

# Learning from the Legacy of Léopold Trouvelot

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**M**ANY OF OUR MOST IMPORTANT INSECT PESTS originated in other countries and were accidentally introduced to the United States. Usually, these exotic pests simply appear in an area, and it is difficult to determine exactly how they arrived here.

The gypsy moth, *Lymantria dispar* (L.), is unusual in this regard, and there is a rather precise history of its introduction to North America (Forbush & Fernald 1896). This insect is one of the most important forest pests in the United States. It has defoliated millions of acres in the northeastern United States and considerable effort has been exerted both to eradicate new populations and to manage established populations. The gypsy moth is established in all of the northeastern states and is currently expanding its range into Ohio, West Virginia, Virginia, and North Carolina as well as Michigan. Small, isolated populations have been found recently in the Pacific Coast states. The history of gypsy moths in North America began one summer day in 1868 or 1869, when several insects escaped out the window of the Medford, Mass., home of Étienne Léopold Trouvelot.

Trouvelot was born Dec. 26, 1827, in Aisne, France. Little is known about his life in France, although he apparently was politically involved as a Republican. He fled the country in 1852 when Louis Napoleon rose to power in the coup d'état (Hoffleit 1976, Herman & Corbin 1986). In 1857 Trouvelot took up residence with his wife and two children in a new home at 27 Myrtle Street in Medford. The deed for the house shows that he purchased it from the builder for \$1,100. His neighborhood was a typical middle-class Boston suburb, home to many successful working-class emigrants.

Trouvelot supported himself as an artist although he had a strong amateur interest in the sciences. He was an active member of the Boston Society of Natural History. He seemed particularly fascinated with the biology and culture of silkworms (Verrill 1865, Trouvelot 1868). Through much of the nineteenth century, many Americans promoted silk culture as a scheme for achieving great wealth (Whitmarsh 1839, Bamford 1886, Cherry 1987). Trouvelot, in an entrepreneurial spirit, believed it possible to capitalize on this market using giant silkworms native to North America. He compared



Étienne Léopold Trouvelot, artist, entomologist, and astronomer. Photograph courtesy of Mary Lea Shane Archives, Lick Observatory.

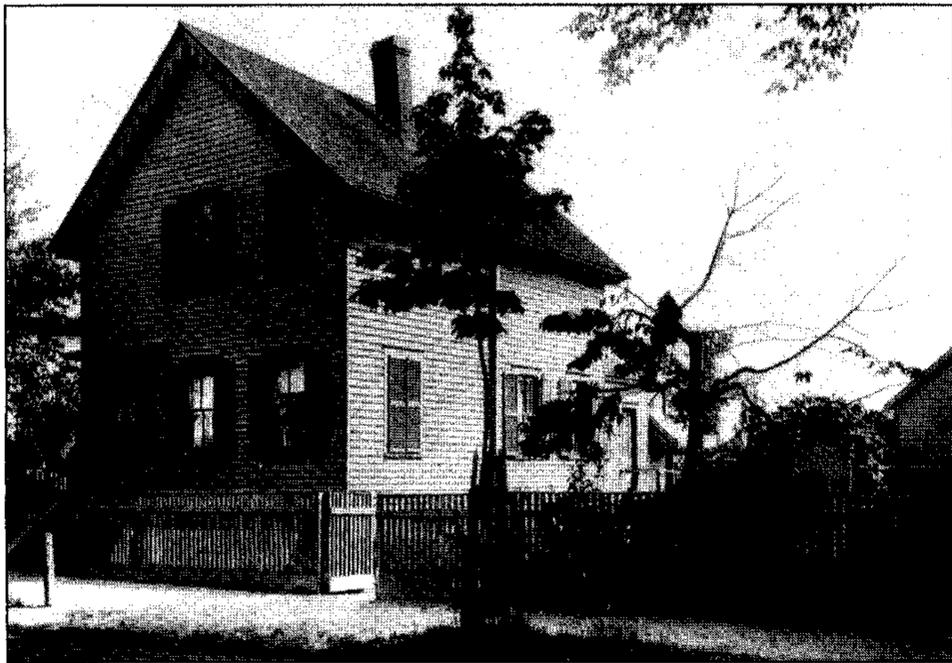
the qualities of silk produced by a variety of native North American silkworms and concluded that *Antheraea polyphemus* (Cramer) showed the greatest possibilities for commercial silk production. This species occurs throughout the United States and southern Canada, feeds on several hardwood tree species, and is reported to produce a very high quality silk (Trouvelot 1868, Baker 1972).

From 1860 until at least 1868, Trouvelot developed techniques for mass rearing *A. polyphemus*. Although he did experiment with rearing larvae on cut foliage, his greatest success came from rearing insects on living saplings. At the peak of his operation, he reportedly had more than a million larvae under culture in a five-acre wooded area behind his house (Trouvelot 1868). Predation by birds upon larvae was a serious problem dealt with by covering the entire area with nets and killing any birds that succeeded in penetrating this barrier (Samuels 1870).

Toward the latter part of the 1860s Trouvelot returned from a trip to Europe with a shipment of live gypsy moth eggs. Howard (1930) stated that Trouvelot was attempting to cross gypsy moth with silk-producing species to develop a strain resistant to the protozoan disease, *Nosema bombycis*, which had decimated the silk industry in much of Europe (Leggett 1949). In 1868 or 1869, several of Trouvelot's gypsy moths escaped the room in which he was culturing them in his house. He was quite upset about the incident and "publicly" announced it (Forbush & Fernald 1896, Howard 1930). We do not know whether he actually contacted any government officials, but within a year, many prominent entomologists, including Charles Valentine Riley, had been informed (Forbush & Fernald 1896).

It wasn't until about 10 years later that the new population of gypsy moths reached defoliating densities in Trouvelot's neighborhood, and many of his neighbors were quite displeased with the in-

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*The Trouvelot house at 27 Myrtle Street, Medford, Mass., as it appeared in 1895. Photograph from Forbush and Fernald (1896).*

sects' presence (Forbush & Fernald 1896). As the outbreak grew, state officials became concerned, and in 1890 a large-scale eradication effort was mounted. This program, as well as several that followed, failed and the range of the gypsy moth continues to spread



*The Trouvelot house as it appears today. Photograph by A. M. Liebhold.*

to this day. It has been pointed out that the vast harm caused by gypsy moths might have been averted by a more expedient response to this quarantine incident (Dunlap 1980).

Trouvelot's loss of interest in entomology must have occurred

shortly after the time of the accident, because there is no record of any further work by him. This suggests that he realized the severity of the accident.

In 1870 Trouvelot observed several spectacular auroras and thus began his new scientific passion: astronomy. He was a talented artist, and he impressed astronomers with his vivid illustrations. In 1872 he was invited to join the staff of the Harvard College Observatory. He produced hundreds of celestial illustrations for the Harvard Observatory and at the U.S. Naval Observatory. He became particularly famous for his drawings of the planets and sun (Herman & Corbin 1986). Moreover, he was clearly a successful astronomer: He published more than 50 scientific papers, he won the French Academy's Valz prize, and a lunar crater was named in his honor. It is interesting that he returned to live in France to work at the Meudon Observatory in 1882, about the same time that gypsy moth populations erupted in Medford.

Trouvelot died April 22, 1895, in Meudon, France. He left behind

a legacy as an outstanding astronomer and a less competent entomologist. There is reason to suspect he might have contributed a great deal to entomology had his career not taken such a disastrous turn. Verrill (1865) wrote about Trouvelot's research with silkworms: "The thanks of the country are due to the ingenious and persevering author of this successful attempt to introduce a new and interesting field for industry and enterprise, which cannot fail to be a source of profit to those who intelligently engage in it, and of increased wealth and prosperity to the people, should it be developed to the extent that now seems possible."

It was only one act of poor judgment that left the United States with one of its worst pest problems. In his defense, the potential for damage from exotic pests was not fully understood in Trouvelot's time. Many other pest animals and plants were carelessly moved between continents, often intentionally. Furthermore, regulatory agencies, such as USDA's Animal and Plant Health Inspection Service had not yet been established.

Perhaps Trouvelot's experience can still serve as a lesson to contemporary scientists. The incident showed that even competent scientists can have accidents that cause catastrophe for subsequent generations. Many experiments currently being conducted with genetically engineered organisms hold great promise for advancement. Yet there is still some uncertainty about unknown detrimental effects of escaped organisms. Trouvelot's experience shows us that when such uncertainty exists, it is worth while to take every precaution to guard against accidental introductions. ■

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