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The University of Alabama at Birmingham  
School of Medicine  
Department of Medicine  
Division of General and Preventive Medicine  
205/934-2294, 205/934-4873

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April 5, 1985

FYI-OTS-0485-0395 INITIAL  
SEQUENCE A

Document Control Officer  
Attention: Terry O'Bryan  
Information Management Division  
Office of Toxic Substances TS-793  
United States Environmental Protection Agency  
401 "M" Street S.W.  
Washington, D.C. 20460

RECEIVED  
4/23/85  
TOB/CSB

Dear Sir:

I am enclosing with this letter the case history of a gentleman who came into my office recently. As you can see from his work history, he was employed as a green chain operator in the lumber industry for 27 years. He stopped work because he developed generalized, disabling scleroderma. The fungicide with which he worked during recent years was Permatox 100 which is said to contain methanol, tetrachlorophenate, sodium salts of other chlorophenols, sodium metaborate, and phenylmercuric acetate. Generalized scleroderma has been reported to occur with increased frequency after jobsite exposures to free silica. Scleroderma-like conditions have also been reported to occur after exposure to vinyl chloride monomer.

I can find no published case of scleroderma developing after long term exposure to wood treatment chemicals. I thought this case report might be of some interest to you. If you or the Pesticides Office of your agency have a record of other such cases, I would appreciate being informed so that I might contact the physician responsible for such individuals.

If you require further clarification or information, please do not hesitate to contact me.

Sincerely yours,

*John F. Finklea, M.D.*  
John F. Finklea, M.D.

JFF/ph  
Enclosure

cc: Dr. Bernard D. Goldstein  
Asst. Administrator for Research & Development  
Office of Research and Development  
U. S. Environmental Protection Agency



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### **MEDICAL EXAMINATION: MR. "L"**

**Birthdate:** July 5, 1925

**Patient Seen On:** January 28, 1985

**Reason for Referral:** Mr. "L" is concerned that jobsite exposures to anti-fungal agents may have contributed to his developing scleroderma.

**History of Present Condition:** Mr. "L" is a 59-year old male who grew up on a farm and then worked as a farmer from 1944 through 1953. He sharecropped, raising cotton, corn, sugar cane, soybeans, oats and hay. The only farm chemicals he can recall using were insecticides applied by a hand blower to the cotton crop on a weekly basis. During the late 40's and early 50's this was probably a chlorinated hydrocarbon pesticide.

In 1953 he went to work for the Shuqualak Lumber and Sawmill Company. He worked on the "green chain", taking off lumber which had just been immersed in a vat containing antifungal chemicals. He stacked the dipped lumber onto a truck or pad which was then transported to the planing mill. He wore gloves and recalls that these became wet quite early in a work day and that his work gloves usually lasted only about one week before they disintegrated. During the work day his hands were usually wet, as was his lower anterior abdomen and his groin area. He recalls that he frequently experienced splashes onto his head, face and chest. When the green chain line was not operating, he sometimes helped stack green or dried lumber. He would remove the dried lumber from the kiln and stack it in the yard. Altogether there may have been 12 or 13 workers on the green chain crew. Mr. "L" believes that very few of the workers stayed with this job a long time.

After working 17 years with the green chain crew at the planing mill, he went to work at a sawmill owned by the same company doing the same job. The anti-fungal treatment is thought to have involved a solution containing sodium tetrachlorophenate, sodium salts of other chlorophenols, sodium metaborate, phenol mercuric acetate, and methanol. One of the trade name products used was Permatox 100 manufactured by the Chapman Chemical Company of Memphis, Tennessee.

Part of Mr. "L"'s job was to clean out accumulated sediment from the dip vat once weekly. He would climb down into the vat and shovel out wet wood chips, bark and sawdust. His feet and hands would get wet with dip solution in this operation.

Mr. "L" stated that he was in fairly good health until approximately 1977 at which time he noted the gradual onset of discomfort and stiffness in the metatarsal-phalangeal joints of his right foot and in the tarsal-metatarsal joints of both feet. He also noticed some intermittent swelling in these areas. Later, he developed pain and stiffness of the proximal interphalangeal joints of the fingers of both hands. This discomfort and stiffness subsequently involved other finger joints in both hands. He had some swelling but does not recall having any redness or increased warmth in these joints. About the same time or shortly thereafter, he noticed that both of his knees became sore and swollen. During the first years of his discomfort, he had more pain in his right hand and right leg than in the left hand and leg.

Mr. "L" consulted his personal physician, Dr. Pat H. Gill of Macon, Mississippi who subsequently referred him to Dr. James Ratcliff. Dr. Ratcliff admitted Mr. "L" to the Noxubee General Hospital in January of 1981. At that time, Mr. "L" was described as having depigmentation of several areas, including the scalp, forehead, neck and upper chest. The skin of his face, neck, upper chest, forehead, scalp and lower extremities was described as being very thick, indurated and edematous. His feet and hands were described as being cold. He was unable to grasp tightly with his right hand. He was described as having stiffness of many joints and ischemic ulcers on the lateral aspects of both ankles. Arterial pulses were not detectable at the wrists or in the feet. None of his joints were acutely inflamed and there was no erythema. He had a history of intolerance to cold. Anti-nuclear antibodies were demonstrated at a titer 1 to 160. Sedimentation rate was elevated at 48. Serum test for rheumatoid arthritis and LE prep were negative. Chest x-ray was clear. Upper gastrointestinal series was said to show no lesion of the esophagus. A small hiatus hernia was demonstrated. A skin biopsy showed chronic dermatitis with scarring. Mr. "L" has been treated with Prednisone, a nasal dilator (Nyldrin), and a non-steroidal anti-inflammatory agent (Clinoril).

Since initial diagnosis, his condition has waxed and waned, but overall it has gradually worsened during the subsequent months. He has not been able to work since the middle of 1980. At the present time, he can walk only for short distances because of pain in his feet. He has difficulty caring for himself because of the deformities of his hands. He is unable to dress himself without assistance. He notices that his pain and stiffness is increased during colder weather. He has numbness in his hands and feet, especially during cold weather. Even though he cannot be physically active, he does have shortness of breath, especially when lying down. He has noticed some periods of irregular and rapid heartbeat. He has had some difficulty swallowing and has some epigastric discomfort which he attributes to a hiatal hernia. He frequently develops skin ulcers which heal with difficulty. He continues to have soreness and stiffness in his joints, muscle stiffness and swelling in his feet and ankles.

**Past Medical History:** Mr. "L" says he has been hospitalized only on the one occasion that has already been described. He is not known to be allergic to any medication or any environmental agent.

**Personal, Social and Occupational History:** Mr. "L" was born in Shuqualak, Mississippi on a farm. He worked on a farm as a young boy and did not attend school. He was examined by Selective Service during World War II, but not accepted for military service. He was allowed to remain on the farm working as a sharecropper raising cotton, corn, soybeans, sugar cane, oats and hay. Before he became ill, Mr. "L" enjoyed fishing

and hunting squirrel and rabbit. He was responsible for household chores and repairs. He owns his own home which is a wooden frame structure having seven rooms. He has a fireplace for heating and an electric stove.

Mr. "L" began smoking cigarettes at age 20 and smoked a pack of cigarettes every day and a half. I estimate that his total exposure to cigarette smoking is 26 pack years. He states that he does not use beverage alcohol. He says his workplace exposures have included cold, heat, noise, vibration and perhaps some organic solvents.

**Family History:** His father died after a cerebrovascular accident at age 70. He had been hypertensive for some years before his stroke. His mother died at approximately age 45 in childbirth. He has four brothers and two sisters who are living and in good health. One sister died of a malignancy involving the hematopoietic system at age 40. One of his brothers died after a gunshot wound at age 47. Another brother with whom he worked at the planing and lumber mill died at age 60 with kidney failure, hypertension and an ulcer. His wife, age 59, is said to be in fair health. They have a total of 10 children. Three of their children, all females, are said to be hypertensive. One of his daughters has iron deficiency anemia. His maternal grandmother is said to have had asthma.

**Review of Systems:** Mr. "L" sometimes has headaches. He complains of sometimes having blurred vision and difficulty with distant vision. He has had some decrease in hearing. He has had some hoarseness. He has had some difficulty with frequent urination, difficulty in stopping his urination and nocturia. He has had recent weight loss, difficulty in sleeping and reduction in his appetite.

**Physical Examination:**

Height: 67 inches  
Weight: 166 pounds  
Pulse: 84  
Blood Pressure: 160/102

General appearance was that of a chronically ill male who was in acute and chronic distress. Patient seemed oriented as to person, place and time. He responded to questions in a logical fashion, but had some difficulty hearing.

Examination of the skin showed loss of pigmentation of the scalp, forehead, periorbital region, ears, nose, left upper lip, upper chest and the left anterior posterior area of the lower chest. There was also a less complete loss of pigmentation over the lumbar region of the spine and scrotum. The skin was abnormal in all areas except the proximal lower extremities, the buttocks and the lower abdomen. In other areas the skin was thickened and edematous. The feet appeared to be swollen but no pitting edema was present. Over the hands and forearms the skin was tightly drawn and shiny. There were contracture deformities of both hands which were left in a claw-like position. Some joint movement could still be elicited and this movement was greater in the left hand than in the right hand. However, the patient could not firmly grasp my finger with either hand. The skin of the face showed loss of normal creases. There was a shiny, hidebound appearance. The eyelids seemed to be tight and there was mucous present at the inner canthus.

The nasal mucous membrane appeared eroded and crusted, but there was no perforation of the nasal septum. Examination of the ears revealed the external auditory canals to be clear and the tympanic membranes to be intact. Examination of the eyes revealed the pupils to be round, equal and to react to light and accommodation. Extraocular movements were intact. Funduscopy examination revealed no abnormalities. Examination of the mouth showed many missing teeth and periodontal disease. The gag reflex was intact. Examination of the neck showed no enlargement of the thyroid. Percussion of the thorax demonstrated movement of the diaphragms upon inspiration. Auscultation of the lungs revealed no rales and no abnormal breath sounds.

Examination of the heart revealed no cardiomegaly. A grade 4 over 6 heart systolic murmur was heard best over the primary pulmonic valve area. The murmur radiated along the right sternal border, but not into the neck. The carotid brachial and femoral arterial pulses were intact. Radial and dorsalis pedis arterial pulses were absent. Abdominal examination revealed no enlargement of the liver or spleen. The kidneys could not be palpated. Genital examination showed no hernia. Rectal examination showed the prostate to be enlarged to over four but symmetrical.

It was not possible to elicit deep tendon reflexes in the lower part of the upper extremities or in the lower part of the lower extremities. Pain and touch sensation were intact bilaterally.

There was severe limitation of movement in the joints of the hands and feet. Movement of the elbows and knees was painful and limited. Shoulder and hip movement were less severely affected. Spinal movements were even less affected.

**Laboratory and Diagnostic Studies:** Distant and near vision were reduced. Intraocular pressure was not elevated. Color vision was within normal limits. Stool examination for occult blood was negative. A screening audiogram revealed hearing loss to be greater on the left than on the right. Hearing thresholds of 40 to 70 decibels were noted on the left. There was a flat hearing loss at frequencies greater than 1000 hertz on the right. Pulmonary function testing revealed a forced vital capacity of 3.29 liters which was 93% of the predicted value. The one-second forced expiratory volume of 2.66 liters was 105% of the predicted value. Maximum ventilatory volume of 120 liters per minute was 121% of the predicted value. Sputum cytology showed no malignant cells. Diffusion testing was not carried out during this visit and blood gases were not measured because of the costs involved.

**Impression:**

1. Diffuse scleroderma.
2. Hypertension.
3. Moderate to severe hearing loss bilaterally.
4. Extensive skin depigmentation.

**Comments:** Diffuse scleroderma has been produced by occupational exposure to free silica. A scleroderma-like disorder of the hands has also been described among workers who were exposed to excessive levels of vinyl chloride monomer. Raynaud's phenomena along with skin changes have also been described in workers exposed to excessive vibration levels. A literature search did not provide evidence that scleroderma has been

described as the consequence of exposure to chlorophenols, dioxins, dibenzofurans, mercury compounds, methanol or metabolates. Dr. Renate Kimbrough of the Centers for Disease Control told me that she did not know of any unpublished case reports linking scleroderma to these chemicals.

I will also forward his case report to the U.S. Environmental Protection Agency as a possible previously unreported adverse effect following exposure to wood preservatives. Because chlorophenol containing wood preservatives may contain dioxin-like compounds. It would also be useful if Mr. "L" could inquire as to whether scleroderma had been among the adverse health effects of Agent Orange documented during previous litigation but not reported in the medical journals.

Because of Mr. "L"'s extremely limited financial resources, I did not undertake other diagnostic studies at this time. I did tell Mr. "L" and his friend, Mr. "W", that I would talk to someone from the Arthritis Clinic to ascertain whether or not advancements in therapy might make it worthwhile for his physician to contact the Arthritis Center or for Mr. "L" to visit the center.

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John F. Finklea, M.D.

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