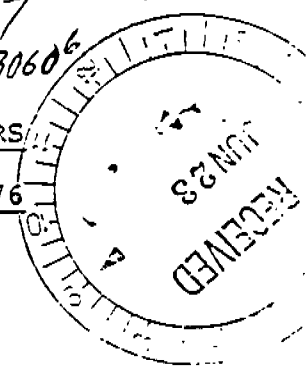


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HENRY GARRARD, JR.
P.O. Box 1587
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SPEECH OF DR. IRVING J. SELPKOFF

BEFORE THE ASSOCIATION OF TRIAL LAWYERS
OF AMERICA AT ATLANTA, GEORGIA IN 1976



THANK YOU VERY MUCH.

I AM SURE THAT I SHARED YOUR ENTHUSIASM FOR DR. BAKER'S PAPER AND I THOUGHT HE REALLY ALMOST SAID WHAT I'M GOING TO SAY IN A SENSE THAT WHEN HE CONCLUDED HE MENTIONED THAT AT THIS POINT IN TIME, AND THAT WAS HIS PHRASE, THIS SITUATION WAS WHAT THE PUBLIC HEALTH SERVICE FOUND IN IDAHO AND IN MEMPHIS, IN BIRMINGHAM AND IN EL PASO AND ELSEWHERE AND HE WAS RIGHT BECAUSE LEAD DISEASE HAS BEEN KNOWN IN ALMOST ALL OF ITS FORMS THAT HE DESCRIBED, THE RENAL BRAIN DAMAGE, THE NERVE DAMAGE, THE BLOOD DAMAGE, FOR ALMOST 150 YEARS. AND WE'VE HAD LAWS AND REGULATIONS FIRST IN BRITAIN AND EVENTUALLY IN THE UNITED STATES FOR OVER 100 YEARS. AND HERE WE ARE IN 1976 WITH CHILDREN ENDING IN THE HOSPITAL WITH LEAD POISONING AND PERMANENT BRAIN DAMAGE AND TENS OF THOUSANDS OF WORKERS IN THE UNITED STATES SUFFERING EXPOSURE WHICH WILL DAMAGE THEM. AND THIS IS LARGELY WHAT I'D LIKE TO TALK ABOUT TODAY. HOW WE CAME TO WHERE WE ARE, BELATEDLY, THE LESSONS WE'VE LEARNED, BECAUSE I HOPE THAT FINALLY HAVING LEARNED THESE LESSONS WE'LL NOT AGAIN, A DECADE OR TWO OR FIVE FROM NOW, BE FACED ONCE MORE WITH WIDESPREAD, PREVENTABLE, DISEASE.

MAY I HAVE THE FIRST SLIDE PLEASE.

I THINK ALL OF YOU WILL REMEMBER TWO YEARS AGO, TWO AND A HALF YEARS AGO, THE FUROR THAT WAS CREATED WHEN THE WALL STREET JOURNAL REPORTED THAT 3 WORKERS AT THE B.F. GOODRICH CHEMICAL COMPANY'S PLANT IN LOUISVILLE, KENTUCKY WERE FOUND TO HAVE A VERY UNUSUAL TUMOR OF THE LIVER. HEMANGIO-SARCOMA OF THE LIVER. AND THIS WAS FOLLOWED WITHIN WEEKS BY HEARINGS AT THE DEPARTMENT OF LABOR, WITHIN MONTHS BY STRICT REGULATIONS OF THE DEPARTMENT OF LABOR BRINGING THE LEVELS IN THE INDUSTRY DOWN FROM, WELL, LEGALLY FIVE HUNDRED PARTS PER MILLION-ILLEGALLY FROM THREE TO FOUR THOUSAND PARTS PER MILLION-TO ONE PART PER MILLION. AND THIS EXTRAORDINARY RESPONSE HAD A HISTORY. IT WASN'T ALWAYS SO.

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BC 4013

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EVEN FOR THINGS THAT WE WELL UNDERSTOOD; THE DATA, THE FACTS, THE KNOWLEDGE, THE SENSE HAD NOT ENTERED OUR COMMON KNOWLEDGE, OUR COMMON UNDERSTANDING. FOR EXAMPLE, THE BEST ENVIRONMENTAL, AND PERHAPS OCCUPATIONAL HAZARD, THAT HAD BEEN IDENTIFIED WAS RADIATION. IT WAS IDENTIFIED OH, SHALL WE SAY, BACK IN 1879, ALMOST A HUNDRED YEARS AGO, WHEN TWO GERMAN SCIENTISTS IN WHAT IS NOW EAST GERMANY IN THE DRESDEN AREA LOOKED AT THE SCHNEBERG MINES, THESE ARE THE OLDEST MINES IN EUROPE, THESE WERE WHERE MOST OF THE SILVER AND COBALT AND NICKEL CAME FROM THAT WAS USED IN COMMERCE DURING THE 1500's, 1600's, 1700's, ETC. BUT IT WAS KNOWN THAT THE MINERS IN THESE MINES IN THE ASCHGEBERGER, THE HILLS BETWEEN EAST GERMANY AND CZECHOSLOVAKIA, DIED YOUNG. IN OTHER MOUNTAINS, FOR EXAMPLE, IT HAD BEEN SAID THAT THE WIDOWS THERE, AND THERE WERE MANY, OFTEN HAD SEVEN HUSBANDS. ONE AFTER THE OTHER DYING. AND HARTINGTON-HESSING IN 1879 LOOKED AT THE MINERS THERE AND FOUND THAT IN THE PREVIOUS TEN YEARS 150 HAD DIED OF LUNG CANCER. THEY CALLED IT SARCOMA AT THE TIME, THAT'S NOT IMPORTANT. AND WE LEARNED THEN OR AT LEAST WE WERE TOLD THEN OF THIS EXTRAORDINARY RISK WITHIN THOSE MINES. NOW, IT WAS NOT KNOWN THEN THAT IT WAS DUE TO RADIATION. THIS, YOU MAY FIND OF INTEREST-WAS THE MINE, SET OF MINES FROM WHICH THE PITCH BLEND WAS DERIVED, WAS TAKEN, THAT THE CURIE'S LATER USED TO DISCOVER RADIUM. THAT, AS I SAY, WAS 1879. IN 1926 IN SCHNEBERG THE TOWN NEARBY YOHACHENSTAHL, THEY LOOKED AT THE AUTOPSIES OF THE MINERS THERE AND 50% HAD LUNG CANCER. 1879 SCHNEBERG, 1926 YOHACHENSTAHL. IT TOOK 50 YEARS FOR THAT KNOWLEDGE TO GO THOSE 50 MILES. AND IF YOU FEEL SOMEWHAT SUPERIOR TO THESE POOR BEKNIGHTED SOULS I MIGHT SUGGEST THAT YOU THINK OF HOW THIS KNOWLEDGE WAS NOT USED IN OUR COLORADO PLATEAU WHEN IN THE 1940's WE BEGAN TO MINE URANIUM FOR OUR ATOMIC BOMB AND WHERE AGAIN NO PRECAUTIONS WERE TAKEN AND WHERE NOW IN 1976 ONE OUT OF EVERY FIVE MINERS WHO DIES ON THE COLORADO PLATEAU DIES OF LUNG CANCER. SO THAT THIS KNOWLEDGE DID NOT ENTER OUR CONVENTIONAL WISDOM. AND THIS IS NOT A SINGLE INSTANCE, OUR HISTORY IS NOT GOOD. ON THE SCREEN YOU WILL FIND AN X-RAY OF A MAN WITH BLACK LUNG. THOSE LARGE WHITE MASSES ARE THE SCARS IN A COAL MINER'S LUNG. THE FIRST \$100,000.00 GIVEN BY THE PUBLIC HEALTH SERVICE IN OUR COUNTRY FOR RESEARCH IN BLACK LUNG WAS ONLY GIVEN IN 1963. THIS IS JUST UNBELIEVEABLE! WE HAD 700,000 MINERS IN THIS COUNTRY AT THE BEGINNING

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BC 4014

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OF THE CENTURY AND NO ONE KNOWS WHAT HAPPENED TO THEM. IN THE LITTLE TOWNS AND VALLEYS OF WEST VIRGINIA, KENTUCKY AND TENNESSEE AND PENNSYLVANIA, THEY QUIETLY DIED AND NOBODY KNEW OF WHAT. AS A RESULT NOW IN THE 1970's WITH THE COAL MINE SAFETY ACT, WE ARE NOW THIS YEAR SPENDING ONE BILLION DOLLARS FOR BLACK LUNG BENEFITS. ARNOLD MILLER, THE PRESIDENT OF THE MINE WORKERS UNION, HAS STATED, THAT IN THE COAL MINING INDUSTRY ALONE ABOUT 210,000 TOTALLY DISABLED MINERS AND 138,000 WIDOWS WILL EVENTUALLY BE RECEIVING FEDERAL BLACK LUNG BENEFITS. NOW I'M NOT GREATLY CONCERNED WITH THE BILLION DOLLARS. WHAT I'M MUCH MORE CONCERNED WITH IS THE SUFFERING, THE LOSS OF LIFE, THE DISEASE, THE UNHAPPINESS, THE HOPELESSNESS THAT IT REPRESENTS. AND THIS IS PART OF OUR HERITAGE. NOW HOW DID THIS HAPPEN? WHY HAVE WE BEEN SO LAGGARD? AS I LOOK AROUND FOR AN EXPLANATION THE BEST ONE PERHAPS TO WHICH I CAN COME IS WHAT I CALL THE PARADOX OF WREN. DR. WREN WAS A GERMAN SURGEON WHO IN 1895 REPORTED THAT OF THE WORKERS HE SAW IN AN ANILINE DYE PLANT, FUCHSINE DYES, THERE WEREN'T MANY ARTIFICIAL DYES IN THOSE DAYS, THAT 3 WORKERS IN THIS SMALL FACTORY DIED OF BLADDER CANCER. HE SAID THAT IT'S LIKELY THAT THESE NEW CHEMICALS THAT WERE BEING PRODUCED, THIS WAS THE BEGINNING OF OUR PETRO-CHEMICAL INDUSTRY, THE NATURAL FUCHSINE TYPE DYES WERE GIVING WAY TO THE ANILINE DYES, THAT THESE BLADDER CANCERS WERE DUE TO THE CHEMICALS IN THAT ENVIRONMENT, IN THAT PLANT. NOW THIS WAS NOT WELL RECEIVED BECAUSE DOCTORS IN THEIR ARROGANCE WERE QUITE CERTAIN THEY KNEW THE CAUSE OF BLADDER CANCER AND IT WAS SOMETHING LIKE THE GREAT CONHEIM HAD SAID, IT WAS DUE TO EMBRYONIC CELL RESTS IN THE BLADDER MUCOSA AND THAT'S WHAT CAUSED IT AND THIS YOUNG UP-START HAD NO BUSINESS MAKING SUCH A CLAIM. AND WE DIDN'T BELIEVE HIM. AS A RESULT OF NOT BELIEVING HIM WE'VE HAD A PRETTY CHECKERED SITUATION AND IN PART IT ANSWERS THE QUESTION THAT I HEARD THIS MORNING, WHY THE UNUSUAL CANCER RATE IN NEW JERSEY? BECAUSE IN 1915 WHEN WE NO

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LONGER COULD IMPORT ANILINE DYES FROM GERMANY AND SWITZERLAND, THE DU PONT COMPANY ESTABLISHED THE GREAT CHAMBERS WORKS IN THE LOVELY SALEM COUNTY, NEW JERSEY, AT THE TIP OF NEW JERSEY, A BEAUTIFUL AGRICULTURAL AREA. AND THEY BEGAN THEIR OPERATIONS IN 1915 AND BY 1931 THEY HADN'T READ DOCTOR WREN'S PAPER, I GUESS, THERE WERE THE FIRST THREE CASES OF BLADDER TUMORS. THEY THEN CYSTOSCOPED OVER 500 MEN IN THE PLANT AT THE TIME AND IN 4% BLADDER TUMORS WERE SEEN. AND OF THE MEN WHO BEGAN WORK FROM 1915 TO 1930 WE ARE STILL IN 1960, 65, 70, 75 SEEING BLADDER CANCERS EVEN THOUGH DU PONT HAS RAZED THAT BUILDING IN WHICH IT MADE A BENZIDINE AND BETANAPHTHALOMINE IN THE PROCESS OF ANILINE DYE MANUFACTURE. SO WE HAD THIS REPORT OF DR. WREN'S. BUT WE DIDN'T BELIEVE HIM. NOW, WHY DIDN'T WE BELIEVE HIM? AFTER ALL, THE MEN THEN WERE JUST AS REASONABLE AS THEY ARE NOW. I SUGGEST, AND INCIDENTALLY, THERE WAS MUCH APPARENT CONFIRMATION BECAUSE OUR COLLEAGUES IN THE LABORATORY SHOWED THAT THREE HUNDRED, FOUR HUNDRED, FIVE HUNDRED DIFFERENT CHEMICALS COULD CAUSE CANCER IN ANIMALS. AND YET WE DIDN'T PUT THOSE TWO'S AND TWO'S TOGETHER. I BELIEVE THE REASON FOR IT IS THAT DOCTORS DIDN'T SEE IN THEIR DAILY PRACTICE IN HOSPITALS, IN CLINICS, ANY RELATION BETWEEN THE CANCERS THAT THEY FOUND AMONG THEIR PATIENTS AND THESE CLAIMS IN THE LABORATORY AND BY A FEW PEOPLE LIKE DR. WREN THAT THESE CHEMICALS BEING PRODUCED BY OUR INDUSTRY WOULD PRODUCE CANCER AMONG HUMANS AS WELL. AND THERE WAS THIS PARADOX, THE LABORATORY SAID YES, OUR CLINICAL JUDGMENT SAID NO. AND THAT PARADOX HAS EXISTED UNTIL

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1 BB 0005021 1

RECENTLY. NOW IT'S BEGINNING TO WEAKEN AND TO CLARIFY. AND THE QUESTION IS BEING RAISED, WAS DR. WREN REALLY RIGHT? MERELY PREMATURE? AND HOW DID WE NOW BEGIN TO LEARN FROM THIS? JUST AS MR. GOODMAN, WE TOO HAVE LEARNED PERHAPS MOST FROM OUR MISTAKES. ONE IS ON THE SCREEN NOW. MINOMATA DISEASE. THAT'S A DISEASE WITH METHYL MERCURY. THE PROCESS BEGAN IN JAPAN IN 1932. THE CASES WERE SEEN IN '53. THE FIRST HINT THAT IT WAS DUE TO METHYL-MERCURY WAS IN '59 AND NOBODY PAID ATTENTION. THE JAPANESE PEOPLE EATING THE FISH, AND THE CATS EATING THE FISH, IN THIS BAY DEVELOPED THESE EXTRAORDINARY NEUROLOGICAL CHANGES AND DEATH. IN 1975 THE CORPORATION INVOLVED HAD ALREADY PAID OUT \$80 MILLION IN COMPENSATION. BUT OUR GREATEST LESSON CAME FROM OUR GREATEST MISTAKE. AND IT'S ON THE SCREEN NOW. IN 1930-35 - THIS IS A GRAPH OF THE PRODUCTION OF CIGARETTES IN THE UNITED STATES IN BILLIONS FROM 1900 TO THE PRESENT - AND YOU WILL SEE THAT FROM 1930-35 WE BEGAN TO BECOME A NATION OF CIGARETTE SMOKERS. NOBODY QUITE KNOWS WHY. SOME PEOPLE BELIEVE IT WAS DUE TO THE MILLIONS OF CARTONS OF CIGARETTES THAT OUR AMERICAN RED CROSS SENT TO OUR DOUGH BOYS OVERSEAS IN THE FIRST WORLD WAR. THEY CAME BACK, MANY OF THEM, AS CONFIRMED CIGARETTE SMOKERS, AND THE HABIT THEN SPREAD. BUT IN ANY CASE, PUBLIC HEALTH AUTHORITIES, MEDICAL PEOPLE, SCIENTISTS, DID NOT PREDICT IN 1935 WHAT WAS GOING TO HAPPEN IN 1955, 60 AND 75. I REMEMBER ASKING DR. HAMMOND, WHO I

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CONSIDER ONE OF THE WORLD'S GREATEST BIO-STATISTICIANS AND EPIDEMIOLOGISTS, WHAT HE WOULD HAVE SAID, MIND YOU, HE'S DIRECTOR OF THE DEPARTMENT OF STATISTICS OF THE AMERICAN CANCER SOCIETY, WHAT HE WOULD HAVE SAID HAD I ASKED HIM IN 1935, WHAT ABOUT THIS CURIOUS RISE IN CIGARETTE PRODUCTION IN THE UNITED STATES, BILLIONS OF CIGARETTES. AND HIS ANSWER WAS WELL IN 1935 I WOULD HAVE SAID, ISN'T THIS A WONDERFUL THING, WE'RE NO LONGER GOING TO HAVE CANCER OF THE LIP WITH CLAY PIPES. WE DIDN'T PREDICT ONE OF OUR MAJOR PUBLIC HEALTH FAILURES. WE'VE RETRACED OUR STEPS A BIT, ON THE SCREEN NOW YOU FIND THE MAJOR LESSON WE'VE LEARNED. AND IT WAS FROM THE GREAT AMERICAN CANCER SOCIETY'S SMOKING STUDY. FOLLOWING ONE MILLION PEOPLE REGISTERED IN 1959 IT WAS DEMONSTRATED THAT THOSE WHO SMOKED CIGARETTES HAD A MUCH GREATER RISK OF DYING OF LUNG CANCER. NOT ONLY THAT BUT THE MORE THEY SMOKED THE GREATER THE RISK. THIS WAS THE SINGLE MOST IMPORTANT PIECE OF INFORMATION. IT TOLD US THAT THE MOST COMMON CANCER IN MEN - LUNG CANCER - BY FAR THE MOST COMMON CANCER IN MEN - DIDN'T COME FROM SOME BUILT-IN ERROR IN OUR GENES, IN OUR GENETIC HERITAGE, BUT IT CAME FROM SOMETHING IN THE ENVIRONMENT. A TREMENDOUSLY IMPORTANT LESSON WHICH REALLY HAS CHANGED OUR WAYS AND CHANGED OUR UNDERSTANDING. THE SECOND SET OF LESSONS WE LEARNED AGAIN CAME FROM A MAJOR MISTAKE. ON THE SCREEN NOW IS AN X-RAY OF A PERSON WITH ASBESTOSIS. THAT'S THESE

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LITTLE WHITE LINES THAT YOU SEE THROUGH THE LUNG FIELDS, SCARS, FINE SCARS, QUITE DIFFERENT THAN THE COAL WORKER'S LUNG THAT I FIRST SHOWED YOU. A CASE LIKE THIS WAS SEEN IN 1924 AND WE'VE KNOWN SINCE THEN THAT INHALATION OF THESE FINE FIBERS - NOT VERY MUCH - IN AN ASBESTOS WORKER WHO DIES OF SCARRED LUNGS, HIS LUNGS WILL OFTEN HAVE... OH, LESS THAN A GRAM OF ASBESTOS IN THEM, BUT WE'VE KNOWN SINCE 1924 THAT INHALATION OF THESE FIBERS CAN BE FATAL. NOW WE'VE LEARNED A GREAT DEAL SINCE 1924. THE MOST IMPORTANT LESSON IS ON THE SCREEN NOW AND IF YOU FORGET REALLY MOST EVERYTHING I SAY AND JUST REMEMBER THIS YOU WILL KNOW VIRTUALLY AS MUCH AS I DO. IN NEW YORK WE EXAMINED OVER A THOUSAND ASBESTOS INSULATION WORKERS. OF THE 725 WITH LESS THAN 20 YEARS FROM ONSET OF THEIR WORK MOST X-RAYS WERE NORMAL AND WHEN THEY WERE ABNORMAL JUST MINIMALLY SO. ON THE OTHER HAND, ONCE THE 20 YEAR POINT HAD PASSED MOST X-RAYS BECAME ABNORMAL AND VERY OFTEN EXTENSIVELY SO. THE 20 YEAR RULE, NOW IT'S LIKE MOST RULES, NOT HARD AND FAST, YOU CAN HAVE SIGNIFICANT DISEASE BEFORE 20 YEARS, YOU CAN EVEN GO 40 YEARS AND STILL HAVE NO DISEASE. THERE'S A DIFFERENCE AMONG INDIVIDUALS. 5% OF THE PEOPLE MORE THAN 40 YEARS FROM ONSET OF THEIR WORK AS YOU CAN SEE HAD NORMAL X-RAYS. BUT BY AND LARGE IT'S A GOOD MARKER AND WE LEARN THEN THAT IT TAKES A LONG TIME FOR DISEASE FROM ENVIRONMENTAL SOURCES GENERALLY TO BECOME EVIDENT. WE LEARNED OTHER THINGS. ON THE SCREEN NOW IS, I THINK, A NORMAL X-RAY. IT'S A MAN

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1 BB 0005024 1

I SAW IN 1951. HE CAME, HE WAS SLIGHTLY SHORT OF BREATH AND WANTED ME TO EXAMINE HIM. I DID AND I ASKED HIM ALL KINDS OF QUESTIONS. HE HAD TOLD ME HE HAD WORKED FOR WRIGHT'S AERONAUTICAL AS A MACHINIST, HE HAD BEEN A TRUCK DRIVER, ETC. AND HE HAD NOTICED A LITTLE BIT OF SHORTNESS OF BREATH. I COULDN'T FIND ANYTHING. I HAVE A PRETTY STRONG PERSONALITY SO THAT WHEN I TOLD HIM THAT THIS WAS PROBABLY DUE TO HYPERVENTILATION SYNDROME, IT WAS NERVOUSNESS, HE BELIEVED ME. AND HE DID FEEL BETTER. HOWEVER, HE CAME BACK IN 1958 AND NOW HIS X-RAY HAD THIS UNUSUAL FINE SCARRING THAT I HAD SHOWN YOU BEFORE AND WAS BI-LATERAL. NOW THERE ARE NOT MANY THINGS THAT DO THIS. I SAID MR. KERR TOLD ME THAT YOU'VE NEVER BEEN IN A JOB WHERE YOU BREATHE IN DUST. "NOPE, MACHINIST, TRUCK DRIVER." HIS WIFE WHO WAS SITTING IN A CORNER OF THE ROOM THEN PIPED UP. SHE SAID, "BOB, DON'T YOU REMEMBER WHEN WE WERE FIRST MARRIED YOU WORKED AS A WEAVER AT THE WORLDBESTOS CORPORATION ON STATE STREET IN 1935." "OH THAT," HE SAID, "THAT WAS FOR SIX WEEKS." AND THAT WAS THE POINT. HE HAD HAD ONLY SIX WEEKS OF EXPOSURE, BUT THE DUST THAT ENTERED HIS LUNG, THE CHANGE IN HIS CELLS, THE CHANGE IN HIS TISSUES, HAD NOW BEEN GOING ON FOR 23 YEARS. AND THIS IS HIS X-RAY LAST YEAR. IT'S VERY EXTENSIVE. HE CAN'T BREATHE WELL ANYMORE. HE'S RETIRED. HE'S MOVED TO HOLLYWOOD, FLORIDA AND SITS ON HIS FRONT PORCH WATCHING THE WORLD GO BY. SO WE LEARN THEN THE DIFFERENCE BETWEEN EXPOSURE AND DURATION FROM ONSET OF

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EXPOSURE. THE NEXT THING WE LEARNED IS ON THE SCREEN ON YOUR RIGHT. THERE'S THIS WHITE HAZE. THESE ARE PLEURA PLAQUES. THEY'RE SCARS ON THE PLEURA. THEY'RE VERY UNUSUAL. THEY DON'T CAUSE MUCH TROUBLE, GENERALLY, BUT YOU DON'T FIND THEM IN MANY THINGS. YOU DON'T FIND THEM, FOR EXAMPLE, WITH COAL OR WITH SILICA, OR WITH ALUMINUM, OR DIATOMACEOUS EARTH, OR ANY OF THE OTHER OF THE DUST DISEASES OF THE LUNGS. BUT WE BEGAN TO FIND THAT PEOPLE WHO HAVE WORKED WITH ASBESTOS HAD THIS. SOMETIMES YOU DIDN'T SEE IT IN JUST THESE LINES. AT THE BOTTOM YOU COULD SEE THIS WHITE HAZE AND IT GOES UP A BIT. WHEN THIS MAN DIED THIS WAS HIS LUNG. THAT WAS THE SCARRING OF THE PLEURA, THE DIFFUSE SCARRING OF THE PLEURA. HE DIED SUFFOCATING. HE JUST COULDN'T BREATHE ANYMORE, BECAUSE THE LUNG COULDN'T EXPAND. WE KEPT HIM ALIVE AN EXTRA TWO OR THREE MONTHS BY DOING A TRACHEOSTOMY. I DON'T THINK WE DID HIM ANY FAVOR. SO WE LEARNED THAT THE PLEURA WAS OFTEN INVOLVED. AND AS YOU CAN SEE HERE AGAIN, THE 20 YEAR RULE HELD. OF THE 725 MEN WITH LESS THAN 20 YEARS, THE PLEURA WAS GENERALLY NORMAL ON X-RAY. AFTER THAT POINT, SCARRING, CALCIFICATION WAS VERY COMMON. NOW WHILE WE WERE LEARNING THESE THINGS NATURE WAS JOGGING OUR ELBOW AND I DON'T THINK WE PAID MUCH ATTENTION AT THE TIME. WE WOULD NOW.

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BC 4021

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IN 1935 KENNETH LYNCH, AT THAT TIME PROFESSOR OF PATHOLOGY AT THE MEDICAL SCHOOL, UNIVERSITY OF SOUTH CAROLINA (LATER CHANCELLOR THERE, HE DIED LAST YEAR) REPORTED A VERY UNUSUAL CASE IN THE AMERICAN JOURNAL OF CANCER. HE SAID HERE'S A MAN WHO, WHEN I DID A POST MORTEM, HAD LUNG CANCER AND ALSO HAD ASBESTOSIS. THAT WHITE MASS AT THE BOTTOM IS A CANCER. YOU MAY SAY, WELL, WHY DID THE AMERICAN JOURNAL OF CANCER PUBLISH THIS UNUSUAL CASE. NOT AT ALL UNUSUAL. IT'S HARD TO APPRECIATE NOW, BUT IN 1935 LUNG CANCER WAS A RARE DISEASE. I REMEMBER ONE OF THE GREAT FIGURES IN CANCER RESEARCH IN CLINICAL CANCER, KNOXNER OF NEW ORLEANS, ONCE TELLING US THAT WHEN HE WAS A STUDENT HIS PROFESSOR OF MEDICINE TOOK HIM BY THE ARM AND SAID, "LET'S GO DOWN TO THE POST MORTEM ROOM. I'M GOING TO SHOW YOU A VERY UNUSUAL CASE. A CASE OF LUNG CANCER. YOU'LL NEVER SEE ANOTHER ONE." THE REASON IS THAT IN 1935 THERE WERE NOT MANY PEOPLE WHO HAD BEGUN SMOKING IN 1910. AND SO IN '35 THERE WERE NOT MANY PEOPLE READY TO GET THEIR LUNG CANCERS. SIMILARLY WE DIDN'T BEGIN TO USE ASBESTOS IN THIS COUNTRY UNTIL THE '20's, 30's and '40's. SO IN 1935 THERE WERE NOT MANY PEOPLE WITH ASBESTOSIS AND THEREFORE TWO RARE DISEASES IN ONE PERSON. I THINK DR. LYNCH WAS CORRECT IN CALLING ATTENTION TO IT. BUT THOSE OF US WHO DENIED WHAT HE SAID WERE ALSO RIGHT. WE SAID, WELL HOW DO YOU KNOW THIS IS NOT JUST SIMPLY A CHANCE

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ASSOCIATION. AND THE MATTER THERE RESTED. NOBODY WAS SURE
ADDITIONAL INSTANCES OF THIS RARE ASSOCIATION BEGAN TO BE
REPORTED, DIDN'T SOLVE ANYTHING. AND IN BETWEEN SOME
ADDITIONAL UNUSUAL THINGS BEGAN TO BE SEEN. ON THE SCREEN
NOW, THE WHITE MARK OVER THE X-RAY IS A PLEURA DIFFUSION.
THERE'S FLUID THERE. IN THIS CASE IT WAS DUE TO A CANCER
OF THE PLEURA. NOW YOU KNOW WHY I TOLD YOU ABOUT THE PLEURA.
THE PLEURA TECHNICALLY IS KNOWN AS THE MESOTHELIUM, THE
LINING OF THE CHEST OR THE MESOTHELIUM IS THE LINING OF THE
ABDOMEN. AND WHEN IT BECOMES MALIGNANT WE CALL IT "MESOTHELIOMA."
IT'S JUST OUR GIBBERISH. AND HERE IS THIS MAN IN 1954 WAS
FOUND TO HAVE MESOTHELIOMA. AND IT WAS DIFFUSE, COVERING
THE ENTIRE PLEURA,, AS YOU SEE HERE. INCIDENTALLY, THIS IS
THE REASON WHY WE HAVE YET TO HAVE A SINGLE CASE CURED,
BECAUSE IT'S SO DIFFUSE THAT IT'S EVEN BEYOND THE SKILLS OF
OUR SURGEONS. BUT AGAIN THE ANSWER WAS, WELL, HOW DO YOU KNOW -
THAT THIS IS NOT A CHANCE ASSOCIATION. THE NEXT YEAR ANOTHER
PHYSICIAN REPORTED THAT MESOTHELIAL LINING OF THE ABDOMEN,
THE PERITONEUM, ALSO BECAME MALIGNANT IN A MAN WHO HAD BEEN
WORKING WITH ASBESTOS. AGAIN, IT WAS DIFFUSE, ALL OVER THE
MESOTHELIUM, AS YOU CAN SEE THESE LITTLE WHITE NODULES. AND
AGAIN, THE SAME QUESTION, HOW CAN YOU BE ABSOLUTELY CERTAIN?
VERY DIFFICULT. YOU COULDN'T BE. AND YET AS I SAY, THESE
UNCOMFORTABLE RECURRENCES WERE BECOMING MORE AND MORE FREQUENT.
AND THE WAY IT WAS RESOLVED IS THE WAY MANY OF THESE THINGS
ARE NOW BEING STUDIED. THE WAR KEPONE IS NOW BEING STUDIED,

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THE WAY POLY BROMINATED BIPHENALS, THE WAY A WHOLE HOST OF CHEMICALS, THE STYRENE IS NOW BEING STUDIED, THE WAY VINYL CHLORIDE HAS BEEN STUDIED, ETC. THE WAY IT WAS DONE IS AS FOLLOWS. THIS IS AN ASBESTOS WORKER. HE'S USING ASBESTOS CEMENT TO COVER THIS PIPE, INSULATING IT. THEY'RE INSULATORS, THEY CALL THEMSELVES LAGGERS, AMONG THEMSELVES THEY OFTEN CALL THEMSELVES PIPE COVERERS AND YOU CAN SEE WHY. NOW IN 1943... 1943, BECAUSE IF WE WANTED TO KNOW WHAT ASBESTOS DID WE HAD TO HAVE AT LEAST 20 YEARS. THERE WERE 632 MEN IN THIS MAN'S UNION IN NEW YORK-- 632 MEN LIKE THIS MAN. WELL, WE FOLLOWED THEM FOR 20 YEARS TO SEE WHAT HAPPENED TO THESE 632 MEN AND THE RESULTS ARE ON THE SCREEN NOW. THERE SHOULD HAVE BEEN 196 DEATHS, GIVEN THEIR AGES IN 1943. INSTEAD THERE WERE 253. 50 MEN, IN OTHER WORDS, DIED WHO WERE NOT EXPECTED TO DIE. NOW, WHY? WELL, THERE SHOULD HAVE BEEN 6 DEATHS OF LUNG CANCER AND THERE WERE 42. DR. LYNCH WAS RIGHT. HERE, THIS CLEVER INTUITIVE PHYSICIAN IN SOUTH CAROLINA HAD SAID THIS IS NOT MY USUAL EXPERIENCE AND HE WAS CORRECT. INTERESTINGLY, THERE WERE, OF COURSE, TO BE NO MESOTHELIOMAS... IN THE PAST THAT'S BEEN SO RARE. WELL, HOW RARE? AT MT. SINAI, WHERE WE HAVE ABOUT 1,200 BEDS, WE'VE LOOKED AT OUR EXPERIENCE FROM 1930 TO 1960 AND WE SAW THREE CASES. VERY RARE. IN GENERAL, IN THE LITERATURE IT'S SOMEWHERE AROUND 1 OUT OF 10,000 AUTOPSIES. 1 OUT OF 10,000 DEATHS. SOMEWHERE AROUND, AND HERE WE HAD 4 MESOTHELIOMAS IN LESS THAN 500 DEATHS. AND ALSO,

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THERE SHOULD HAVE BEEN 9 OR 10 DEATHS OF GASTRO-INTESTINAL CANCER, YOU KNOW, STOMACH, ESOPHAGUS, COLON, RECTUM. AND INSTEAD THERE WERE 3 TIMES AS MANY. WELL, OBVIOUSLY ANYONE WHO INHALES DUST ALSO TENDS TO INGEST IT. AND, OF COURSE, THERE WERE DEATHS OF SCARRED LUNGS OF ASBESTOSIS. WE HAVE CONTINUED TO FOLLOW THESE PEOPLE, THAT IS THE SURVIVORS AMONG THEM. BY 1975 THESE FIGURES ARE STILL UNPUBLISHED. I THOUGHT YOU MIGHT FIND THEM OF INTEREST. THERE SHOULD HAVE BEEN ANOTHER 109 DEATHS. THERE WERE 198. ALMOST TWICE AS MANY MEN DIED AS WERE EXPECTED TO DIE. THERE SHOULD HAVE BEEN 6 DEATHS OF LUNG CANCER, INSTEAD THERE WERE 47. THERE SHOULD HAVE BEEN NO DEATHS OF MESOTHELIOMA, THERE WERE 28. AND AGAIN, THE MODEST INCREASE OF GASTRO-INTESTINAL CANCER. ALL TOGETHER, FROM 1943 TO 1974, OUT OF 451 DEATHS, ALMOST THE TOTAL EXPERIENCE OF THIS COHORT, 89 WERE DUE TO LUNG CANCER. ONE OUT OF EVERY FIVE ASBESTOS WORKERS WHO DIES, DIES OF LUNG CANCER. THIS IS SIMPLY A DISASTER. THIS IS NOT AN ACADEMIC QUESTION. THE PUBLIC HEALTH SERVICE HAS CALCULATED THAT THERE ARE IN THE COUNTRY NOW SOMEWHERE AROUND A MILLION MEN AND WOMEN WHO HAVE IN THE PAST REGULARLY WORKED WITH ASBESTOS OR WHO ARE NOW WORKING WITH ASBESTOS. ONE MILLION. 200,000 MAY BE ANTICIPATED TO DIE OF LUNG CANCER. THERE WERE ALSO, AS YOU CAN SEE, 35

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1 BB 0005030 1

DEATHS OF MESOTHELIOMA. ALMOST 1 OUT OF 10 INSTEAD OF 1 OUT OF 10,000. A THOUSAND TIMES INCREASE. THE QUESTION AROSE WHETHER THIS, HOWEVER, WAS PECULIAR TO NEW YORK. AND WHAT WAS DONE WAS TO REGISTER EVERY UNION INSULATION WORKER IN THE COUNTRY ON JANUARY 1, 1967 AND WE'VE BEEN FOLLOWING THEM SINCE. BY WE, I MEAN DR. HAMMOND OF THE AMERICAN CANCER SOCIETY AND MYSELF.

ALMOST 1 OUT OF 10 WAS DUE TO GASTRO-INTESTINAL CANCER, ETC. HERE WE HAD ENOUGH STATISTICAL DATA TO DO AN ANALYSIS BY WHEN DID THE LUNG CANCERS OCCUR. THESE ARE IN FIVE YEAR GROUPS. ON YOUR LEFT. 10 YEARS FROM ONSET, 10-14, 15-19, 20-24, ETC. YOU WILL SEE VERY FEW LUNG CANCER DEATHS BEFORE 15 YEARS FROM ONSET. IT BEGAN AROUND THE 15-20-25 YEAR POINT. AGAIN, THE 20 YEAR RULE HELD. WE THEN WANTED TO KNOW HOW MUCH EXPOSURE IS NECESSARY. WE WENT TO A FACTORY HERE. IT'S THE OLD UNION ASBESTOS AND RUBBER COMPANY PLANT IN PATTERSON, NEW JERSEY. IN 1940 IT WAS RESCUED FROM THE WRECKER BY THE U. S. NAVY, BECAUSE THE NAVY NEEDED ASBESTOS INSULATION FOR THE NEW SHIPS WE WERE THEN BUILDING. AND THE COMPANY THEN BEGAN TO DO THIS IN 1941. THEY EMPLOYED 933 PEOPLE FROM 1941-45. THE PLANT CLOSED IN '54. AND WE FOUND WHEN WE TRACED THESE 933 PEOPLE EXACTLY THE SAME AS I'VE ALREADY TOLD YOU: THE LUNG CANCER, CANCER OF THE TONGUE, A FEW OTHER SITES, BUT MOSTLY THE LUNG. THERE, HOWEVER, SOME OF THE PEOPLE WORKED FOR ONLY ONE DAY. SOME FOR A WEEK, SOME FOR A MONTH. SOME WORKED FOR THE WHOLE 13 YEARS UNTIL THE PLANT CLOSED.

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[BB 0005031]

NOW, YOU MAY WONDER WHY PEOPLE WORKED FOR ONE DAY. I SPOKE TO SOME MEN LIKE THIS AND I ASKED HOW COME? WELL, LAST MAN IN GETS A NIGHT SHIFT. SO THEY WOULD COME, GET THE NIGHT SHIFT, DIDN'T LIKE THE PLACE. IT WAS A DIRTY PLACE, A LOT OF DUST AND THEY WEREN'T GOING TO STAY. HOWEVER, NOT EVERYONE HAD A CAR IN 1941. THEY CAME BY BUS AND THE BUS DIDN'T START RUNNING UNTIL 6 IN THE MORNING. SO THEY FIGURED, WELL, MIGHT AS WELL WORK THIS ONE SHIFT, MAKE OUR THREE BUCKS AND TAKE THE BUS IN THE MORNING, WHICH THEY DID. AS YOU CAN SEE, HERE EVEN LESS THAN ONE MONTH OF WORK, THE TOP BAR WAS ENOUGH TO GIVE A MARKEDLY INCREASE RISK OF LUNG CANCER. NOW, THE LONGER THEY WORKED, 6 MONTHS, THEY HAD MORE CANCER THAN IF THEY WORKED FOR 1 MONTH, IF THEY WORKED FOR 2 YEARS OR MORE, THEY HAD MORE CANCER THAN IF THEY WORKED FOR 2 MONTHS. AGAIN, THE DOSE-DISEASE RESPONSE RELATIONSHIP TO WHICH, INCIDENTALLY,-- DR. BAKER CORRECTLY ELUDED. EVEN 1 MONTH OF WORK, PROVIDED YOU LOOK 30 YEARS LATER, IS ENOUGH TO DO IT. THIS IS AN X-RAY OF THE MANAGER OF THE FACTORY, WHO LATER BECAME A REAL ESTATE AGENT IN RIDGEWOOD, NEW JERSEY. THIS IS HIS X-RAY. HE WAS MOSTLY A BOONKEEPER AND THEN IN THE OFFICE, A YEAR LATER THIS IS HIS MESOTHELIOMA ON THE RIGHT... THE X-RAY THERE. DIDN'T TAKE MUCH. AND THIS FITS WITH WHAT WE'VE LEARNED FROM THE LABORATORY. NOW WE'RE GOING BACK TO THE LABORATORY. WE KNOW WHAT QUESTIONS TO ASK. DR. WAGNER IN SOUTH WALES HAS DONE SOME BRILLIANT STUDIES EXPOSING RATS TO THE INHALATION OF ASBESTOS AND HE HAS FOUND THAT EVEN 1 DAY OF INHALATION, THE TOP LINE, IS ENOUGH TO

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BC 4027
1 BB 0005032 1

PRODUCE LUNG CANCER OR MESOTHELIOMA IN RATS. PROVIDED YOU ALLOW THE RAT TO LIVE OUT HIS LIFE AND OBSERVE HIM. NOW, THE LONGER THE EXPOSURE, THE GREATER THE RISK OF DEVELOPING THE CANCER. SO NOW THE LABORATORY BEGINS TO FIT THE HUMAN EXPERIENCE. NOW WHAT HAVE WE LEARNED? THE FIRST AND MOST IMPORTANT THING IS THE LONG, LATENT PERIOD FOR MUCH ENVIRONMENTAL DISEASE. I GUESS I'VE PUT IT AT THAT WHEN THE ONSET OF EXPOSURE BEGINS THE CLOCK STARTS TICKING FROM THAT POINT, NOT FROM WHEN HE LEAVES THE PLANT, BUT FROM THE DAY HE ENTERED THE PLANT. I THINK MR. GOODMAN CALLED IT THE "TIME BOMB." WE LEARN THE DIFFERENCE BETWEEN DURATION OF EXPOSURE AND DURATION FROM ONSET OF EXPOSURE. DON'T EVER MISTAKE THIS AGAIN. IT TOOK US A LONG TIME TO LEARN THIS VALUABLE INFORMATION. WE LEARN THE IMPORTANCE OF A DOSE-RESPONSE RELATIONSHIP. SURE, THE GREATER THE DOSE THE MORE LIKELY DISEASE WILL OCCUR. BUT THERE IS SIGNIFICANT DISEASE AT THE LOWER DOSES AS WELL, ONLY THE RISK IS LESS. THAT BRIEF EXPOSURE, IF EXCESSIVE, MAY BE HAZARDOUS. YOU DIDN'T HAVE TO WORK 20 YEARS TO HAVE THIS RISK. THERE WERE STILL EXCEPTIONS. ON THE SCREEN NOW IS A VERY UNUSUAL CASE OF SILICOSIS IN A WOMAN WHO WAS A SECRETARY OF A LAWYER. SHE HAD WORKED FOR HIM FOR 4 YEARS AND THEN COULDN'T BREATHE

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BB 0005033

VERY WELL. SHE CAME WITH THIS X-RAY AND I WASN'T INTERESTED HOW MANY YEARS SHE WORKED FOR THE LAWYER, BUT WHAT DID YOU DO BEFORE THAT. BEFORE THAT SHE WORKED FOR A COMPANY MAKING ABRASIVE SOAP. AND THIS IS ABRASIVE SOAP PNEUMOCONIOSIS. AND SHE DIED OF THIS SILICOSIS. I ASKED HER, WHEN YOU LEFT THE FILLING MACHINE, WHO TOOK YOUR PLACE? BOB JONES TOOK MY PLACE, THAT WAS FOUR YEARS AGO. WE WENT TO FIND BOB JONES AND WE DID FIND A RECORD OF HIM IN THE FORDHAM HOSPITAL. AND THIS WAS THE X-RAY. HE HAD WORKED THERE FOR 1 YEAR AFTER SHE DID, COULDN'T BREATHE ANYMORE, WENT TO FORDHAM HOSPITAL AND THIS WAS THE X-RAY BEFORE HE DIED OF ACUTE SILICOSIS. SO THERE ARE EXCEPTIONS. THERE ARE STILL ACUTE DISEASES, BUT THE MAIN LESSON IS THE LONG, LATENT PERIOD. WE ALSO LEARNED THE IMPORTANCE OF WHAT I CALL SIGNAL NEOPLASMS. CANCERS ARE GIVING US A SIGNAL. FOR EXAMPLE, YOU ALL KNOW OR HAVE HEARD THAT NICKEL MIGHT CAUSE CANCER. IT'S INTERESTING TO KNOW HOW WE FOUND THIS OUT. IT WAS A COUNTRY PRACTITIONER IN SOUTH WALES WHO SAW A MAN WITH A CANCER OF THE SINUS. VERY UNUSUAL. ONE OF HIS PATIENTS. SEVEN MONTHS LATER HE SAW ANOTHER PATIENT WITH A CANCER OF THE SINUS. HE SAID, "HEY NOW, TWO OF THESE IS TOO MUCH." BECAUSE HE NOTED THAT BOTH WORKED IN THE LOCAL NICKEL SMELTER. AND THAT GAVE US A

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BC 4029

1 BB 0005034 1

SIGNAL, THE HEMANGIO SARCOMAS OF THE LIVER OF WHICH THE WALL STREET JOURNAL WROTE WERE SIGNAL NEOPLASMS. THEY'RE UNUSUAL AND WE ARE BEGINNING TO FIND THESE MORE AND MORE. CANCERS OF THE TIP OF THE EAR, THE TIP OF THE NOSE. IT'S AN UNUSUAL LOCATION AND WE LOOK FOR VARIOUS KINDS OF COLD TAR DERIVATIVES TO DO THIS. NOW, THOSE ARE THE THINGS WE LEARNED. THE IMPORTANCE OF THE LATENT PERIOD, THE DIFFERENCE BETWEEN DURATION OF EXPOSURE AND DURATION FROM ONSET OF EXPOSURE, THE IMPORTANCE OF A DOSE-RESPONSE RELATIONSHIP, THE IMPORTANCE OF SIGNAL NEOPLASMS, ETC. WE THEN LEARNED ANOTHER LESSON WHICH GIVES YOU A PROBLEM, I'M SURE, AND I'M SURE ALSO THAT YOU CAN SOLVE IT, BECAUSE IT REFLECTS ACCURATELY, MUCH MORE ACCURATELY, THE REAL WORLD. IN 1963 WHEN WE EXAMINED THE SURVIVORS OF THE ORIGINAL GROUP OF 1943, THERE WERE 370 MEN, EACH WAS ASKED ABOUT HIS SMOKING HABITS. OBVIOUSLY, ANY STUDY WITH THE AMERICAN CANCER SOCIETY IS GOING TO ASK ABOUT SMOKING. BUT, HERE WE HAD A SPECIAL REASON. THESE MEN WERE DYING OF CANCER OF THE LUNG, BUT YOU COULD ALSO DIE OF CANCER OF THE LUNG FROM CIGARETTE SMOKING. INDEED, THERE'S A GOOD RISK. SO THEY WERE EACH ASKED ABOUT THEIR SMOKING HABITS. WE FOUND THAT 87 HAD NEVER SMOKED CIGARETTES REGULARLY. ON THE OTHER HAND, 283 HAD A HISTORY OF REGULAR SMOKING. BY '67 THE 87 MEN WHO WERE NOT EXPECTED TO HAVE LUNG CANCER -- NONSMOKERS DON'T GET MUCH LUNG CANCER - AND NOT ONE

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1 BB 0005035 1

OCCURED. THEY HAD THEIR LUNGS FULL OF ASBESTOS WHEN THEY DIED. THEY DIED OF ASBESTOSIS, MESOTHELIOMA, OTHER DISEASES, BUT NOT OF LUNG CANCER. ON THE OTHER HAND, OF THE 283 MEN WITH A HISTORY OF CIGARETTE SMOKING, THERE SHOULD HAVE BEEN, OH... ABOUT 3 DEATHS OF LUNG CANCER GIVEN THOSE SMOKING HABITS. INSTEAD OF 3, THERE WERE 24. IT WASN'T THE ASBESTOS ALONE, NOT 1 DIED OF LUNG CANCER, IT WASN'T THE CIGARETTE SMOKING ALONE, ONLY 3 WOULD HAVE DIED OF LUNG CANCER. THE COMBINATION OF THE TWO, THE MULTIPLE FACTOR INTERACTION GAVE THIS EXTRAORDINARY INCREASE. NOW THIS WAS BASED ON LIMITED INFORMATION, SO WE'VE EXTENDED THESE STUDIES. AND WHEN IN 1967 WE REGISTERED THE ENTIRE UNION IN THE COUNTRY WE TOOK SMOKING HISTORIES. WE FOUND THAT 2,000 OF THE MEN HAD NO HISTORY OF CIGARETTE SMOKING AND 9,500 HAD A HISTORY OF REGULAR CIGARETTE SMOKING. HERE WE ARE TO 1975. OF THE 2,000 WHO NEVER SMOKED CIGARETTES REGULARLY, WE HAVE NOW SEEN ONLY 6 DEATHS OF LUNG CANCER. IT'S OVER 8 YEARS, 2,000 MEN, WHICH IS A LITTLE MORE THAN YOU WOULD EXPECT IN NONSMOKERS. BUT SINCE THE NONSMOKING RISK IS NOT VERY GREAT, EVEN DOUBLING IT, OR TRIPLING IT, STILL DOESN'T MAKE FOR MANY DEATHS. ON THE OTHER HAND, AMONG THE 9,500 CIGARETTE SMOKERS THERE SHOULD HAVE BEEN 45 DEATHS OF LUNG CANCER AND THERE WERE 248. CONFIRMING THE ORIGINAL, THE IMPORTANCE OF THE MULTIPLE FACTOR INTERACTION, THIS IS REALLY THE REAL WORLD. WE DON'T LIVE IN A SOCIETY, IN A FACTORY, IN A NEIGHBORHOOD WITH ONLY ONE EXPOSURE. AND IT'S BEEN FOUND NOW WITH OTHER THINGS, FOR

EXAMPLE, IN HIROSHIMA THE SURVIVORS HAVE HAD INCREASED RISK OF DEATH OF LEUKEMIA. TRUE. BUT IF SUBSEQUENT TO HIROSHIMA THEY'VE WORKED WITH BENZINE, THEY HAVE A MUCH GREATER RISK THAN ALL THE OTHER PEOPLE EXPOSED AT HIROSHIMA AND NAGASAKI. THE COMBINATION, THE MULTIPLE FACTOR INTERACTION, EVEN ON THE COLORADO PLATEAU, URANIUM MINERS TEND NOT TO DIE OF LUNG CANCER UNLESS THEY ALSO SMOKE CIGARETTES. IF THEY DO, THEY HAVE A MUCH GREATER RISK THAN ALL OTHER CIGARETTE SMOKERS. IT'S NOT THE CIGARETTE SMOKING, THE RISK HERE, IT IS THAT THE ASBESTOS EXPOSURE, OR THE URANIUM EXPOSURE, GREATLY INCREASES THE ALREADY HIGH RISK OF CIGARETTE SMOKING. HOW THIS BEGINS TO PERVADE EVEN OUR OLD STANDARD COMPENSATION PROBLEMS IS ON THE SCREEN NOW. AS YOU KNOW, CHRONIC BRONCHITIS IS COMMON AMONG MINERS EXPOSED TO SILICA. DR. SCHLOSS KRAMER LOOKED AT THE MINERS IN A TOWN IN SOUTH AFRICA, BUT ALSO LOOKED AT ALL THE OTHER PEOPLE IN THE TOWN. AND HE FOUND, SURE ENOUGH, THAT IF THEY WORKED IN THE GOLD MINES THEY HAD A MUCH GREATER CHANCE OF HAVING BRONCHITIS. 39% VERSUS 19%. BUT, IF THEY DIDN'T SMOKE IT MADE NO DIFFERENCE WHETHER THEY WERE IN THE MINES OR NOT. IF THEY DID SMOKE THEN THEY HAD A MUCH GREATER RISK OF PEOPLE NOT IN THE MINES AT ALL OR MINERS WHO DIDN'T SMOKE. SO MUCH SO THAT AT THE PRESENT TIME, AND THIS IS A QUOTATION FROM DR. KEDZIE, WHO IS MEDICAL DIRECTOR OF THE RAND MINES: "AS MUCH AS 60% OF PEOPLE BEING COMPENSATED NOW IN SOUTH AFRICA HAVE NORMAL LOOKING X-RAYS INSOFAR AS SILICOSIS

IS CONCERNED." WELL, I THINK THIS WOULD PROBABLY HAVE BEEN ENOUGH FOR THIS MORNING'S LECTURE, BUT THERE'S BEEN SOMETHING ELSE AND I THINK NOW I AM COMING CLOSER TO PERHAPS THINGS THAT YOU ARE TROUBLED ABOUT, PERHAPS MORE INTERESTED IN. IN 1960 SOME DISTURBING NRWS APPEARED FROM SOUTH AFRICA THAT MESOTHELIOMA WAS BEING FOUND IN PEOPLE IN A PART OF SOUTH AFRICA IN WHICH THERE ARE MANY ASBESTOS MINES AND MILLS, BUT IN PEOPLE WHO THEMSELVES DID NOT WORK IN THE MINES AND MILLS. AND THE QUESTION WAS RAISED WHETHER JUST BEING IN THE AREA OR JUST HAVING SOME CHANCE CONTACT MIGHT BE ENOUGH TO GIVE THIS ASBESTOS CANCER. IN 1965 MOLLY NEWHOUSE, A VERY GOOD EPIDEMIOLOGIST AT THE LONDON SCHOOL OF HYGIENE, REPORTED THAT SHE HAD LOOKED AT THE 76 CASES THEN IN THE FILES OF THE LONDON HOSPITAL. 31 OF THE 76, WHEN SHE VISITED THE RELATIVES AND GOT INFORMATION, 31 OF THE 76 HAD SURE ENOUGH WORKED WITH ASBESTOS. WELL THAT COMES AS NO SURPRISE. BUT IN THE 45 WHO HAD NOT WORKED WITH ASBESTOS, 9 HAD SIMPLY LIVED IN THE HOUSEHOLD OF AN ASBESTOS WORKER. THESE WERE WOMEN WHO HAD WASHED THEIR HUSBANDS' CLOTHES WHEN THEY CAME HOME FROM WORK, BREATHED IN THE SAME DUST AS HE HAD INHALED IN THE FACTORY, VERY MUCH LIKE DR. BAKER HAD TOLD US TODAY ABOUT THE MEN AND CHILDREN IN THE LEAD SMELTERS. AND OF THE 36 WHO HAD NEITHER WORKED WITH ASBESTOS, NOR LIVED WITH SOMEONE WHO WORKED WITH ASBESTOS, 11 HAD SIMPLY LIVED WITHIN A HALF MILE OF ONE OF THE ASBESTOS

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BC 4033

BB 0005038

PLANTS IN LONDON AT BALKING AND HAD BEEN SUBJECTED TO ASBESTOS AIR POLLUTION. NOW THIS HAS BEEN CONFIRMED ALL OVER. AND ONE OF THE MOST TROUBLESOME CONFIRMATIONS CAME FROM ANOTHER AREA. ON THE VERY BOTTOM OF THIS SLIDE, THERE'S A SMALL TABLE. IT'S FROM A PAPER THAT APPEARED, WRITTEN BY PETER HARRIES, THE ROYAL NAVY DOCKYARD PHYSICIAN AT THE DEVONPORT DOCKYARD SHIPYARD IN GREAT BRITAIN. IN 1968 HE REPORTED THAT HE HAD 5 CASES OF MESOTHELIOMA IN THE SHIPYARD, NOT ONE IN AN ASBESTOS WORKER. A BOILERMAKER, A FITTER, A LABORER, A SHIP-WRIGHT, A WELDER. AND HE RAISED A QUESTION AND PRODUCED INFORMATION THAT ALL OF THESE MEN ARE WORKING CHEEK BY JOWL AND THE ASBESTOS WORKER IS SIMPLY THE TYPHOID MARY AMONG THEM, OR THEY'RE USING THEIR OWN ASBESTOS MATERIALS. THIS HAS BEEN CONFIRMED NOW IN VIRTUALLY EVERY SEAPORT IN THE COUNTRY. MCKUEN REPORTED 80 CASES IN SCOTLAND, EVERYONE ON THE SEASIDE. ONE A YEAR UNTIL RECENTLY, NOW 20, 25, 30 A YEAR. THE IMPORT FOR US IS THAT IN 1940 - 41 INSTEAD OF HAVING ABOUT 75,000 - 90,000 SHIPYARD WORKERS IN THIS COUNTRY, WHICH WAS THE CASE BETWEEN THE TWO WORLD WARS, WE TOOK OVER THE SHIP BUILDING AND SHIP REPAIRING FOR THE FREE WORLD AT THE OUTBREAK OF WORLD WAR II. AND WE WENT UP TO, IN NOVEMBER OF 1945 1,750,000 MEN AND WOMEN WORKING IN OUR SHIPYARDS. ALTOGETHER 4½ MILLION AMERICANS WORKED IN OUR

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BC 4034

1 BB 0005039 1

SHIPYARDS IN WORLD WAR II AND SINCE THEN IT'S BEEN AROUND 250,000 AT ANY ONE TIME IN OUR SHIPYARDS. THESE PEOPLE ARE NOW REACHING THE 30 YEAR FROM ONSET POINT AND HARDLY A WEEK GOES BY THAT WE DON'T SEE A CASE OF MESOTHELIOMA IN SOMEBODY, MAYBE HE'S NOW A SHOE SALESMAN, OR A REAL ESTATE SALESMAN, AN ATTORNEY, OR WHAT HAVE YOU, WHO WORKED IN WORLD WAR II IN A U. S. SHIPYARD AND THERE ARE LARGE NUMBERS OF PEOPLE NOW IN OUR SHIPYARDS EVEN TODAY. FOR EXAMPLE, IN GROTON, CONNECTICUT AT THE ELECTRIC BOAT COMPANY THERE ARE AT PRESENT 19,000 MEN EMPLOYED. HERE WAS A WOMAN THAT I SAW RECENTLY FROM SAN FRANCISCO. SHE WAS A BUYER AT A DEPARTMENT STORE THERE AND SHE WAS ASKED BY HER SUPERVISOR TO GO UP FOR HER ANNUAL PHYSICAL EXAMINATION, WHICH SHE DID, AND SHE GOT A LITTLE NOTE, GO SEE YOUR DOCTOR, WHICH SHE DID. AND THE DOCTOR SAID, "WELL, THE X-RAY... THERE'S SOMETHING THERE ON THE RIGHT LUNG, WHICH IS YOUR LEFT SIDE.. YOU HAVE TO HAVE AN OPERATION." SO SHE WENT UP AND THE WAY SHE TOLD THE STORY WAS THAT HE CAME DOWN FROM THE OPERATING ROOM TO HER RECOVERY ROOM WITH A LONG FACE. SHE LOOKED AT HIM AND SAID TO HIM, "DOCTOR, YOU DON'T HAVE TO WORRY ABOUT TELLING ME. I KNOW WHAT I HAVE. I HAVE MESOTHELIOMA." WHEREUPON HE FELL TO THE FLOOR. HE HAD NEVER SEEN ONE BEFORE. AND SHE SAID, "I KNOW THIS, BECAUSE IN 1943 IN RESPONSE TO PATRIOTIC APPEALS I WORKED AT THE MARE ISLAND YARD FOR A YEAR. AND I KNOW THAT

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BC 4035

1 BB 0005040 1

IF YOU WORK IN A SHIPYARD YOU'LL GET MESOTHELIOMA." SHE
FORTUNATELY WAS COMPENSATED BY THE FEDERAL BUREAU OF EMPLOYEES
COMPENSATION, WHICH HAS AGREED, WITH SOME RESTRICTIONS, TO
ACCEPT THAT THE GOVERNMENT IS THE LAST EMPLOYER FOR PEOPLE
WHO WORKED IN NAVY YARDS IN WORLD WAR II AND ALL MESOTHELIOMAS
WILL NOW BE COMPENSATED UNDER THOSE RESTRICTIONS. TO SHOW
YOU HOW IMPORTANT THIS CAN BE, THIS IS ANOTHER MESOTHELIOMA,
YOU RECOGNIZE THESE NOW. IT'S ON YOUR RIGHT HAND SIDE, THAT WHITE
MATERIAL. IT WAS IN A 30 YEAR OLD MAN, WHO WAS BORN IN 1940.
NOW, HOW THE DEVIL DID HE GET MESOTHELIOMA? HE HAD BEEN BORN
ON WALL STREET IN BROOKLYN, LIVED THERE FOR A YEAR, MOVED TO
WILSON STREET, LIVED THERE FOR 16 YEARS, THEN GOT MARRIED
AND HIS WIFE SAID WE CAN'T LIVE HERE, WE HAVE TO MOVE TO
FLATBUSH, WHICH THEY DID, AND WHAT'S MORE SHE INSISTED HE
GET A JOB, WHICH HE DID AT MACY'S AS A CLERK. AND YET HE
HAD MESOTHELIOMA. SO A LUNG BIOPSY WAS DONE AND SURE ENOUGH
THERE ARE THE LITTLE FIBERS THAT YOU SEE, THOSE LITTLE WHITE,
THOSE LITTLE GREY LINEAR STRUCTURES, ONE OF THEM WAS LARGE
ENOUGH TO ALLOW FOR ELECTRON DIFFRACTION, A SPECIAL TECHNIQUE,
AND IT TURNED OUT TO BE AMOSITE ASBESTOS AND THEN HE KNEW
THE ANSWER, BECAUSE AMOSITE ASBESTOS HAS SPECIAL PROPERTIES
RESISTANT TO WATER, SALT WATER, AND IT WAS COMMONLY USED IN

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BC 4036

BB 0005041 1

SHIPYARDS AND WE MADE THE DIAGNOSIS WITH A 15¢ MAP OF NEW YORK. THAT ONE DOT, THE LOWER DOT, OR THE FARTHEST TO YOUR RIGHT IS ROSS STREET, THE OTHER ONE IS WILSON STREET, RIGHT ACROSS THE STREET FROM THE BROOKLYN NAVY YARD. AND HE HAD GOTTEN HIS ASBESTOS IN HIS MOTHER'S ARMS, 30 YEARS BEFORE. WE HAVE NOW EXAMINED THIS IS THE FIRST 350 CASES, WE HAVE NOW EXAMINED ALMOST 700 WIVES AND CHILDREN WHO LIVED WITH THOSE FACTORY WORKERS FROM '41 TO '45. ONE THIRD HAVE ABNORMAL X-RAYS AND WE'VE ALREADY DIAGNOSED THE FIRST FOUR MESOTHELIOMAS. THE LESSON THAT DR. HARRIES HAS BEEN TEACHING US: HERE, FOR EXAMPLE, IS... OH, THIS WAS A COMMON PRACTICE FROM 1959 TO 1972 IN THE UNITED STATES, INCLUDING HERE IN ATLANTA. WHEN WE BEGAN TO BUILD VERY TALL BUILDINGS OF STEEL IT WAS NECESSARY TO FIRE-PROOF THE STEEL AND ASBESTOS IS A WONDERFUL FIRE-PROOFING MATERIAL. AND HERE IT IS BEING SPRAYED ON. SPRAYED ASBESTOS FIRE-PROOFING. AND WHEN YOU SPRAY IT, AS YOU CAN SEE, MUCH OF IT ACTUALLY GETS ON THE BEAM. THIS IS THE WORLD TRADE CENTER. THIS IS WHAT THE IRON WORKER GOT. THE ELECTRICIAN. THE MASON. THE FRONT END LOADER. THERE ARE 4½ MILLION CONSTRUCTION WORKERS IN THE UNITED STATES. THESE ARE ASBESTOS WORKERS SAWING BLOCK. NOBODY LOOKS, NOBODY HAS EVEN THOUGHT OF HARDLY THE PROBLEM OF WASTE DISPOSAL, REPAIR, MAINTENANCE, THAT DUST GOES ALL OVER THE BUILDING. THIS IS THE BOTTOM OF OUR PATHOLOGY BUILDING

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BC 4037

1 BB 0005042 1

AT MT. SINAI. WE'VE JUST, SOME OF YOU MAY KNOW, WE'VE JUST BUILT A MAGNIFICENT NEW ANNENBERG BUILDING. WE TORE THIS DOWN. TORE OFF ALL THAT INSULATION AND TRACKED IT RIGHT THROUGH THE HOSPITAL, WE THEN STORED IT IN OUR BACK YARD, PUT IT INTO TRUCKS, THAT'S 101st STREET, THAT'S 5th AVENUE IN THE DISTANCE AND THAT TRUCK THEN GOES RIGHT DOWN THROUGH THE CENTER OF MANHATTAN, WHEN WE STORE IT IN OUR BACK YARD WHERE DO WE STORE IT? UNDERNEATH OUR AIR INTAKE. AND THE FIRST STOP ON THAT AIR DISTRIBUTION SYSTEM IS OUR INHALATION THERAPY CENTER. THE PROBLEM OF WASTE DISPOSAL -- THIS IS AMBLER, PENNSYLVANIA. FOR 10 BLOCKS THROUGH THE CENTER OF TOWN THE ASBESTOS FACTORIES HAVE BEEN DUMPING THEIR WASTE. OVER THE YEARS, HOWEVER, THEY HAVE BEEN VERY KIND TO THE KIDS. AND THEY HAVE BUILT THIS EXCELLENT BASKETBALL COURT AND THE KIDS REALLY LIKE TO PLAY THERE. REMEMBER THE 20 YEAR RULE. 30 YEAR RULE. THIS WHOLE PROBLEM, WE HAVE NOW IN THE UNITED STATES OVER 25 MILLION TONS OF ASBESTOS IN OUR BUILDINGS. AND THIS IS HOW IT'S GONE INTO ALL KINDS OF PLACES. FOR EXAMPLE, STARTING IN 1946 WE NO LONGER BUILT MASONARY WALLS. IT WAS ALL DRY-WALL CONSTRUCTION. THEY DID A BEAUTIFUL JOB. WHEN THEY'D TAPE THOSE JOINTS YOU COULD HARDLY SEE WHERE THE JOINT WAS. JUST AS YOU SEE IN THE WALLS HERE. THEY'RE ALL DRY-WALLED. NOBODY TOLD THESE TAPING WORKERS, NOR ANYBODY ELSE AROUND THEM THAT THIS MATERIAL CONTAINED 12% ASBESTOS. AND THIS IS WHAT IT LOOKS LIKE UNDER THE MICROSCOPE. ELECTRON MICROSCOPE. HOW MANY TIMES HAVE YOU WAITED FOR YOUR CAR TO BE DELIVERED TO YOU, THE BRAKES BEING REPAIRED. BRAKES WHICH HAVE 50% ASBESTOS. NOBODY TOLD THE 1 MILLION BRAKE REPAIR AND BRAKE MAINTENANCE WORKERS IN THIS COUNTRY THAT THEY OUGHT TO VACUUM OUT THE DUST INSTEAD OF BLOWING IT OUT. AND THIS DUST IS FOUND, BY THE WAY,

UP TO 75 FEET OR MORE FROM THE SOURCE WHEN YOU DO AIR SAMPLING. AND THIS IS WHAT IT LOOKS LIKE UNDER THE MICROSCOPE. WE HAVE 25 MILLION TONS OF ASBESTOS IN OUR BUILDINGS, AND SO FORTH, AND ONE DAY IT'S GOT TO BE REPAIRED, IT'S GOT TO BE REMOVED, IT'S GOT TO BE TAKEN OUT. AND WE DON'T KNOW HOW TO DO IT. WE ARE NOW USING IN THIS COUNTRY, WELL IN THE WORLD, THE WORLD PRODUCTION OF ASBESTOS IN 1930 WAS 500,000 TONS, LAST YEAR IT WAS AROUND 5 MILLION TONS. BEING USED MORE THAN EVER. THE CANCERS WE HAVE BEEN TALKING ABOUT HAVE BEEN RELATED TO THE CONSUMPTION OF AROUND 2 MILLION TONS A DECADE IN THE 1920's, THE 1930's. THE CANCERS THAT WILL BE SEEN WITH THE 1960-69 ASBESTOS, WILL NOT BE SEEN UNTIL THE YEAR 2000. SO, NOW WHAT HAVE WE ADDED TO OUR KNOWLEDGE? WE'VE ADDED THE IMPORTANCE OF LOW LEVEL EXPOSURE, OF WHAT I CALL BI-STANDARD DISEASE. THESE ARE NOT ASBESTOS WORKERS, BUT THEY GET THE SAME ASBESTOS DISEASES. THE IMPORTANCE OF DEMOLITION, WASTE DISPOSAL, MAINTENANCE, REPAIR, THE IMPORTANCE OF END PRODUCT USE, BRAKES, CONSTRUCTION MATERIALS, ALL KINDS OF CONSUMER PRODUCTS. THE ASBESTOS FIBERS HAVE NO IDEA OF THE ECONOMIC CATEGORIES IN WHICH THEY'RE SUPPOSED TO BE. ALL OF THIS ADDS UP TO WHAT I WOULD CONSIDER AGNES ALLEN'S LAW. DO YOU ALL KNOW AGNES ALLEN? AGNES ALLEN WAS A NEW YORK CORSETIERE. AND SHE USED TO SAY THAT THERE ARE SOME THINGS THAT ARE MUCH EASIER TO GET INTO THAN OUT OF. NOW, I'D LIKE TO RETURN IN CONCLUSION TO HOW I BEGAN WITH REGARD TO THE WALL STREET JOURNAL. WHEN THE WALL STREET JOURNAL PUBLISHED THE HEMANGIO SARCOMA CASES WITH VINYL CHLORIDE THIS RANG A BELL WITH MANY OF US. WE KNEW ABOUT VINYL CHLORIDE, WE KNEW THAT IT WAS A TOXIC MATERIAL, FOR OVER 10 YEARS. WE KNEW THAT IT COULD CAUSE ACRO-OSTEOLYSIS, THAT'S IN THE TIP OF THAT FINGER THERE, THERE IS A BONE EATEN AWAY. WE HAD KNOWN THAT FOR AT LEAST 10 YEARS. AND THE FINGERS OFTEN GET SHORTENED. WE CALL THAT PSEUDO-CLUBBING. BECAUSE WHEN THE BONE IS EATEN AWAY THERE'S A RETRACTION OF THE FINGERS. WE KNEW THAT. WE KNEW THAT SCARRING OF THE LIVER, THAT BLUE IS THE SCAR TISSUE IN

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THE LIVER, WE KNEW THAT, OH, SINCE 1947, OR SO, AND WHEN YOU LOOK AT THE LIVER, THIS IS WITH A PERITONOSCOPY, YOU PUT A TUBE INTO THE ABDOMEN AND LOOK AT THE LIVER AND YOU CAN TAKE PHOTOGRAPHS, YOU CAN SEE ALL THE SCARS IN THAT LIVER. WE KNEW THAT. WE KNEW ALSO THAT HEMANGIO SARCOMA NOT ONLY WAS VERY RARE BUT WAS ALSO CAUSED BY SOMETHING ELSE IN THE ENVIRONMENT. WE KNEW THAT IT COULD BE CAUSED BY ARSENIC BECAUSE THE VINEYARD SPRAYERS IN GERMANY WERE FOUND TO HAVE HEMANGIO SARCOMA AND THEN WE KNEW SOMETHING ELSE, THAT THOROTRAST, WHICH WE DOCTORS HAD BEEN USING IN THE MID-20's AS A CONTRAST MEDIUM IN X-RAY WORK BEGINNING IN 1926, 20 YEARS LATER WE BEGAN TO SEE HEMANGIO SARCOMA OF THE LIVER AND ELSEWHERE, BONE MARROW AND ELSEWHERE, IN PEOPLE WHO HAD BEEN GIVEN THIS THORIUM DIOXIDE FOR DIAGNOSTIC PURPOSES. THEREFORE, THE FIRST QUESTION WE ASKED WHEN THE HEMANGIO SARCOMAS OF THE LIVER WERE REPORTED BY THE WALL STREET JOURNAL WAS WHEN DID THAT PLANT OPEN? AND WE WERE TOLD IT OPENED IN 1940. AND NOW THAT FIT. THE SAME 20 YEAR RULE. INDEED WHEN WE LOOKED AT THE PRODUCTION FIGURES FOR THE INDUSTRY WE FOUND THAT THE PETRO-CHEMICAL INDUSTRY, THE PLASTICS INDUSTRY IS A NEW ONE IN 1930 IT PRODUCED LESS THAN 100,000 TONS OF PLASTICS. IN 1970 IT WAS UP TO 30 MILLION TONS. THEREFORE WHAT WE WERE SEEING IN 1974-75, AS YOU CAN SEE, KNOWING THAT THESE HAD TO BE THE FIRST CASES, THE YOUNGEST ONES, THE ONES WITH THE SHORTEST DURATION FROM ONSET, AGAIN, THE SAME LONG, LATENT PERIOD. I THINK THAT'S ABOUT ENOUGH. THE LAST THING I WOULD CALL TO YOUR ATTENTION IS THAT WHEN WE LOOKED AT THE VINYL CHLORIDE WORKERS WE ALSO DID SOMETHING ELSE, WE LOOKED AT THEIR LYMPHOCYTES IN THE BLOOD, AT THEIR CHROMOSOMES. AND THIS IS THE LAST THING. WE FOUND THAT THE CHROMOSOMES BECAME ABNORMAL. RAISING NOW THE MOST TROUBLESOME, WORRISOME, PERHAPS OF ALL THE LONG, LATENT PERIOD PROBLEMS. THE PROBLEMS OF OUR ENVIRONMENT. THE PROBLEMS OF CHEMICALS THAT WE'VE INTRODUCED IN THE LAST 40 YEARS. THE QUESTION OF MUTAGENICITY. THE CHANGING OF OUR GERM PLASM IN OUR SOCIETY IN ADDITION TO THE LONG, LATENT, PERIOD ASSOCIATED WITH CARCINOGENICITY.

THANK YOU.

CONFIDENTIAL - SUBJECT TO COURT ORDER

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