

DERMATITIS VENENATA FROM TREE POLLEN OILS

A CLINICAL REPORT

ROBERT G. LOVELL, M.D., KENNETH P. MATHEWS, M.D., AND
JOHN M. SHELDON, M.D., ANN ARBOR, MICH.

DERMATITIS venenata from exposure of a sensitized person to plant oils has been recognized for many years.^{1, 2} Poison ivy (*Rhus toxicodendron*) dermatitis has been so common and troublesome that it is well known to all. Ragweed pollen, probably the most common cause of hay fever in the United States, also has contributed to some extent to the dermatitis venenata problem. Dermatitis of the exposed areas of the skin may be caused by hypersensitivity to the ether-soluble fraction of the pollen and the plant leaves and stem. This clinical syndrome has been adequately discussed with complete references by Fromer and Burrage.³

The possibility that the ether-soluble fraction of plant oil from other plants also could cause similar disease is assumed.⁴ Trees (particularly the conifers, whose sap is used for preparing pitch and turpentine) have contributed to the contact dermatitis problem. The observation of hypersensitivity to turpentine in carpenters, painters, and woodcutters is not rare, but the existence of contact sensitivity to tree *pollen* oil first was brought to our attention in 1951 through a visit to our clinic by an unusual patient. She consulted the University Hospital in May, stating that she ran a gasoline service station in northern Michigan and that her problem involved a dermatitis which appeared on the face, hands, and forearms every April and May when the trees began to blossom. The skin lesions were distributed on the exposed areas and were clearing at the time of her visit. They were erythematous, scaling, and excoriated, and the physician who saw her felt that she had contact dermatitis. She was patch tested to the available testing materials, which consisted of juniper, turpentine, oil of cade, and pine oil. None of these gave a positive reaction, and she was discharged with symptomatic treatment. The following April she sent a letter to the clinic, stating that her dermatitis had returned "according to schedule," and asked if anything new had been discovered which would be of help. As a result of this, the need for a complete set of tree oil patch testing materials became apparent.* She was requested to come in for testing but did not return.

The similarity of the history given a few weeks later by a 68-year-old farmer (Case 2, Mr. A. M.) from upper Michigan was striking. He stated that for twenty years, since being a farmer, he had noted a dermatitis on the exposed

From the Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, Michigan.

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*These patch testing materials can be obtained from Graham Laboratories, 6146 Willow Lane, Dallas, Texas.

areas of his skin only during the fall and in late April and May. His skin promptly cleared after May and he had no further difficulty until fall, during September and October. Then no trouble occurred until spring, when the maple, elm, and birch trees began to blossom. When he came south 300 miles to visit his son on March 29, 1953, his symptoms came about ten days earlier than

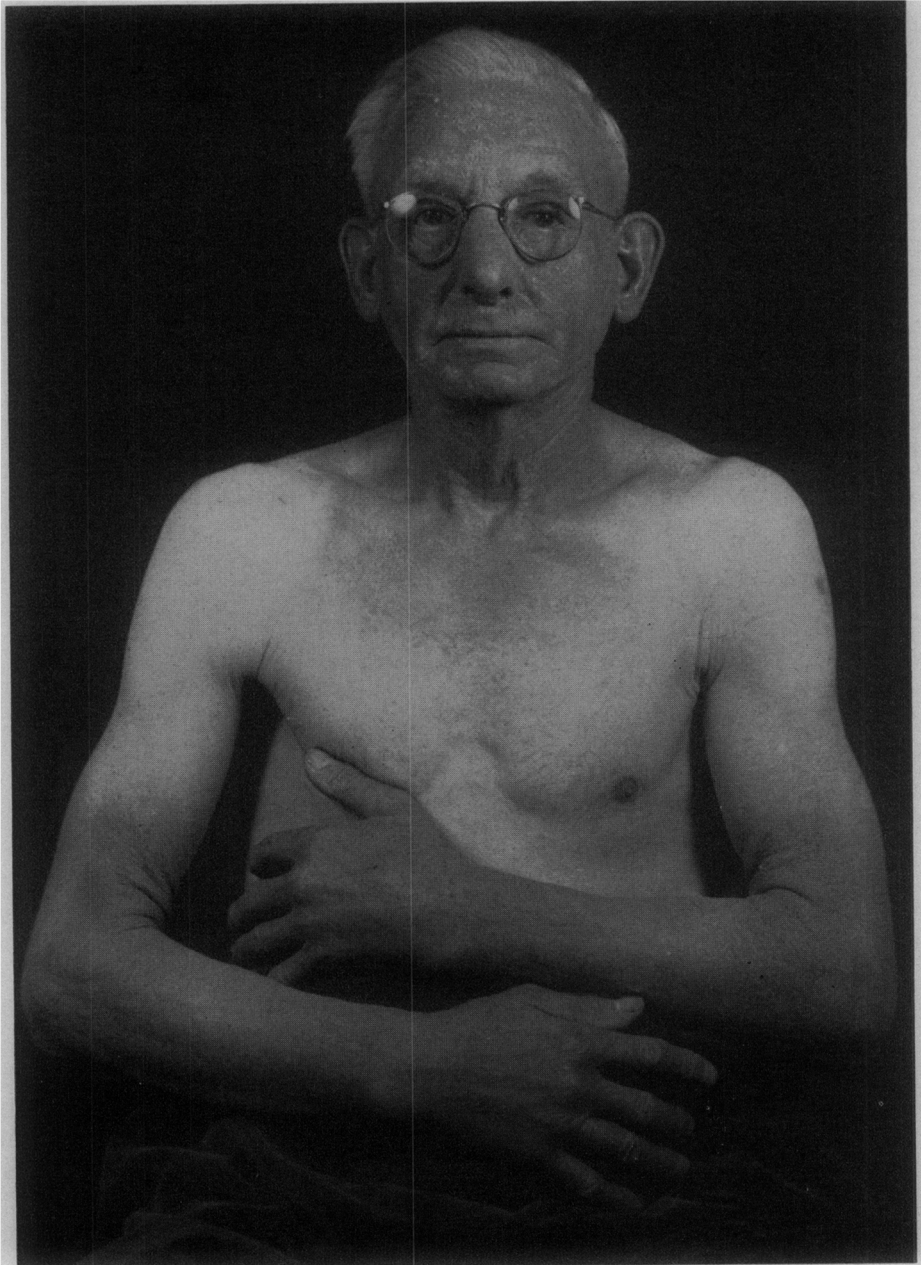


Fig. 1.—Case 2, A. M. Dermatitis confined to exposed areas.

expected. This difference corresponded with the earlier pollination of trees in the Detroit area. The patient was seen on April 20, stating that four days after arrival in the Detroit area his skin flared up and his eyes watered and itched. There was no sneezing or itching of the nose. The first trouble with his skin had occurred in 1933, following the commercial handling of bananas, and was characterized by an eczematoïd dermatitis of the face, palms, and forearms, which cleared a few months after he left the fruit business. He subsequently also found it necessary to avoid orchard spray, since this irritated his skin. Except for urticaria (cause unknown) in the fall of 1952, he had no collateral allergy. There was no family history of allergy.

TABLE I. PARTIAL LIST OF PATCH TESTS APPLIED TO PATIENT 2, MR. A. M.

MATERIAL	DILUTION	RESULT
1. Copper sulfate	1 per cent aqueous	-
2. Sodium arsenate	10 per cent aqueous	-
3. Potassium dichromate	0.5 per cent aqueous	-
4. Bichloride of mercury	1:1000 aqueous	-
5. Nickel chloride	5 per cent aqueous	-
6. Tincture of Pyrethrum	20 per cent tincture	-
7. Butesin pierate	1 per cent in petrolatum	++++
8. Paraphenylenediamine	2 per cent in petrolatum	+++
9. DDT	50 per cent in olive oil	-
10. Para-red, deep #1	powder	++++
11. Para-red, deep #2	powder	++++
12. Para-red, light	powder	++++
13. Eosin dye	powder	++++
14. Ragweed oil	1:1000 in olive oil	+/-
15. Poison ivy oil	1:5000 in olive oil	+/-
16. Maple pollen oil	1:100 in olive oil	+
17. Box elder pollen oil	1:100 in olive oil	++
18. Poplar pollen oil	1:100 in olive oil	-
19. Oak pollen oil	1:100 in olive oil	-
20. Cedarwood oil	1:100 in olive oil	-
21. Birch pollen oil	1:1000 in olive oil	-
22. White ash pollen oil	1:100 in olive oil	-
23. Quack grass oil	1:100 in olive oil	+
24. Black-eyed Susan oil	1:100 in olive oil	+
25. Olive oil (control)	1:1	-

Scratch and intradermal tests with the defatted (protein) portion of the tree pollens listed above were all negative.

Examination in 1953 showed that he had a scaling, erythematous dermatitis on his face, neck, forearms, and hands; the palms were clear (Fig. 1). In consultation with a dermatologist, a tentative diagnosis of contact sensitivity to bananas, tree spray, and plant oils was made, and he was treated with starch and soda baths, calamine lotion in 50 per cent peanut oil, adrenalin in oil 1:500, and repeat action Chlor-Trimeton. His lesions cleared in about ten days and it was felt safe to patch test him with the newly obtained ether-soluble tree pollen oils. This was done by the usual technique^{5, 6} (Table I) and in about twelve hours positive reactions appeared at the testing sites and increased in severity until, by thirty-six hours, several had become vesicular (Fig. 2). Control tests using the same materials on normal persons were negative. In addition, the patient was patch tested with sixty common plant oils and showed +1 reactions to *Agropyron repens* (quack grass) *Anthemis catula*, and *Rudbeckia hirta* (black-eyed Susan) and equivocal reactions to ragweed and poison ivy oils. A known

sensitivity to red paint was confirmed by patch testing with farm machinery red paint, and he was warned to avoid handling red-covered magazines and red cardboard containers which might contain para-red dyes.

Since oral desensitization to plant oils has been reported to be successful in some cases of ragweed pollen oil sensitivity,⁷ it was decided to prepare an extract containing equal parts of ragweed, maple, and box elder pollen oil diluted with equal parts of olive oil and made into 1:50, 1:500, 1:5,000, 1:50,000 and 1:500,000

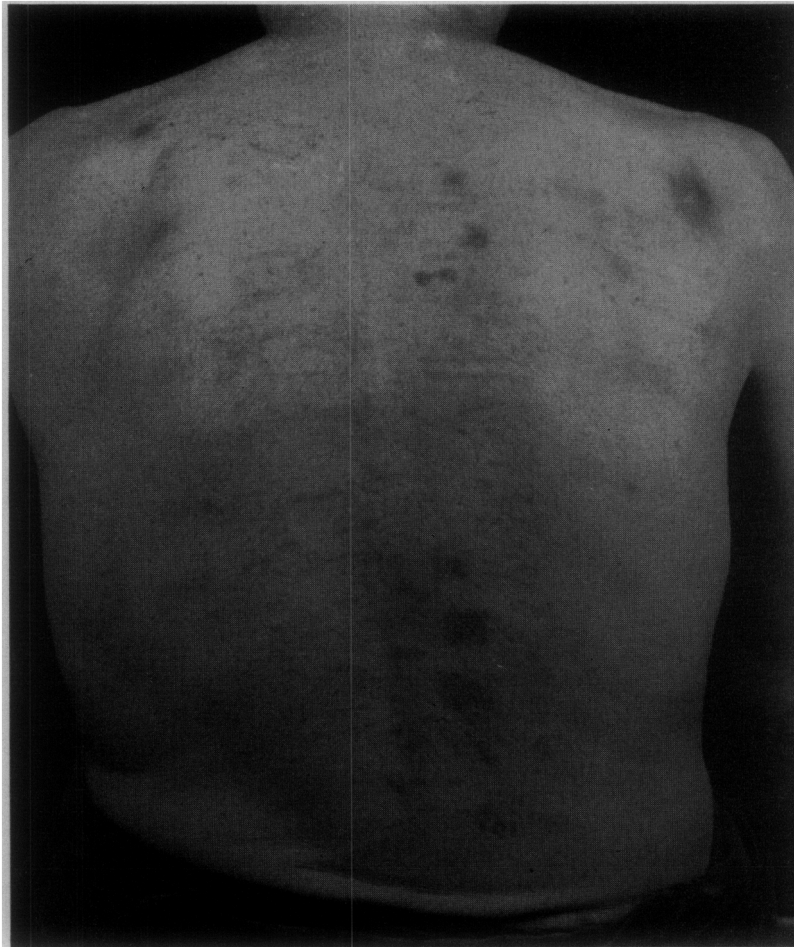


Fig. 2.—Case 2, A. M. Patch test reactions. *Upper left:* tree pollen oils. *Upper right:* Butesin picrate and paraphenylenediamine. *Lower right:* para red dyes.

dilutions. This was done and the patient was discharged, after being instructed in the technique of taking the extract. It was seen that he could tolerate the 1:500,000 dilution orally without reaction. He was to start with one drop of the 1:500,000 material on a cracker with meals once daily, building up gradually in the usual manner to fifteen drops and working up through the various dilutions to a maintenance dose of the highest dilution tolerated. He reported by

letter in June, 1953, that he had tolerated his medication initially, but that six drops of the 1:5,000 material had caused a breaking out of his skin in the same area as before. He discontinued the plant oil and his skin cleared. His extract was diluted tenfold and he resumed the oil after reassurance. He reported in November, 1953, by letter that his skin again had flared, and he would not continue the treatment in spite of our entreaties. His local physician prescribed treatment which cleared his lesions initially, but subsequently he has had intermittent and persistent flare-ups of dermatitis. He was seen again in March, 1954, with a generalized vesicular, weeping, erythematous dermatitis which was felt to be due to the application of several proprietary remedies. Skin biopsy showed hyperplasia of the epidermis with some increase in keratin and increase of melanin in the basal layer. He was discharged in April, 1954, considerably improved.

The third case was that of a 65-year-old retired policeman who previously had a diagnosis, made in 1951, of plant oil contact dermatitis from ragweed oil and *Leptilon canadense* (mare's tail). His history extended over twenty years. Dermatitis of the face, arms, hands, and legs began each year in the last two weeks of August and cleared by frost. The skin lesions were typical of plant oil dermatitis, with a vesicular, pruritic, erythematous rash located over the exposed areas. Relief was obtained by his remaining in the basement. Patch tests to the sap of stems, leaves, and pollen oil of ragweed and mare's tail, both of which were observed near his home, were positive, showing vesiculation. Oral desensitization to these plant oils was begun in May, 1951, and was progressing satisfactorily. He could tolerate mare's tail in a concentration of 1:1,000 and

TABLE II. PARTIAL LIST OF PATCH TESTS APPLIED TO PATIENT 3, MR. E. P.

MATERIAL	DILUTION	RESULT
1. Maple pollen oil	1:100 in olive oil	++++
2. Poplar pollen oil	1:100 in olive oil	++++
3. Box elder pollen oil	1:100 in olive oil	++++
4. Ash pollen oil	1:100 in olive oil	++++
5. Elm pollen oil	1:100 in olive oil	++++
6. Oak pollen oil	1:100 in olive oil	-
7. Cedarwood oil	1:100 in olive oil	-
8. Birch pollen oil	1:100 in olive oil	-
9. Ragweed oil	1:100 in olive oil	++++
10. <i>Leptilon canadense</i> oil	1:100 in olive oil	++++
11. Olive oil (control)	1:1	-

Scratch and intradermal tests with the defatted (protein) portion of the pollens listed above were all negative.

ragweed oil in 1:100, but more concentrated extract caused dermatitis. In January, 1952, his skin was completely clear and he was taking his plant oils. He had done quite well, reporting the "best fall I've had in twenty years." However, in the spring of 1952, on May 1, he reported that he was having a flare-up of his dermatitis "out of season," which had started on April 14. Although he had been on a well-tolerated maintenance dosage of ragweed and mare's tail, this was discontinued. His symptoms did not abate. It was noted that he had severe vesicular erythematous dermatitis of the exposed areas, particularly his face and cheeks. He was treated with Phenergan, 12.5 mg. twice daily, and

Wise's shake lotion in 40 per cent peanut oil. By the first week of May he had begun to improve and finally his skin cleared. His oral desensitization was resumed. He did well through the fall and winter of 1952 and 1953, taking maintenance dosage up to 1:1,000. Between April 1 and April 14, 1953, he had a flare-up of dermatitis, starting on the legs below the knees. The face, neck, and hands were also involved. He was patch tested to tree pollen oils (Table II). Positive reactions were seen to pollen oils of elm, maple, poplar, box elder, and ash (Fig. 3). Scratch and intracutaneous tests with the protein extract of the

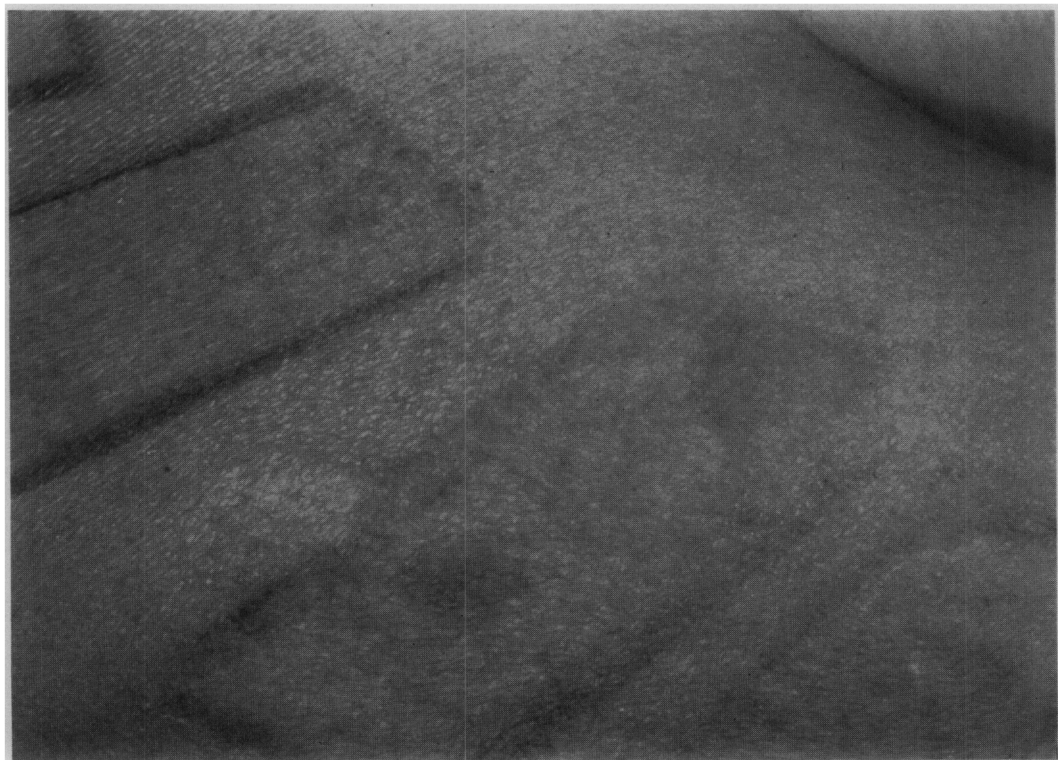


Fig. 3.—Case 3, E. P. Positive patch test reaction to tree pollen oil.

tree pollens were negative. He then was treated topically with Wise's shake lotion and cortisone, 100 mg. orally per day. Cortisone was tapered off rapidly because of a coincident hypertension. The skin cleared with this treatment by mid-May. Oral hyposensitization was begun on June 24, 1953, in a manner described in the first case, to equal parts of maple, poplar, ash, and elm. By the seventh dose he had a mild flare-up, but the program was resumed at a lower dosage level. At present the patient is on a maintenance dose of 1:500 dilution of the tree oils. If he increases dosage above seven drops of 1:50 the skin flares.

DISCUSSION

Contact dermatitis due to the ether-soluble portion of tree pollen oil is a very unusual condition. Of necessity, it would have to be a seasonal entity at first,

since the offending pollen is in the air for relatively short periods of time, a specific type being recorded in terms of days and weeks. It would be expected that the skin should clear after spring pollination was ended and remain so until the following season. The exposed areas of the skin would be involved, and the lesions would be expected to be indistinguishable from other types of dermatitis venenata. This was the case in the patients presented here. Positive patch test reactions to the tree pollen oils were observed, but there was no evidence clinically of sensitivity to tree pollen through inhalation. Patient A. M., described in this report, did complain of itching eyes with his dermatitis. Skin tests to the aqueous pollen extracts by scratch and intracutaneous methods did not confirm protein sensitivity. Careful trial of hyposensitization with the pollen oil is worth trying if symptomatic treatment is not adequate.

SUMMARY

1. Pollen oil dermatitis is a recognizable entity. Dermatitis venenata due to tree pollen oil appears to be extremely rare.

2. Two cases of dermatitis venenata are reported, and observations are made on a third case in which the symptoms occurred coincident with the tree pollination period in Michigan. These patients had typical lesions of plant dermatitis on the exposed areas of their skin. The two patients tested gave positive patch reactions with the ether-soluble fraction of the tree pollens.

3. Oral hyposensitization with pollen oil caused an exacerbation out of season in the dermatitis of both patients, causing one patient to discontinue treatment. The second person treated by oral hyposensitization to tree pollen oil now is tolerating it well.

4. Testing for possible sensitivity to plant pollen oils in dermatitis venenata might well include representatives of tree pollen oils.

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