICH BOTH MADE THEM WANT TO SMOKE AND MADE THEM  
6 DEVELOP LUNG CANCER.

7 Q. THANK YOU.  
8 ROUGHLY, WHEN DID YOU FIRST HEAR OF  
9 THE GENETIC THEORY?

10 A. OH, IN THE MID-1950'S WHEN, I AM  
11 NOT SURE THE EXACT DATE, BUT CERTAINLY FAIRLY EARLY  
12 IN THE 1950'S, FISHER PUT THIS FORWARD.

13 Q. DID SCIENTISTS DO STUDIES IN ORDER  
14 TO SEE IF THAT WAS A VALID HYPOTHESIS?

15 A. THEY DID, EVENTUALLY, YES.

16 Q. COULD YOU DISCUSS THOSE WITH THE  
17 JURY. AND IT'S OF SOME INTEREST TO ME TO HAVE THE  
18 TIMING, THE APPROXIMATE TIMING OF THE STUDIES.

19 A. THESE STUDIES WERE BEGUN, I AM NOT  
20 SURE, I THINK IN THE EARLY 1960'S, OR POSSIBLY  
21 EARLIER THAN THAT. BUT THEY WERE NOT REPORTED FOR  
22 SOME YEARS AFTER THAT.

23 AND IN THESE STUDIES, THEY SOUGHT  
24 PAIRS OF TWINS WHO WERE IDENTICAL TWINS WITH  
25 DIFFERENT SMOKING HABITS. BECAUSE ACCORDING TO  
26 FISHER'S HYPOTHESIS, IF ONE TWIN DEVELOPED LUNG  
27 CANCER, THE OTHER TWIN SHOULD DEVELOP IT,  
28 IRRESPECTIVE OF WHAT HIS SMOKING HABITS WERE, JUST

1 BECAUSE HE WAS AN IDENTICAL TWIN.

2 AND THE STUDY WAS DONE IN SWEDEN IN  
3 PARTICULAR, WHERE THEY HAD A BIG TWIN REGISTER, AND  
4 THEY WERE ABLE TO BUILD UP A LARGE GROUP OF  
5 IDENTICAL TWINS IN WHICH THE INDIVIDUALS HAD  
6 DIFFERENT SMOKING HABITS.

7 AND THEY FOUND THAT THE RISK OF  
8 LUNG CANCER WENT WITH THE SMOKING HABIT, NOT WITH  
9 WHAT THE OTHER TWIN HAD. IT WAS NOT RELATED TO THE  
10 GENETICS AT ALL.

11 Q. AND WHEN WERE THE RESULTS OF THAT  
12 STUDY?

13 A. I CAN ONLY RECALL THE FINAL RESULTS  
14 IN 1988, BUT THERE WERE EARLIER RESULTS AND I  
15 FORGET THE DATE.

16 Q. HAS THERE BEEN ONLY ONE TWIN STUDY?

17 A. NO, THERE HAVE BEEN TWO SUBSEQUENT  
18 ONES, ONE IN FINLAND AND ONE IN THE UNITED STATES,  
19 BOTH SHOWING THE SAME RESULTS.

20 Q. EXCUSE ME. COMING BACK TO THIS  
21 DOCUMENT THAT'S UP ON THE BOARD NOW, IN 1965,  
22 DECEMBER OF 1965, AS FAR AS THE BODY OF SCIENTISTS  
23 IN THE WORLD WERE CONCERNED, WAS THE GENETIC THEORY  
24 THE MAIN ALTERNATIVE TO THE SMOKING THEORY?

25 A. IT WASN'T AN ALTERNATIVE THAT WAS  
26 ACCEPTED BY ANYBODY THAT I KNEW. IT WAS A SMALL  
27 MINORITY OF PEOPLE WHO HADN'T REALLY STUDIED THE  
28 ISSUE, BECAUSE IF YOU STUDIED THE ISSUE, IT VERY,

1 VERY RAPIDLY BECAME CLEAR THAT IT WASN' T AN  
2 ALTERNATIVE AT ALL.

3 ONE THING, OF COURSE, IT DIDN' T, IN  
4 ANY WAY, EXPLAIN THE INCREASE IN LUNG CANCER. YOU  
5 HAD TO POSTULATE THOSE, SOMETHING QUITE DIFFERENT  
6 WHICH CAUSED THE INCREASE.

7 BUT THE MERE CONCEPT OF THE GENETIC  
8 FACTOR BEING IMPORTANT WAS FOR ANYONE WHO STUDIED  
9 IT, AGAIN, QUITE LUDICROUS. BECAUSE IT WOULD  
10 REQUIRE THAT WOMEN HAD DIFFERENT GENETIC  
11 CHARACTERISTICS TO MEN IN SOME COUNTRIES AND HAD  
12 THE SAME GENETIC CHARACTERISTICS TO MEN IN OTHER  
13 COUNTRIES BECAUSE IN SOME COUNTRIES WOMEN SMOKED  
14 AND GOT LUNG CANCER AND IN OTHER COUNTRIES WOMEN  
15 DIDN' T SMOKE AND DIDN' T GET LUNG CANCER.

16 SO FOR ALL SORTS OF REASONS, IT WAS  
17 A THEORY WHICH DIDN' T ATTRACT ANYONE EXCEPT A FEW  
18 THEORETICAL STATISTICIANS.

19 Q. THANK YOU.

20 I AM ALMOST DONE WITH THIS  
21 DOCUMENT. AT THE END OF '65, THIS DOCUMENT REFERS  
22 TO THE SMOKING THEORY. WAS IT A SMOKING THEORY,  
23 WAS IT, IN YOUR VIEW, WAS IT A THEORY THAT SMOKING  
24 HAD SOMETHING TO DO WITH LUNG CANCER?

25 A. NO. IT WAS A FACT.

26 Q. WHEN DID THE -- THIS IS SOMETHING I  
27 THINK ALL OF US KNOW, BUT WHEN DID THE U. S. SURGEON  
28 GENERAL' S REPORT ON SMOKING AND TOBACCO AND LUNG

1 CANCER, THE FIRST REPORT, COME OUT, PLEASE?

2 A. THAT SURGEON GENERAL'S REPORT CAME  
3 OUT IN 1964. BUT, OF COURSE, THERE HAD BEEN AN  
4 EARLIER REPORT BY THE U. S. PUBLIC HEALTH SERVICE IN  
5 THE LATE 1950'S WHICH HAD REPORTED THAT SMOKING WAS  
6 A CAUSE OF LUNG CANCER.

7 Q. U. S. HEALTH, PUBLIC HEALTH SERVICE,  
8 A GOVERNMENTAL BODY HERE IN THE UNITED STATES?

9 A. YES.

10 Q. AMONG SERIOUS SCIENTIFIC  
11 RESEARCHERS IN 1965, DID YOU KNOW OF ANY ONE  
12 PERSON, ANYWHERE, THAT THOUGHT THAT THE LINK  
13 BETWEEN SMOKING CIGARETTES AND LUNG CANCER WAS A  
14 THEORY OR WAS THEORETICAL?

15 A. NO.

16 Q. NOW, I'D LIKE TO GO TO A NEW  
17 SUBJECT.

18 EARLIER, YOU MENTIONED THAT WHEN  
19 YOU WERE TALKING TO THE DOCTORS, I THINK IT WAS THE  
20 DOCTORS, YOU CORRECT ME IF I AM WRONG, YOU WANTED  
21 TO KNOW ABOUT WHETHER THEY INHALED AND EXACTLY WHAT  
22 THEY DID WITH THE CIGARETTES. DO YOU REMEMBER  
23 THAT?

24 A. YES.

25 Q. REMIND US, TELL US WHEN AND WHERE  
26 THAT WAS, PLEASE.

27 A. THAT WAS IN 1951. WE SENT THEM  
28 THEIR FIRST QUESTIONNAIRE AND THEY SENT SUBSEQUENT

1 ONES LATER ASKING FURTHER QUESTIONS IN LATER DATES  
2 1957, 19 -- SOMEWHERE IN MID-1960'S, 1971, ET  
3 CETERA, ET CETERA.

4 Q. WHAT WERE THE -- DID YOU GIVE THEM  
5 CHOICES, WERE THE CHOICES LIKE, YOU KNOW, DON'T  
6 INHALE OR I INHALE DEEPLY OR EXACTLY HOW DID YOU  
7 WORD THOSE QUESTIONS, DO YOU REMEMBER?

8 A. YES. NO, I THINK AS FAR AS  
9 INHALING WAS CONCERNED, WE JUST ASKED THEM IF THEY  
10 INHALED. I AM AFRAID I WOULDN'T -- I WOULD NEED TO  
11 REFRESH MY MEMORY ABOUT THIS. I HAVEN'T LOOKED AT  
12 IT FOR SOMETIME.

13 Q. WELL, AS A RESULT OF THE ANSWERS  
14 YOU GOT THEN AND LATER, DID YOU DRAW SOME SORT OF A  
15 GENERAL CONCLUSION ABOUT HOW MUCH SOMEONE INHALED  
16 AND WHAT EFFECT THAT MIGHT HAVE ON THE GEOGRAPHY OF  
17 TUMORS OF THE CHEST?

18 A. YES. THIS IS A VERY DIFFICULT AND  
19 COMPLEX QUESTION WHICH HAS EXCITED THE INTEREST OF  
20 RESEARCH WORKERS OVER A LONG PERIOD. WE WERE FIRST  
21 INTERESTED IN IT IN 1950 BECAUSE IN OUR FIRST  
22 STUDY, PATIENTS WHO SAID THEY INHALED DID NOT SEEM  
23 TO BE AT GREATER RISK THAN PATIENTS WHO DIDN'T  
24 SAY -- WHO SAID THEY DIDN'T INHALE.

25 AND WE MADE INQUIRIES, THEREFORE,  
26 OF SPECIALISTS WHO DEALT WITH THE DISTRIBUTION OF  
27 DROPLETS AND SMALL PARTICLES IN THE LUNGS WHEN  
28 PEOPLE BREATHED THEM IN BECAUSE THERE WAS A LOT OF

1 INTEREST IN THIS SUBJECT FROM THE POINT OF VIEW OF  
2 THE CAUSES OF LUNG DISEASE FROM EXPOSURE TO DUSTS.  
3 AND THE EXPERTS THAT WE CONSULTED  
4 SAID THAT YOU COULDN'T BE SURE WHAT THE EFFECT OF  
5 REPORTED INHALING WOULD BE BECAUSE THE TOBACCO  
6 TARS, WHEN THEY ARE FIRST INSPIRED, ARE IN SMALL  
7 DROPLETS. AND AS THESE ARE TAKEN DOWN INTO THE  
8 LUNGS, IT'S MOIST AND WARM ATMOSPHERE, THE DROPLETS  
9 EXPAND AND THEY MIGHT FALL OUT INTO THE PERIPHERY  
10 OF THE LUNG AND NOT, IN FACT, IMPINGE ON THE  
11 BRONCHI, ON THE TUBES, WHERE THE LUNG CANCER  
12 OCCURS.

13 SO WE -- WITHOUT KNOWLEDGE OF WHERE  
14 THE DROPLETS, WHERE THE DROPLETS WERE DEPOSITED  
15 WHEN PEOPLE SAID THEY INHALED OR DIDN'T INHALE, IT  
16 WAS IMPOSSIBLE TO PREDICT PRECISELY WHAT THE EFFECT  
17 WOULD BE.

18 I, IN FACT, DID SOME EXPERIMENTS  
19 MYSELF WITH A RADIOLOGIST FRIEND TO TRY TO FIND OUT  
20 WHERE THE DROPLETS WENT. BUT IT PROVED TO BE TOO  
21 DIFFICULT AND WE DIDN'T GET ANY USEFUL RESULTS.

22 Q. OVER THE COURSE OF THE YEARS, RIGHT  
23 UP UNTIL TODAY, ARE YOU STILL INVOLVED IN THE  
24 RESEARCH OF SUBINFORMATION REGARDING TOBACCO AND  
25 LUNG CANCER?

26 A. YES.

27 Q. WHEN IS THE LAST TIME THAT YOU HAD  
28 YOUR NAME ON A PUBLICATION INVOLVING TOBACCO AND

1 LUNG CANCER?

2 A. INVOLVING TOBACCO PRODUCTS?

3 Q. YES.

4 A. LAST YEAR.

5 WE REPORTED A STUDY WE HAD CARRIED  
6 OUT IN SOUTHWEST ENGLAND IN CONJUNCTION WITH A  
7 STUDY WE WERE DOING OF THE EFFECTS OF RADON IN  
8 HOUSES AND THE RISK OF LUNG CANCER WHERE WE HAD A  
9 LOT OF DETAILED INFORMATION ABOUT SMOKING HABITS  
10 AND WERE ABLE TO MAKE SOME INTERESTING DEDUCTIONS  
11 ABOUT THE EFFECT OF GIVING UP SMOKING.

12 Q. IN ADDITION TO -- AND THAT'S A  
13 TOPIC THAT I AM TEMPTED TO END WITH --

14 A. I AM SORRY, I DON'T HEAR VERY WELL.

15 Q. YOU HEAR FINE. I AM NOT TALKING  
16 LOUD ENOUGH. THAT'S MY FAULT, AND I APOLOGIZE. I  
17 AM TRYING TO STAY AWAY FROM PEOPLE AS MUCH AS I  
18 CAN.

19 THAT'S A TOPIC THAT I HAD INTENDED  
20 TO END WITH AS AN INTERMEDIATE STEP THERE, I WANTED  
21 TO TALK A LITTLE BIT ABOUT LIGHT CIGARETTES.

22 A. YES.

23 Q. HAVE YOU AND YOUR COLLEAGUES DONE  
24 SOME RESEARCH, PERHAPS, TO DO WITH LOWER TAR  
25 CIGARETTES?

26 A. YES. MY COLLEAGUE, PROFESSOR WALD,  
27 WHO STARTED HIS WORK AS A MEMBER OF MY DEPARTMENT  
28 IN OXFORD, COMPLETED IT WHEN HE BECAME A PROFESSOR

1 AND HAD HIS OWN DEPARTMENT IN LONDON, PUT A GOOD  
2 DEAL OF WORK ON THE DISTRIBUTION OF THE COMPONENTS  
3 OF TOBACCO SMOKE FROM DIFFERENT SORTS OF  
4 CIGARETTES.

5 Q. I'D LIKE TO KNOW, IS DR. PETO  
6 INVOLVED IN ANY OF THAT RESEARCH?

7 A. NO.

8 Q. LET'S STAY WITH -- LET'S LEAVE  
9 DR. PETO ALONE THEN AND STAY WITH YOUR OWN  
10 COLLEAGUE. WARD IS IT?

11 A. WALD, W-A-L-D.

12 Q. WALD.

13 WHAT'S THE CURRENT THING -- WHAT'S  
14 YOUR CURRENT THINKING ON WHETHER LOW TAR CIGARETTES  
15 REDUCE THE RISK OF LUNG CANCER FOR SMOKERS AS  
16 OPPOSED TO CIGARETTES THAT AREN'T LOW TAR?

17 A. WELL, I HAVE CHANGED MY OPINION  
18 ABOUT THIS OVER THE YEARS.

19 INITIALLY, I BELIEVED, AND I STILL  
20 DO BELIEVE, THAT THE REDUCTION FROM THE VERY HIGH  
21 TAR THAT WAS COMMON IN THE 1930'S TO SOMEWHAT LOWER  
22 TAR IN THE LATE 1950'S, EARLY '60'S, THE REDUCTION  
23 OF THE ORDER OF 35 TO 25 MILLIGRAMS DELIVERY, I  
24 BELIEVE THAT DID REDUCE THE RISK TO SOME EXTENT.  
25 AND I COULD GIVE THE EVIDENCE FOR THAT IF YOU WERE  
26 INDEPENDENT.

27 BUT SUBSEQUENTLY, THE SUBSEQUENT  
28 REDUCTIONS IN SO-CALLED TAR DELIVERY, I DON'T

1 BELIEVE HAVE HAD A BENEFICIAL EFFECT BECAUSE THEY  
2 ARE ARTIFICIAL. THE REDUCTIONS ARE AS RECORDED BY  
3 SOME APPARATUS WHICH DRAWS OUT, DRAWS IN TOBACCO  
4 SMOKE IN QUITE A DIFFERENT WAY THAN THE WAY  
5 INDIVIDUALS ACTUALLY SMOKE THE VERY LOW TAR  
6 CIGARETTES.

7 Q. THANK YOU.

8 I WANT TO, OBVIOUSLY, YOU KNOW THIS  
9 STUFF BY HEART AND MOST OF US ARE HEARING IT FOR  
10 ABSOLUTELY THE FIRST TIME, SO I WANT TO BREAK IT UP  
11 INTO LITTLE PIECES, IF I COULD.

12 HOW DO YOU KNOW HOW MANY MILLIGRAMS  
13 OF TAR WERE IN CIGARETTES THAT WERE MANUFACTURED IN  
14 THE '30'S, HOW DO YOU KNOW THAT?

15 A. WELL, I DID RESEARCH ON THAT  
16 MYSELF.

17 I WANTED TO FIND OUT IF THERE HAD  
18 BEEN A CHANGE IN THE TAR DELIVERY BETWEEN THAT  
19 PERIOD AND THE 1960'S. AND I APPLIED TO THE  
20 TOBACCO, THE PEER ON TOBACCO IN BRITAIN. I AM NOT  
21 SURE I SPOKE TO THEM OR THE TOBACCO RESEARCH  
22 COUNCIL, I THINK I SPOKE TO IN ENGLAND, ASKING THEM  
23 IF THEY COULD PROVIDE ME WITH SAMPLES OF CIGARETTES  
24 FROM THE 1930'S FOR COMPARISON. AND I WAS TOLD THE  
25 TOBACCO INDUSTRY HAD NO SUCH SAMPLES AVAILABLE THAT  
26 THEY COULD PROVIDE FOR ME.

27 I STATED THIS IN A LECTURE AND IT  
28 SO HAPPENED THERE WAS A JOURNALIST PRESENT WHO

1 WROTE THIS UP IN A WIDELY READ NEWSPAPER THAT I HAD  
2 BEEN UNABLE TO MAKE COMPARISON BETWEEN THE TAR  
3 DELIVERIES OF THESE DIFFERENT PERIODS BECAUSE I  
4 COULDN'T GET ANY CIGARETTES FROM THE EARLIER  
5 PERIOD. AND I WOULD BE INTERESTED IN KNOWING WHAT  
6 THEY WERE.

7 DO YOU KNOW I HAD ABOUT 2000  
8 PACKAGES OF CIGARETTES SENT TO ME. WE WERE  
9 INUNDATED WITH THEM THE EARLIEST ONE WENT BACK TO  
10 1890. AND MY COLLEAGUE WALD CARRIED OUT A DETAILED  
11 STUDY OF THE TAR DELIVERY BY THE FORMER APPARATUS  
12 THAT WAS USED BY GOVERNMENT CHEMISTS TO COMPARE THE  
13 TAR DELIVERY AS THE CIGARETTES SOLD AT DIFFERENT  
14 PERIODS.

15 SO I HAVE PERSONAL KNOWLEDGE OF  
16 THAT.

17 Q. THANK YOU.

18 AND SO YOU MENTIONED A NUMBER  
19 BEFORE BETWEEN, YOU WERE COMPARING THE '30'S WITH  
20 MAYBE THE '50'S OR '60'S BUT THE NUMBER DOESN'T  
21 REALLY MEAN MUCH TO MOST OF US. SO LET ME START  
22 YOU OFF -- THAT'S NOT MEANT AS A CRITICISM

23 LET'S START OFF WITH THIS. WHAT'S  
24 TAR?

25 A. I BEG YOUR PARDON?

26 Q. WHAT IS TAR?

27 A. I WISH I COULD TELL YOU PRECISELY.

28 IT'S A SOLID MATERIAL WHICH IS DEPOSITED, EXTRACTED

1 FROM CIGARETTE SMOKE WHICH CONTAINS MOST OF THE  
2 ORGANIC MATERIALS WHICH ARE THOUGHT LIKELY TO  
3 CAUSE, POTENTIALLY, CAUSING CANCER.

4 Q. EARLIER, WHEN WE WERE TALKING IN  
5 HERE, I FORGET WHERE, WE WERE TALKING ABOUT  
6 PAINTING SMALL MAMMALS WITH TAR. WE WERE TALKING  
7 ABOUT TAR THAT IS AN EXTRACT FROM SMOKING  
8 CIGARETTES.

9 A. YES.

10 Q. AND WAS IT GENERALLY THOUGHT BACK  
11 THEN THAT TAR IS NOT A GOOD THING?

12 A. YES.

13 Q. THANKS.

14 SO NOW, YOU HAVE TOLD US ABOUT HOW  
15 YOU GOT THE CIGARETTES FROM THE 30'S, I AM SURE I  
16 UNDERSTAND HOW YOU COULD GET CIGARETTES FROM THE  
17 '50'S OR '60'S, YOU WOULD GO OUT AND BUY THEM AND  
18 TEST THEM WHAT WOULD THE DIFFERENCE BE, IN OTHER  
19 WORDS, WAS ONE TWICE AS MUCH TAR, HALF AS MUCH TAR?  
20 JUST EXPLAIN.

21 A. WELL, I AM SPEAKING FROM MEMORY  
22 HERE. I HAVEN'T CHECKED MY FIGURES FOR A LITTLE  
23 WHILE. I MIGHT NEED TO BE CORRECTED. BUT I WOULD  
24 SAY OF THE ORDER OF REDUCTION FROM 35 MILLIGRAMS  
25 DELIVERY PER CIGARETTES TO 25 MILLIGRAMS.

26 Q. THANK YOU.

27 A. BUT I MAY NEED TO BE CORRECTED.

28 Q. I WON'T DO IT.

1 ANYWAY, YOU THOUGHT AND STILL THINK  
2 THAT THAT REDUCTION WOULD BE SIGNIFICANT AS FAR AS  
3 CANCER-CAUSING POTENTIAL?

4 A. YES, I BELIEVE IT WAS.

5 Q. THANK YOU.

6 NOW, HAVING TALKED ABOUT THAT  
7 HISTORICAL THING, LET'S COME TO MODERN CIGARETTES,  
8 COMPARING FILTER CIGARETTES THAT AREN'T SO-CALLED  
9 LOW TAR OR LIGHT CIGARETTES TO THOSE THAT ARE  
10 CALLED LOW TAR OR LIGHT CIGARETTES.

11 NOW, IS YOUR OPINION THAT ONE  
12 DELIVERS LESS TAR THAN THE OTHER?

13 LET'S START WITH THAT.

14 A. WELL, IF IT IS MEASURED ACCORDING  
15 TO THE GOVERNMENT STANDARD MACHINERY FOR MEASURING  
16 TAR DELIVERY, YES. THE ANSWER IS YES.

17 IF DETERMINED BY WHAT THE SMOKER  
18 ACTUALLY GETS, THE ANSWER IS NO.

19 Q. WHY THE DIFFERENCE, PLEASE?

20 A. BECAUSE THE SMOKER DOES NOT SMOKE  
21 LIKE A MACHINE. HE CAN ADJUST HIS, THE AMOUNT OF  
22 SMOKE HE TAKES IN WITH EACH PUFF. HE CAN ADJUST  
23 THE POSITION OF HIS LIPS IN RELATION TO THE FILTER  
24 SO THAT WHERE THERE ARE HOLES IN THE FILTER PAPER,  
25 HE CAN COVER THEM AND HE WANTS TO GET A CERTAIN  
26 AMOUNT OF NICOTINE AND THERE IS A CORRELATION,  
27 GENERALLY SPEAKING, BETWEEN THE NICOTINE AND THE  
28 TAR. AND HE ADJUSTS HIS SMOKING TO GET A

1 SATISFYING AMOUNT OF NICOTINE, WHATEVER THE  
2 GOVERNMENT MACHINE MAY SAY THE CIGARETTE ACTUALLY  
3 DELIVERS.

4 MR. CARLTON: OBJECTION, YOUR HONOR, MOVE  
5 TO STRIKE, BEYOND THE BOUNDS OF HIS EXPERTISE, LACK  
6 OF FOUNDATION.

7 THE COURT: OVERRULED. YOU CAN  
8 CROSS-EXAMINE.

9 Q BY MR. PIUZE: IS THE SMOKER  
10 TRYING TO GET THE NICOTINE?

11 A. YES.

12 Q. IF, IN ORDER TO GET THE SAME AMOUNT  
13 OF NICOTINE, THE SMOKER HAS TO DRAW AND SUCK HARDER  
14 OR KEEP IT IN LONGER, OR COMPENSATE IN SOME OTHER  
15 WAY, IS IT YOUR VIEW THAT THE SMOKER WILL DO THAT  
16 IN ORDER TO MAINTAIN THE NICOTINE LEVEL?

17 A. YES.

18 Q. HAVE YOU PUBLISHED ON THIS?

19 A. NO, MY COLLEAGUE WALD HAS. I  
20 HAVEN' T.

21 Q. ARE YOU FAMILIAR WITH THE TERM  
22 "COMPENSATION" AS IT APPLIES TO THIS SUBJECT?

23 A. YES.

24 Q. DEFINE THAT, PLEASE.

25 A. THAT IS CHANGING THE WAY YOU SMOKE  
26 SO AS TO COMPENSATE FOR A REDUCED AMOUNT IN A  
27 SINGLE PATH.

28 Q. I' D LIKE YOUR OPINION ON THE

1 FOLLOWING.

2                               REGARDLESS OF WHAT IT MIGHT SAY ON  
3 THE SIDE OF THE PACK OF CIGARETTES, ABOUT HOW MUCH  
4 TAR -- I AM GOING TO USE MARLBORO AS AN EXAMPLE,  
5 BECAUSE THIS CASE IS ABOUT MARLBORO, SO I WILL USE  
6 IT AS AN EXAMPLE.

7                               MARLBORO RED IS REGULAR STRENGTH  
8 MARLBORO. AND THEN MARLBORO, I GUESS IT'S GOLD IS  
9 A LIGHT CIGARETTE, A REDUCED TAR CIGARETTE.

10                              REGARDLESS OF WHAT IT SAYS ON THE  
11 SIDE OF THE LABEL ABOUT HOW MUCH TAR THERE MIGHT BE  
12 WHEN SOME MACHINE, IN A GOVERNMENT BUILDING, SMOKES  
13 THE CIGARETTE, WHEN A HUMAN BEING SMOKES THE  
14 CIGARETTE, ARE THOSE DIFFERENCES IN THE STATED  
15 AMOUNT OF TAR VALID?

16                              A.     NO.

17                              Q.     AND IF A SMOKER WENT FROM MARLBORO  
18 RED, LET'S SAY, FULL STRENGTH, TO MARLBORO GOLD,  
19 LIGHT, AND THEN TOOK AN ADDITIONAL STEP AND THEN  
20 WENT TO MARLBORO PLATINUM, MY WORD, WHICH IS SORT  
21 OF AN ULTRA LIGHT CIGARETTE, AND IT SAYS ON THE  
22 SIDE OF THE PACKAGE THAT THAT'S EVEN LESS TAR HERE,  
23 WHEN MEASURED BY A MACHINE, DO YOU HAVE AN OPINION  
24 AS TO WHETHER THOSE ARE VALID NUMBERS WHEN THE  
25 CIGARETTE IS SMOKED BY A HUMAN BEING?

26                              A.     NO, THEY ARE NOT.

27                              Q.     AS IT TURNS OUT, BECAUSE OF THE  
28 COMPENSATION, DOES THE HUMAN BEING GET

1 APPROXIMATELY THE SAME AMOUNT OF THESE MATERIALS,  
2 WHETHER IT'S RED OR GOLD OR PLATINUM?

3 A. YES. THEY MAY GET THEM IN  
4 DIFFERENT PLACES.

5 Q. I AM COMING THERE TOO.

6 IF A SMOKER BELIEVES THAT HE OR SHE  
7 IS DOING HIMSELF OR HERSELF A FAVOR BY GOING FROM A  
8 RED FULL STRENGTH, FULL TAR STRENGTH CIGARETTE TO A  
9 GOLD, LESS STRENGTH TAR CIGARETTE, TO A PLATINUM  
10 EVEN LOWER TAR STRENGTH CIGARETTE, AND THAT SMOKER  
11 THINKS HE OR SHE IS DOING LESS HARM TO THEMSELVES,  
12 IS THAT PERSON RIGHT OR WRONG?

13 A. WRONG.

14 Q. NOW, THANK YOU.

15 LET'S TALK ABOUT GEOGRAPHY.

16 DO YOU HAVE AN OPINION AS TO  
17 WHETHER THE STRENGTH OF THE CIGARETTE, BE IT RED,  
18 FULL STRENGTH, GOLD, PART STRENGTH, OR PLATINUM  
19 LOW, LOW STRENGTH TAR ON THE LABEL, EFFECTS THE  
20 POTENTIAL LOCATION OF CANCEROUS TUMORS OF THE LUNG?

21 A. YES.

22 AND THIS HAS BEEN SHOWN, I THINK,  
23 UNIVERSALLY THAT WITH THE LOWER TAR DELIVERY BY  
24 MACHINE AND THEREFORE THE GREATER COMPENSATION THAT  
25 A SUBJECT HAS TO CARRY OUT WHEN SMOKING A CIGARETTE  
26 TO GET THE SAME SATISFACTION, THE PROPORTION OF  
27 CANCERS THAT DEVELOP IN THE DISTAL PERIPHERY OF THE  
28 LUNG HAS INCREASED. AND IT IS ESTABLISHED, HAS

1 BEEN ESTABLISHED NOW FOR SOME YEARS THAT WHAT WE  
2 CALL TECHNICALLY AN ADENOCARCINOMA OF THE LUNG,  
3 WHICH IS A SLIGHTLY DIFFERENT TYPE OF CELL TO THE,  
4 WHAT USED TO BE CALLED THE SQUAMOUS CARCINOMA OF  
5 THE LUNG WHICH OCCURRED PRINCIPALLY IN THE MAIN  
6 BRONCHI JUST AS THE PASSAGES, RESPIRATORY PASSAGES  
7 SEPARATE FROM THE TRACHEA IS WHERE MOST OF THE  
8 CANCERS USED TO OCCUR. NOW, VERY FEW OF THEM USED  
9 TO OCCUR IN THE DISTANT PERIPHERY. NOW AN  
10 INCREASED PROPORTION OCCUR IN THE PERIPHERY. AND  
11 THIS HAS BEEN SHOWN IN SEVERAL DIFFERENT COUNTRIES.

12 Q. SO AS MY LAST SHOT BEFORE LUNCH, DO  
13 YOU SEE THAT, IN YOUR VIEW, IS THERE A LINK BETWEEN  
14 PEOPLE SMOKING MORE AND MORE SO-CALLED LIGHT OR LOW  
15 TAR CIGARETTES AND THE FACT THAT OVER THE COURSE OF  
16 THE LAST COUPLE OF DECADES, MAYBE, WE ARE SEEING  
17 MORE AND MORE PERIPHERAL LUNG TUMORS?

18 A. YES. I BELIEVE THERE IS A LINK  
19 BETWEEN THOSE TWO THINGS.

20 Q. OKAY, THANK YOU.

21 YOUR HONOR, LOOKING AT THE CLOCK  
22 HERE, I KNOW THIS IS A GOOD TIME TO BREAK.

23 THE COURT: WELL, THANK YOU VERY MUCH,  
24 COUNSEL. TO ALL MY GOOD COUNSEL, TO MY JURORS,  
25 LADIES AND GENTLEMEN, WE WILL SEE YOU AT 1:30 THIS  
26 AFTERNOON. WE WILL SEE YOU THEN, SIR.

27 //////////////

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(AT 12 NOON, THE LUNCH  
RECESS WAS TAKEN TO  
1:30 P. M OF THE SAME DAY.)

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