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DOCTOR ELIAS FRANCIS SHIPMAN AND THE HOOSIER FROG

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ABSTRACT. The holotype of the Hoosier frog (*Rana circulosa*), now the northern crawfish frog (*Lithobates areolatus circulosus*), is an important museum specimen with minimal documentation. Its exact collection locality and date are unknown. The specimen is the earliest and northernmost Indiana record, and the sole known individual from Benton County. Our investigation of Elias Francis Shipman, the man who collected the holotype, provides some resolution on the holotype's provenance. Shipman was a native Hoosier with family ties to Benton County. He attended Northwestern University, graduated with a medical degree, and set up medical practice in Remington, Indiana. As an undergraduate he collected both zoological and botanical specimens, but mostly botanical. A sufficient number of his botanical specimens exist in herbaria databases to reveal a collecting pattern. Biographical and botanical data indicate that the frog was collected in summer or fall 1876. While unable to determine an exact collection locality within Benton County, areas near Shipman family farms in Grant and Gilboa townships are strong possibilities. These conclusions may change if a different collecting pattern emerges when more of Shipman's herbarium becomes available for analysis. The biographical information on Shipman suggests a date range of 1872–1885 for his undated plant specimens and provides an opportunity to update plant collector databases. Shipman's previously unrecognized contributions to Indiana natural history are worthy of note.

Keywords: *Lithobates areolatus circulosus*, Hoosier frog, northern crawfish frog, Benton County Indiana, E.F. Shipman

INTRODUCTION

Museum specimens are critical to the study and understanding of biodiversity. However, specimens with limited documentation leave gaps in our knowledge. The holotype of the Hoosier frog (*Rana circulosa*), now the northern crawfish frog (*Lithobates areolatus circulosus*) (Fig. 1), is one such specimen – historically and currently important, but with minimal documentation. Its collection locality is documented only to the county level and its collection date is currently estimated at pre-1879 (Engbrecht & Lannoo 2010). *Lithobates areolatus* is an Indiana endangered species, with isolated populations in the southern half of Indiana (Engbrecht et al. 2013). Shipman's specimen is the northernmost and earliest record for the species in Indiana, and the sole Benton County record (Engbrecht 2010; Engbrecht & Lannoo 2010). Our goal was to learn more about the provenance of the holotype by learning more about its collector, E.F. Shipman (Fig. 2).

Using historical and genealogical research methods and sources, and herbarium records, we have constructed the story of a Hoosier naturalist whose legacy is more than a significant frog specimen. During his short life, Shipman assembled an herbarium of over 2,000 plants (Northwestern University Museum of the College of Liberal Arts 1893). Some of Shipman's botanical specimens are extant in museum collections and have contributed to botanical research, even though many of his plant specimens are as cryptically documented as his frog. Understanding Shipman's Benton County ties, his pattern of Indiana collecting, and the natural history, topography and settlement of Benton County in the late 1870s, offer useful clues on the provenance of the Hoosier frog holotype. Evidence supporting a collection year and possible collection localities are presented. A year range is offered that can be used to date undated Shipman herbarium specimens to enhance their scientific value.

EARLY DOCUMENTATION FOR THE 'HOOSIER FROG' HOLOTYPE

Shipman deposited his frog specimen in the collection of the Northwestern University Museum

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Figure 1.—Holotype of *Lithobates areolatus circumlosus*, Chicago Academy of Sciences (CA 160). (Photo by Alan Resetar.)

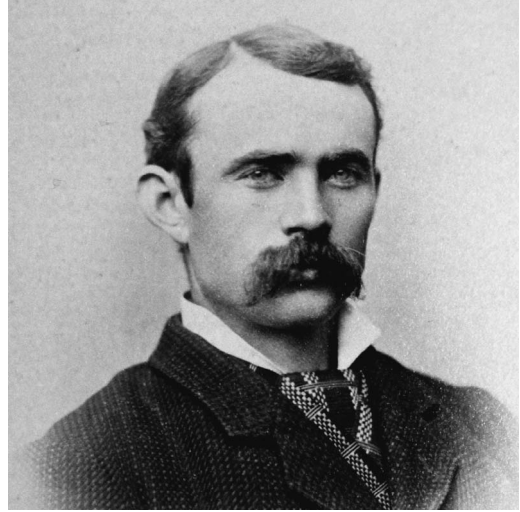


Figure 2.—Elias Francis Shipman, circa 1880. (Original photo attributed to Alexander Hesler. Courtesy of Northwestern University Archives.)

of Natural History in Evanston, Illinois (Northwestern University Museum of Natural History 1883). In February 1931, the specimen was transferred to the Chicago Academy of Sciences and is currently listed in their catalog as CA 160. The original Academy catalog and the current jar label with the preserved frog have “northern Indiana” as the locality, but the Academy database indicates Benton County, Indiana, as the locality. The original specimen tag that read “Benton County, Indiana” (Minton 1972, p. 119) no longer exists. The Academy catalog record indicates Shipman as the collector.

Frank Leon Rice and Nathan Smith Davis, Jr. (Figs. 3 & 4) first described Shipman’s specimen as the Hoosier frog (*Rana circulosa*). Their original description appears in the addendum to the second edition of David Starr Jordan’s *Manual of the Vertebrates of the Northern United States* (1878). Jordan’s text concerning *R. circulosa* is “abridged from Mr. Rice’s Notes” (p. 355). Unfortunately, Rice’s notes have not been found in the Jordan archival collections at Indiana University or Stanford University, or in the archives at Butler University, where Jordan was teaching when he wrote the second edition. A few years after the original description was published, Davis & Rice (1883a) designated it as *Rana areolata circumlosa*, a subspecies of the crawfish frog.

Jordan (1878) credits Rice and Davis for the original description and acknowledges Shipman as the “discoverer” but not necessarily the collector. However, Davis & Rice (1883a) do specifically acknowledge “Mr. E.F. Shipman” as the collector. Minton (1972) makes a simple mistake when he credits Rice and Davis as the collectors. This error was not repeated in Minton’s second edition (2001).

Authors are careful to note 1878 as the year of description, but not as the collection date. Altig & Lohofener (1983) give the collection date as “unknown.” Engbrecht & Lannoo (2010) give pre-1879 for a collection year and 1878 as an estimated date for the most recent county record. The original Northwestern University Museum of Natural History catalog is missing. Museum reports remain, but none were generated after June 1874 until 1883. The June 1874 Museum report lists only a water bug (*Belostoma haldimani*) donated by E.F. Shipman (Marcy 1874). This suggests that Shipman was just beginning to engage in natural history collecting, and had not yet collected the frog. The 1883 Museum report lists donors since 1874, with this entry on page 16, “Shipman, E.F. Ethnological specimens, A large collection of plants (deposited), *Rana circulosa*, R. and D. (type, see Jordan’s Manual of Vertebrates, p. 355) (deposited), Other zoological specimens” (Northwestern University Museum of Natural History 1883). This entry narrows the collection time window



Figures 3 & 4.—The original description of the Hoosier frog was written by Shipman’s classmates, Frank Leon Rice and Nathan Smith Davis, Junior. 3. Left. Rice, circa 1881. 4. Right. Davis, circa 1880. (Original photos attributed to Alexander Hesler. Courtesy of Northwestern University Archives.)

for CA 160 to between July 1874 and 1878, the year it was described.

HISTORY OF THE TYPE LOCALITY CONTROVERSY

Shipman’s specimen, as the only Benton County record and the northernmost Indiana record (Engbrecht 2010), gave rise to a controversy surrounding the validity of the type locality (Stejneger & Barbour 1943; Mittleman 1947; Schmidt 1953; Minton 1972; Harding 1983). Minton (2001, p. 135) alludes to the question surrounding the Benton County locality when he writes, “This frog was described from Benton County, Indiana, in 1883. While it has not been recorded from there since, the record is probably valid. I have taken specimens within thirty miles of the southern boundary of the county.” Minton is referencing specimens from Vermillion and Fountain counties (Minton 1998; Engbrecht & Lannoo 2010) to support the validity of Benton County as the type locality. Minton’s reference to the 1883 date is curious, since he does not include an 1883 publication in his bibliography, but he is likely referencing Davis’ and Rice’s enhanced description of the frog (1883a).

Confusion over the type locality begins with Stejneger & Barbour (1943) who give “northern” Illinois as the type locality without explanation.

Mittleman (1947) points out Stejneger’s and Barbour’s error in rejecting Benton County as the type locality. Nevertheless, Schmidt (1953, p. 78) restricts the type locality to the “vicinity of Olney, Richland County, Illinois.” Smith (1956) follows Schmidt. Neill (1957, p. 140) criticizes Schmidt for revising “numerous type localities and overlooking previous and different revisions,” although he does not specify the northern crawfish frog holotype in his critique. As noted above, Minton (1972) corrects Schmidt and cites the original specimen tag. Harding (1983) repeats the Illinois type locality error, in the same year that Altig & Lohofener (1983) summarize the debate and support Benton County, Indiana, as the valid type locality, and E.F. Shipman as the collector. Frost (2014) and Fouquette & Dubois (2014) also note the errors and provide summaries of the type locality issue.

WHO WAS E.F. SHIPMAN?

Family and early life.—Elias Francis Shipman was a rural Indiana boy from humble beginnings. He was born in Indiana in 1851 or 1852 (U.S. Census 1860. Indiana, Montgomery Co.), the eighth child of Joseph and Mary Ann Wine Shipman. Joseph Shipman was a farmer and a carpenter (U.S. Census 1850. Indiana, Cass Co.; Iowa State Census 1856. Davis Co.). Elias’s

Table 1.—Location of Elias Francis Shipman's adult relations in the 1870 and 1880 U.S. Censuses, the time period critical to the collection of the holotype of *Lithobates areolatus circulosus*. Some relatives are missing from one or both censuses.

Name	Relationship to E.F. Shipman	1870 U.S. Census	1880 U.S. Census
Sara Johnson Hayes	Half-sister	Benton Co., Grant Twp.	Warren Co., Pine Twp.
Elizabeth Johnson Baldwin	Half-sister	Benton Co., Grant Twp.	Moved to Illinois in Feb 1880
James Scott Shipman	Brother	Benton Co., Gilboa Twp.	Benton Co., Gilboa Twp.
Daniel Shipman	Brother	Benton Co., Gilboa Twp.	Deceased (Died July 1879)
Abigail Shipman Steffey	Sister	Newton Co., Iroquois Twp.	Benton Co., Center Twp.
George C. Shipman	Brother	Newton Co., Iroquois Twp.	Montgomery Co., Wayne Twp.
Henry Milton Shipman	Brother	Newton Co., Iroquois Twp.	Jasper Co., Newton Twp.
William Marshall Shipman	Brother	Unknown	Unknown
Nancy Shipman Ogburn	Sister	Unknown	Warren Co., Pine Twp.
Sara Baldwin Royalty	Niece	Benton Co., Grant Twp.	Deceased

extended family included Mary Ann's three children by her first husband. The ninth Shipman child was born in October 1853, and both mother and infant died in December of that year. Two months after the death of his mother and infant brother, the oldest child, Elias's half-brother, died at age twenty-five (Brown n.d.).

By 1856, most of the remaining extended family, except Elias, were living in Davis County, Iowa (Iowa State Census 1856. Davis Co.). The family oral history handed down to Shipman genealogist Marvin Ogburn (Pers. Comm.), is that the wagons were full and everyone had to walk to Iowa. Elias was left behind, presumably because there was no one who could care for him on the journey. His two married half-sisters had to carry their own toddlers. If the adolescent Shipman boys had to help with the wagons and stock, only one teenage daughter was available to care for the three younger children who did make the trip. Elias was left with a neighboring farm family in Coal Creek Township, Montgomery County. There he lived and attended school (U.S. Census 1860. Indiana, Montgomery Co.). His father enlisted in the Union Army and died of disease in 1864 at the age of fifty-seven (Iowa Adjutant General 1910). By the time he was thirteen, Elias was an orphan.

Around 1861, Elias's half-sister Elizabeth Johnson Baldwin returned to Montgomery County. The family story (Ogburn, Pers. Comm.) is that she retrieved Elias upon her return to Indiana and raised him along with her two daughters, who were about his age. In

1862, Elizabeth Baldwin's husband bought a tract of land in the northeast corner of Benton County in Gilboa Township (Indiana. Benton County. 1862. "Deed Books"). Between 1867 and 1870, the Baldwins sold their Gilboa Township land, purchased land in southern Benton County in Grant Township along the border of Warren County, and moved there (Indiana. Benton County. 1867, 1868. "Deed Books"; U.S. Census 1870. Indiana, Benton Co.).

Although Elias's very early childhood was spent in Montgomery County, he had a number of family ties to Benton County and the surrounding area. In 1870 and 1880, Elias's siblings were living in the Indiana counties of Benton, Jasper, Montgomery, Newton, and Warren (U.S. Census 1870. Indiana; U.S. Census 1880. Indiana). The known whereabouts of Elias's adult relations in the 1870 and 1880 censuses (Table 1) may be relevant to the collection of the frog and Shipman's Indiana herbarium specimens.

Elias is missing from the 1870 census index; his precise whereabouts that year are unknown. While there is no reason to doubt the oral tradition that Elias lived with the Baldwins in Benton County (Ogburn, Pers. Comm.), no records have been found to verify this. Elias's undergraduate student records at Northwestern University, Evanston, Illinois, list his hometown as Zionsville, Boone County, Indiana (Northwestern University 1873, 1874, 1876, 1877, 1878, 1879, 1880 Catalogue). Elias must have lived in Zionsville sometime before attending Northwestern to consider it his hometown,

Table 2.—Number of Shipman plant records by year, month, and locality. The records show that Shipman did most of his collecting in Illinois, except for the summer and fall of 1876, when he collected in Indiana.

Year	Month	State/Province	Localities	Number of plant records
1872	<i>unknown</i>	IN	Newton Co.	1
1875	May-Aug	IL	Cook Co.	34
1875	Sep-Oct	IL	Cook Co.	16
1876	Apr-May	IL	Cook Co.	7
1876	June	ONT	Niagara Falls	1
1876	June	IN	<i>unknown</i>	1
1876	June	IN	Hamilton, Marion Cos.	3
1876	July	PA	Elm Station	2
1876	July	IN	<i>unknown</i>	1
1876	July	IN	Boone, Clinton, Hamilton, Jasper, Newton Cos.	9
1876	Aug	IN	Benton, Warren Cos.	6
1876	Sep	IN	Jasper, Newton, Warren, White Cos.	10
1876	<i>unknown</i>	IN	Hamilton Co.	1
1876	<i>unknown</i>	IN	W. Ind.	1
1876	<i>unknown</i>	MI	<i>unknown</i>	1
1877	May-July	IL	Cook Co.	4
1878	May-Aug	IL	Cook Co.	9
1878	<i>unknown</i>	IL	Cook Co.	3
1879	July-Sep	IL	Cook Co.	6
1880	<i>unknown</i>	TN	Franklin Co.	2
n.d.	<i>unknown</i>	IL	Cook Co.	20
n.d.	<i>unknown</i>	IN	Hamilton Co.	1
n.d.	<i>unknown</i>	IN	Marion Co.	2
n.d.	<i>unknown</i>	IN	White Co.	2

but his living situation and activities there remain a mystery.

Undergraduate years and plant collecting.—When Elias Francis Shipman left Northwestern University, he donated “a large herbarium” to their Museum of Natural History (Northwestern University Museum of Natural History 1886, p. 21). In a later report, his herbarium was described as “a collection of at least two-thousand specimens” assembled when he was a student (Northwestern University Museum of the College of Liberal Arts 1893, p. 6). He also donated zoological and ethnological specimens (Northwestern University Museum of Natural History 1883). Between 1930 and 1933, Northwestern dispersed its museum collection (Northwestern Daily 1930 May 30; Turner 1954). No museum de-accession records are available at Northwestern. Shipman’s frog went to the Chicago Academy of Sciences, but the Academy has no other Shipman specimens listed in their database (Roberts, Pers. Comm.). About five percent of Shipman’s herbarium can be accounted for in current museum collections or through the

literature, but not his zoological or ethnological specimens. It is possible that more Shipman specimens will be revealed as museums database their collections but, for now, information regarding his collecting habits must be determined from the preserved plants available and from the details of his life. The available records (summarized in Table 2) indicate that Shipman’s collecting was done while he was associated with Northwestern. We can narrow the collection date window for the frog by knowing exactly when Shipman was away from the Evanston campus and free to collect in Indiana.

In the fall of 1872, around the age of twenty-one, Shipman began his studies at Northwestern in the Preparatory School “Selected Studies” program (Tripod 1872 Oct 21; Northwestern University 1873. Catalogue). The purpose of the Preparatory School was to groom students for college level work. The “Selected Studies” option was designed for persons who did not plan on seeking a degree, although the entrance qualifications and academic rigor were the same as for students who intended to seek a degree

(Northwestern University 1876. Catalogue). Preparatory School completion normally took three years, but students who had already completed some of the required studies were allowed to finish earlier. Shipman finished his preparatory course in two years and matriculated to the undergraduate program in the fall of 1874 (Northwestern University 1874. Catalogue).

Northwestern was a good fit for Shipman. The University's expanding natural history museum, curated by Professor Oliver Marcy, supported Shipman's affinity for botany. The original Northwestern museum collection began with donations from noted naturalist Robert Kennicott, but it was Marcy who transformed the collection into a proper natural history museum (Turner 1954; Pridmore 2000). Marcy was an active, published scientist who believed in "the importance of firsthand observation" (Pridmore 2000, p. 50). For Marcy, the museum was important to scientific pedagogy. Shipman was one of many students who contributed specimens to the museum collection during their undergraduate years.

Frank L. Rice and Nathan S. Davis Jr. were Shipman's undergraduate classmates when they wrote the initial description of the Hoosier frog. However, their backgrounds were very different than Shipman's. Rice was the son of an Evanston businessman and had an older brother who also attended Northwestern (U.S. Census 1870. Illinois, Cook. Co.; Northwestern University 1878. Catalogue). Davis was the son of Dr. Nathan S. Davis, Sr., a prominent physician, founder of the American Medical Association, and dean of the Medical College of Chicago (later the Northwestern University Medical School) (Bonner 1957). Rice and Davis were in preparatory school at the same time as Shipman (Northwestern University 1874. Catalogue), although they were about seven years younger (U.S. Census 1880. Illinois, Cook Co.). Davis matriculated to the undergraduate program with Shipman in the fall of 1874 (Tripod 1874 Oct 22). Rice matriculated in the fall of 1876 (Northwestern University 1877. Catalogue). Both Rice and Davis lived at home with their families during their college years, while Shipman first lived in Dempster Hall and later in an Evanston boarding house (Northwestern University Registrar 1877; 1878. Index Register).

The financial data in the available Registrar's records (Northwestern University Registrar 1876–1879. Index Register) support our understanding

that Shipman was a man of limited means. Undergraduate tuition was \$15 per term, with an additional \$7 per term for incidentals. Davis, as the son of a Northwestern faculty member, paid only the incidental fee. Rice and his brother paid a reduced total when both were enrolled, and later when Rice's father became disabled, but for at least one term, Rice paid the full cost. Shipman never paid more than the incidental fee, and for at least one term he paid nothing. How he qualified for his financial aid is unknown.

As undergraduates, Shipman and Davis were students in the "Classical Curriculum", which meant two years of study in Greek and Latin. Rice started out in the "Scientific and Latin Curriculum", which meant he did not have to study Greek. He eventually switched to the "Scientific Curriculum", which meant he could study a modern language instead of a classical one (Northwestern University Registrar 1874–1880. Class Roster). Other than the language requirements, the courses among these three curricula were very similar. Botany and zoology were requirements for all three (Northwestern University 1877, 1878, 1879, 1880. Catalogue).

Shipman's transition to the undergraduate degree-granting program did not go smoothly. At the beginning of the 1874/75 academic year he is listed as an incoming freshman in the class of '78 (Tripod 1874 Oct 22). In the 1875/76 catalog, published at the end of the academic year, he is listed as a sophomore but a dagger next to his name indicates that he was not on campus (Northwestern University 1876. Catalogue). He is also absent from the Registrar's record for 1876 (Northwestern University Registrar 1876–1879. Index Register). There is no mention of Shipman in the campus newspapers for 1875 or 1876. Early in 1877, he is mentioned in the campus newspaper *Freshman Brevia* column (Tripod 1877a Jan 25) and again in the *Personals* column as joining the class of '80 (Tripod 1877 Feb 22). At the end of the 1876/77 academic year, he is listed in the catalog as a freshman again (Northwestern University 1877. Catalogue). The Registrar's records confirm his return to campus in January 1877 (Northwestern University Registrar 1876–1879. Index Register). His undergraduate career proceeded without interruption after January 1877, and he earned his A.B. degree in June 1880 (Vidette 1880 Jun 24).

The 1875/76 break in Shipman's undergraduate career is significant to possible collection dates for the frog. Based on Shipman's available

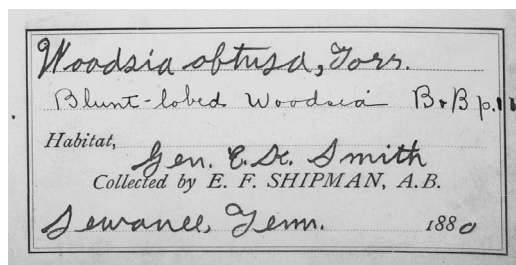


Figure 5.—Shipman's personal herbarium label used after earning his A.B. degree in June 1880. This label is on FMNH 1430010. (Courtesy of the Field Museum of Natural History.)

herbarium records, he was collecting plants in Evanston during the fall of 1875 and the spring of 1876, even though he was “not on campus.” His plant records make it clear that he spent at least part of the summers of 1875, 1877, 1878 and 1879 in Evanston, even though there were no summer classes. The only time he did extensive plant collecting in Indiana was during the summer and fall of 1876. Later in the paper, we strengthen our argument that this is when he collected the frog.

Rice and Davis also had breaks in their undergraduate programs. Davis left campus for a trip to South America from January to June 1877 (Tripod 1877b Jan 25; 1877 Jun 28). Like Shipman, missing two terms put Davis back. Instead of graduating in 1878, he graduated in 1880 with Shipman (Vidette 1880 Jun 24). While Rice was on campus every term, he changed his curriculum and had to return to the preparatory school coursework his sophomore year (Northwestern University 1879. Catalogue). He earned his undergraduate degree in 1881, a year after Shipman and Davis (Northwestern Daily 1881 Jul 8).

While Shipman's natural history interest was botany, Rice and Davis focused on zoology. This may explain why Rice and Davis wrote the description of the Hoosier frog instead of Shipman. The specimens Rice donated to the Northwestern Museum included insects, bird eggs, and bird and mammal skins (Marcy 1874; Northwestern University Museum of Natural History 1883). Davis donated specimens of insects, crabs, fish, lizards and snakes, many of which were collected on his South American trip (Northwestern University Museum of Natural History 1883; Northwestern University Museum of the College of Liberal Arts 1893).

As an undergraduate, Shipman put his botanical skills to work on behalf of his fellow students. He worked with a local merchant to print a standardized set of botanical labels that students could purchase to help them complete their herbarium assignment (Tripod 1879 May 16). As a senior, he tutored the sophomore botany students and the student newspaper acknowledged his expertise, “The botanists have kept Shipman well occupied the past week. ‘Shippy’ is a necessity to the students, and should be given the chair of Botany.” (Tripod 1880 Jun 18, p. 106). Whether he wanted the job or not is unknown, but Shipman did not become the chair of botany.

Life after 1880.—After graduating, Shipman had new personal herbarium labels printed with his degree (Fig. 5), suggesting that he intended to continue plant collecting. Thus far only two specimens have been found using this label, so we cannot determine any post June 1880 plant collecting pattern. There are only two public records that describe Shipman's activities between receiving his undergraduate degree and entering medical school. In the fall of 1880, Shipman is listed in the *Evanston Directory* for 1880–1881 as a janitor for a local church (Evanston Directory 1880). A December 1880 note in the campus newspaper suggests that he may have taught school in Illinois but outside of the Evanston area (Tripod 1880 Dec 17).

In the fall of 1882, around the age of thirty, Shipman enrolled in the Chicago Medical College, which was a department within Northwestern University. Although he had listed Zionville, Indiana, as his undergraduate hometown, he considered Rensselaer, Jasper County, Indiana, his hometown during medical school (Northwestern University 1883, 1884, 1885. Catalogue). His brother Henry had a farm in the Rensselaer area (U.S. Census 1880, Indiana, Jasper Co.), which explains Shipman's connection to Rensselaer, although we have yet to find evidence that Shipman actually lived in either Zionville or Rensselaer.

Many of Shipman's medical school classmates had preceptors who were physicians. Shipman, as a rural Indiana man without prestigious connections, had no individual preceptor; he was mentored by the entire medical school faculty (Northwestern University 1883, 1884, 1885. Catalogue). While in medical school, he worked as a laboratory assistant (Northwestern Daily 1882 Nov 16). Shipman earned an A.M.

from Northwestern in 1884 and his medical degree in the spring of 1885 (Northwestern University 1885, 1886. Catalogue).

In August 1885, Dr. Elias Francis Shipman applied for his license to practice medicine in Jasper County, Indiana (Rennselear Republican Weekly 1885 Aug 13). By December 1885, he had set up medical practice in Remington, Jasper County, Indiana (Remington News 1885 Dec 25). This was a logical place for him to locate if he wanted to stay in Indiana and be close to family. His sisters no longer lived in Benton County, but Remington lies almost halfway between his brother Henry's farm near Rensselaer and his brother James Scott's farm in Gilboa Township, Benton County (U.S. Census 1880. Indiana, Benton Co., Gilboa Twp.).

Rice went into business after graduating (Northwestern University College of Liberal Arts 1903). He collaborated with Davis on two publications (Davis & Rice 1883a, 1883b) but did no published science after that. Davis followed in his father's footsteps. He enrolled in medical school and earned both an A.M. and M.D. in 1883. His research interests turned from zoology to the field of human medicine (Northwestern University College of Liberal Arts 1903).

While Rice and Davis prospered in their chosen fields of business and medicine, Shipman simply disappears from the public record. Shipman is listed as a Remington physician in the *Annual Report of the State Board of Health for the Year ending October 31, 1885*, but he is not listed in the reports ending in October 1886 or 1887 (Indiana State Board of Health 1886, 1887, 1888). He is listed as a Remington physician in the 1886 *Medical and Surgical Directory of the United States*, but not in the 1887 *Indiana State Gazetteer and Business Directory*. He is not listed among registered physicians in Illinois (Illinois State Board of Health 1886; 1890). The *Remington News* for 1886–1890 has not been preserved, and there is no mention of Shipman in the *Rensselaer Republican* for those years. He is not mentioned in the *History of the Town of Remington and Vicinity, Jasper County, Indiana* (Royalty 1894) even though the author had been connected to the Shipman family through marriage and business interests. Shipman's residence is listed as unknown in the 1903 Northwestern alumni publication and he is listed as deceased in the 1909 publication (Northwestern University College of Liberal Arts 1903; 1909).

Shipman is not listed in any online census records after 1860, nor in any online city directory.

Inaccurate tombstone.—When, where and how Shipman died remains unknown. No death record has been found for him. He is buried in the Jordan Chapel Cemetery, Jefferson County, Illinois, next to his half-sister, Elizabeth Johnson Baldwin, but this cemetery has no early burial records or corresponding church records. His tombstone (Find-A-Grave 2012) displays his dates as 1857–1884. Clearly both dates are wrong. His mother died in 1854, so Shipman could not have been born in 1857. He was in medical practice in December 1885, so he could not have died in 1884. Charles Deam, in his list of Indiana plant collectors (1940), gives Shipman's dates as 1861 to pre-1902, but Deam's source for this information is unknown. The 1861 birthdate may be a typographical error for 1851.

WHEN COULD SHIPMAN HAVE COLLECTED THE FROG?

We have already narrowed the collection time window to between 1874 and 1878. The first date in this range is based on the Northwestern University Museum of Natural History report (1883), which lists the frog as a specimen added to their collection after June 1874. The end date, 1878, is the year the frog's description was published by Jordan. To better determine the collection year, we need to look at the frog's period of activity and compare it to Shipman's opportunities to return to Indiana from Evanston, Illinois.

It has been noted often that the northern crawfish frog is difficult to find in Indiana due to both its rarity and its secretive, burrowing habits (Blatchley 1900; Myers 1925, 1926; Smith 1956; Minton 2001; Heemeyer & Lannoo 2012; Heemeyer et al. 2012). Individual crawfish frogs show exclusive fidelity to specific burrows and typically overwinter in their primary burrows (Heemeyer & Lannoo 2012; Heemeyer et al. 2012.) The frogs are easier to locate during their March to early April breeding season, when their loud distinctive calls can be heard from a distance (Minton 2001; Karns 2003; Heemeyer & Lannoo 2012; Williams et al. 2013; Palis 2014). Shipman's only opportunity to collect the frog during any breeding season between 1874 and 1878 would have been during Northwestern's one-week "spring break" between the

second and third terms. The plant collecting data (Table 2) indicate that Shipman spent most of his time in Evanston, even in summers when classes were not in session. A brief spring break trip back to Indiana neither fits his pattern nor our knowledge that he was a man of limited means.

Eighteen seventy-eight can also be eliminated as the collecting year based the short time frame between possible collection dates and when Jordan published the description. Jordan's second edition was reviewed in July 1878 (*American Naturalist* 1878). It is clear from the review that the second edition had been published, so it was published sometime between January and June 1878. This eliminates summer or fall as possible collection times for that year. In 1878, Northwestern's spring break was March 27 to April 3, a few days later than in previous years (*Northwestern University 1878. Catalogue*, p. 91). This greatly reduces the time in 1878 for Shipman to collect the frog, for Rice and Davis to complete their description, send it to Jordan, and for Jordan to summarize and submit it to his publisher.

As explained previously, the plant collecting evidence indicates that Shipman was not actively collecting anything in 1874, and that he was in Evanston during the summers and autumns of 1875 and 1877. Jordan's comment (1878, p. 355) that the frog was "lately discovered" suggests 1876 or 1877 as the more likely collection years over anything earlier. The only time Shipman collected extensively in Indiana was the summer and fall of 1876, when the Northwestern documentation indicates he was not on campus (*Northwestern University 1876. Catalogue; Northwestern University Registrar 1876. Index Register*).

Could Shipman have caught the frog after the breeding season, despite the difficulty in finding them then? History and biography suggest an answer. Wright & Wright (1949, p. 410) describe their conversation with an Illinois farmer who "has plowed them up and cut them in plowing." In 1876, Shipman had relatives actively farming in Benton County. If he was on their farms during that summer or fall, he could have found a frog disturbed by plowing.

Another possibility is that the frog was discovered during the extensive ditching of Benton County. Ditching began in Benton County in the 1850s near Oxford (Birch 1928) and some tile drainage was used in the early 1870s near

Raub. However, use of the prairie ditching plow, starting in 1875 or 1876, allowed extensive county-wide ditching to begin in earnest (Barce 1925). This plow was a formidable ditching machine, as described below. The Biblical language at the end of the quote emphasizes the reverence with which farmland was regarded over wetlands.

"Twelve yoke of oxen were strung out in a long line. ... Following behind was a large plow equipped with a lever, cutting a V shaped ditch from two to three feet deep, from two to three feet wide on the bottom, and from four to six feet in width at the top. The dirt was pushed out on the banks by two wooden mould-boards about four feet in height and attached to the body of the plow by frames of steel. Rude as was this contrivance, it spelled the work of progress. The waters under the heavens were gathered together unto one place and the dry land appeared." (Barce 1925, p. 91–92)

If Shipman collected the frog in 1876 and brought the frog with him when he returned to campus in January 1877, it would have been in the Northwestern Museum collection and available to Davis when he returned from South America in June 1877. Davis and Rice would have had the summer and fall of 1877 to write the description and send it to Jordan in time for the early 1878 publication.

We suggest that future date references to the collection of the frog be given as "circa 1876." This is based on the evidence that 1) Shipman was not enrolled at Northwestern during the summer and fall of 1876, 2) this is when he was actively collecting plants in Benton and surrounding counties, 3) there is no evidence to date that he did major collecting in Indiana at any other time, 4) he could have found the frog outside the breeding season during plowing or ditching, and 5) this date allows sufficient time for Rice and Davis to write the description and send it to Jordan, even though Davis was out of the country for the first six months of 1877.

WHERE IN BENTON COUNTY COULD SHIPMAN HAVE COLLECTED THE FROG?

Shipman's biography in general and his plant collecting activity in particular narrow the

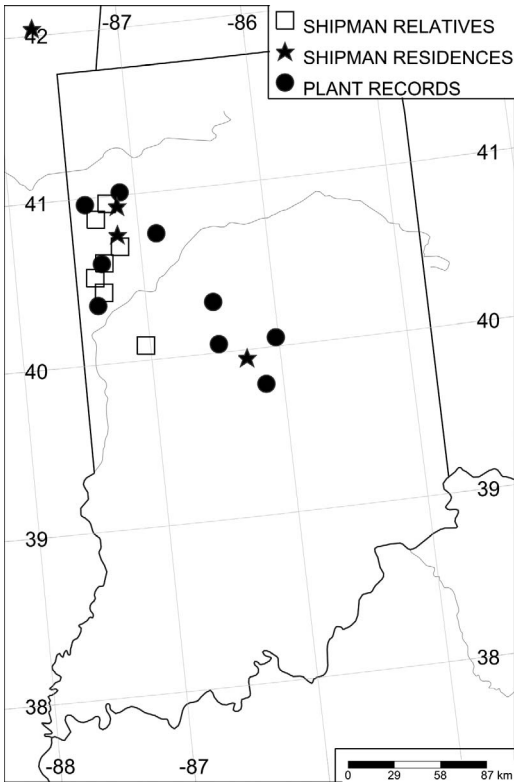


Figure 6.—Map showing Indiana localities where Shipman collected plants (Table 2), his stated hometowns, and the general areas where his relatives lived between 1870 and 1880 (Table 1). Symbols for relatives indicate township center and not exact location. Symbols for plants indicate county center, and not exact plant collection sites, which are unknown.

collection time window for the frog, but do not help in determining a more precise Benton County collection locality. His plant collecting in Indiana included the county of his undergraduate residence (Boone), nearby counties (Clinton, Hamilton, and Marion), and counties near and where his siblings lived (Benton, Jasper, Newton, Warren, and White) (Fig. 6). This distribution of the plant localities suggests that he was willing to travel to collect specimens.

The habitat requirements of northern crawfish frogs include fishless bodies of water in which to breed, abandoned crayfish burrows to shelter the adults, and “large, grassland complexes” (Engbrecht et al. 2013, p. 154). Prior to ditching, Benton County offered an ideal habitat for the northern crawfish frog. Although

it was dotted with several forest groves of oak, hickory, and walnut, Benton County was a land of tallgrass prairie. Water was not limited to the major streams or the many ponds large and small. The prairie itself was wet—very wet.

“... up to the early 70’s little had been done to render the fertile plains of Benton County fit for the plow. Sloughs and ponds abounded, filled with miasma and croaking frogs—fever and ague and malarial fevers prevailed—greenhead flies swarmed in the lowlands and in the tall bull-grass, tormenting the horses and cattle—roads wound around the bogs and marshes, and for weeks at a time, were wholly impassable—crops were precarious—often a failure. ... there was scarcely a field of twenty acres that did not border on a slough. There was no under-drainage whatever. Only the higher lands along the ridges were under a state of cultivation. Even these were seepy and wet. ... The fields, on account of the many ponds and sloughs, consisted of small patches of irregular shape. ... The ground, having but little power of absorption, could not drink up the great rains, and frequently the farmer could not get into his fields for a week.” (Barce 1925, p. 88–89)

Once railroads were built in the early 1870s, solving the problem of getting farm products to market, there was incentive to ditch and farm the prairie. Towns were platted along railroad lines and the population grew from 5,615 in 1870 to 11,108 in 1880 (Birch 1928). As noted above, ditching began in earnest around 1875 or 1876, draining the sloughs and marshes, and permanently lowering the water table (Barce 1925). The prairie ditching plow described previously was first used to ditch land in Gilboa Township just south of land owned by Shipman relatives (Barce 1925). Even large ponds were drained. Hickory Grove Lake near Fowler, one of the largest ponds at 200 acres, was drained around 1880 (Barce 1925). Most of the ponds visible on one 1876 county map no longer exist (Andreas 1968).

Biogeographical evidence that *L. areolatus* is native to Benton County is its occurrence in the watershed of the Wabash River. It appears that the Wabash River tributaries are important in the distribution of *L. areolatus* at its northern

limits in Illinois and Indiana. It occurs in the watersheds of the Embarrass and Little Wabash Rivers in Illinois, west of the main stem of the Wabash. The two northernmost Indiana records from Benton and Vermillion counties are from north and west of the main stem respectively (Engbrecht & Lannoo 2010).

The plots of Shipman land (Gilboa Township) and Baldwin land (Grant Township) are within or adjacent to the Wabash River watershed, albeit possibly in two different sub-watersheds. In the 1870s, Shipman's brothers, Daniel and James Scott, lived together in Gilboa Township on land in Section 29, T26N R6W (U.S. Census 1870. Indiana, Benton Co.; Indiana. Benton Co. 1871. "Deed Books"). Section 29 is immediately north of a major drainage divide (Blue Ridge) between Big Pine Creek which flows directly into the Wabash and the Tippecanoe River watershed (Gorby 1886). From 1867 to 1880, the Baldwins (Shipman's half-sister and brother-in-law) owned land in Section 35, T24N R9W in Grant Township (Indiana. Benton Co. 1867. "Deed Books"; 1880. "Deed Books"). This land is either in the watershed of Mud Pine Creek (a tributary of Big Pine Creek) or in the watershed of the Vermillion River, which trends west into Illinois and then south to join the Wabash River in Vermillion County, Indiana.

Given Benton County's extensive network of sloughs and marshes, Shipman's propensity to travel as indicated by his plant collections, and that he had relatives with farms at opposite county boundaries, he could have found the northern crawfish frog anywhere within the 407 square miles of the county.

Researchers generally agree that the northern crawfish frog is extinct in Benton County (Minton 2001; Engbrecht et al. 2013). Robert Brodman, Michael Redmer, and St. Joseph College students surveyed Benton County for it in 1998 without success (Brodman, Pers. Comm.).

THE VALUE OF SHIPMAN'S HERBARIUM

Museum specimens illustrate what our world was like at a given point in time. Like the Hoosier frog, some of Shipman's Indiana plants are now rare, threatened, endangered, or extirpated, including the spoon-leaved sundew (*Drosera intermedia* Hayne), Carolina bugbane (*Trautvetteria carolinensis* (Walter) Vail), running buffalo

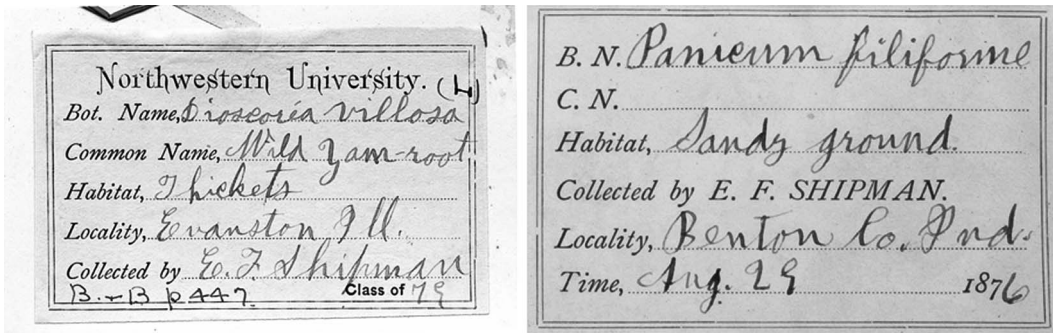
clover (*Trifolium stoloniferum* Muhl. ex Eaton), and the prairie white fringed orchid (*Platanthera leucophaea* (Nutt.) Lindl.) (Yatskievych 2000). Shipman's collecting provides valuable information on the former landscape of the Indiana Grand Prairie Region.

By modern standards, many Shipman plant specimens are not well documented. While most of his Illinois specimens have locality information to the city level, and occasionally more detail (e.g., Calvary Cemetery or Lincoln Park), his Indiana specimens have only county level localities. While this is unfortunate for our understanding of Indiana natural history, it is understandable. At the time Shipman was collecting, the Indiana prairie areas were largely featureless. Some township lines were still in flux. Benton County had few roads, only two railroad lines, and only eleven towns, all located along the railroad lines (Andreas 1968). Even today, Gilboa Township is traversed by only county roads; it has no railroad line and no federal or state highway.

Many Shipman plant specimens lack collection dates. This appears to be a factor of which label he used. The Northwestern branded labels (Fig. 7) had no space for the date. Shipman's personal labels bearing his printed name had a place for a date (Fig. 8). Fortunately, we can narrow the range of collection years for all Shipman specimens to the years he was associated with Northwestern University, 1872 to 1885. Specimens collected after June 1880 have the printed label indicating his undergraduate degree (Fig. 5). Herbarium collection managers may find one other clue on Shipman's undated labels. On one Field Museum specimen (FMNH 1430383) Shipman noted on the label that he was in the Class of '78 (Fig. 7). This specimen must have been collected in 1874 or 1875, when he was a member of that class.

In 1893, Oliver Marcy broke up a number of Northwestern student herbaria, including Shipman's, incorporating them into one large systematic herbarium (Northwestern University Museum of the College of Liberal Arts 1893; Northwestern Daily 1893 Mar 3). Duplicates were removed from the main collection, put into storage, or exchanged with other herbaria for more "desirable additions" (Northwestern University Museum of the College of Liberal Arts 1893). This explains how some of Shipman's plants ended up in other collections.

As noted earlier, we can account for only about five percent of Shipman's original



Figures 7 & 8. —Additional examples of labels on Shipman herbarium specimens. 7. Left. Northwestern University printed plant label. Shipman specimens with this label often are undated. This label on FMNH 1430383 is unusual in that Shipman noted that he was in the class of '78. This plant must have been collected in 1874 or 1875, when he was a member of that class. 8. Right. E.F. Shipman personal printed label on FMNH 1386158. Shipman was more likely to include a date when he used this label. (Courtesy of the Field Museum of Natural History.)

herbarium of about 2,000 specimens. We can identify only those specimens that are cited in the literature (Ames 1910; Pennell 1935; Steyermark & Swink 1952; Brooks 1983) or indexed by collector in online herbaria databases. Deam used twenty-two Shipman plants in *Grasses of Indiana* (1929) but does not cite individual specimens. On his maps, he indicates "NW" on the county to indicate that his locality information is based on a specimen from the Northwestern herbarium. By the time Deam wrote *Flora of Indiana* (1940), most of the Northwestern herbarium had been transferred to the Field Museum of Natural History, even though Deam did not update his maps to reflect this. Some of the Shipman grass specimens Deam used can be found in the Field Museum's database.

The Field Museum of Natural History (2012) Botany Collections Database includes a collector index and the database continues to expand. When our research began in 2011, a collector search yielded 75 Shipman plants. The same search in December 2015 yielded 135 Shipman plant specimens. A search by collector in the Harvard University Gray Herbarium database (2014) yields two Shipman specimens. The collector's web page for the University of Nebraska State Museum, Division of Botany, Bessey Herbarium (2013) includes Shipman, but so far only one Shipman plant (NEB-073271) is in their online database, which is not publically available (Labeledz, Pers. Comm.).

Marcy noted in his 1886 report (Northwestern University Museum of Natural History 1886, p. 21) that Shipman's herbarium included plants from Indiana, Tennessee, Pennsylvania, New Jersey, North Carolina, and South Carolina. Thus far, the only known Shipman specimens from outside of Illinois or Indiana were collected in June or July 1876, or after June 1880. Did he acquire these plants by exchange or purchase, or did he travel and collect them himself? If he did collect them himself, it does not change our conclusion that the Hoosier frog specimen was collected in 1876. The only Indiana specimen collected in a year other than 1876 is FMNH 1396509, an American white water lily (*Nymphaea odorata* Aiton) collected in Newton County, Indiana, in 1872. This is the earliest of all Shipman's plant records. This specimen has neither a Northwestern label nor a Shipman label; the documentation crediting him as the collector is not in Shipman's handwriting. Shipman started in the Northwestern preparatory school the fall of 1872. Did he collect the plant before attending Northwestern and bring it with him to campus, thus demonstrating an even earlier interest in botany? As herbarium databases grow, we may refine our understanding of Shipman's collecting patterns.

Museums are actively working to database their collections. The value of well-indexed accessible records cannot be overstated. As museums build their databases, the collector field should be included. Collector data can be mined for information about the person's

movements and potentially fill in documentation gaps about their specimens, as we have demonstrated with the plants collected by Elias Francis Shipman and the Hoosier frog holotype.

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