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K. Elizabeth Gibbs

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Without Benefit of Insects



**The Story of Edith M. Patch of the
University of Maine**

K. Elizabeth Gibbs

**Maine Agricultural and Forest Experiment Station
Miscellaneous Publication 763**

Without Benefit of Insects

*The Story of Edith M. Patch of the
University of Maine*

K. Elizabeth Gibbs

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About the author

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This publication is dedicated to the memory of

Geddes Wilson Simpson

who encouraged my interest in Edith M. Patch.

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CONTENTS

PREFACE	III
CHAPTER 1	I
Early Years in Massachusetts and Minnesota	2
University of Minnesota	8
CHAPTER 2	14
Entomology in Maine	14
The Maine Agricultural Experiment Station	15
Edith in Orono—Early Research and Publications	17
Graduate Work at Cornell	32
CHAPTER 3	37
Braeside	37
Aphids	40
Writings for General Readers and Children	47
CHAPTER 4	59
Post–World War I: The 1920s	59
Research and Writing for Adults	61
Books for Children	72
On Writing for Children	77
Edith in the Community	80
The Presidency of the Entomological Society of America	82
CHAPTER 5	87
Winding Down Her Research Career	87
Books for Children	89
Without Benefit of Insects	99
Edith and University of Maine Students	103
Retirement	104
CHAPTER 6	106
Retirement Years	106
Books for Children	107
Correspondence with Max Fitch	108
Travel	111
The Food-Plant Catalogue	112
Women in Entomology	114
Environmental Concerns	118
World War II at Braeside	120

Spiritual Concerns	121
The Last Years at Braeside	123
EPILOGUE	127
APPENDIX: PUBLICATIONS OF EDITH M. PATCH	131
NOTES	141

ILLUSTRATIONS

Edith Patch as a young woman	9
Holmes Hall as it looked in 1904	16
Mt. Vernon House women's dormitory	18
One of the first greenhouses at the University of Maine	20
Edith Patch and other staff in 1914	21
Maine Agricultural Experiment Station poster	24
Illustrations from "The Potato Plant Louse"	27
Illustrations of aphid wings from "Gall Aphids of the Elm"	31
Braeside	38
Insect house at the University of Maine	43
Edith Patch in 1916	46
"Burial of Cock Robin" illustration	48
Corbie Crow illustration	50
Poly, the Easter Butterfly	56
Edith Patch's office in Holmes Hall in 1926	60
Aroostook Farm in Presque Isle, Maine	62
Photograph from Edith Patch's travels in England	69
Colored illustration of the life stages of a meadow caterpillar	72
Passenger pigeon illustration from <i>Bird Stories</i>	74
Frontispiece from <i>Holiday Meadow</i>	77
Edith Marion Patch ca. 1930	82
Illustration from <i>Holiday Shore</i>	91
Photograph from a camping exploration of the Southwest	96
Edith Patch in the Southwest in 1936	97
Illustration from <i>Prairie Neighbors</i>	108
DDT trials at Aroostook Farm in 1945	119
Edith Patch and friends	125

PREFACE

MY FIRST ENCOUNTER WITH EDITH MARION PATCH, founder of the Department of Entomology at the University of Maine, was in the early 1970s, when I saw her photograph on the wall of the office of the department. I would later become a faculty member in this department, and Geddes W. Simpson, then department head, encouraged my interest in this early entomologist by occasionally leaving on my desk items related to Patch from his personal collection. In the following years, I continued to add to this miscellaneous collection with donations from various persons at the University of Maine and from the Orono–Old Town community, especially following publicity related to efforts to preserve and rehabilitate her home, Braeside, and the formation of the Friends of Dr. Edith Marion Patch to support this project. The decision to seriously pursue a study of her life and work came with my retirement from the University of Maine. The process of reviewing material associated with Patch and becoming familiar with her life made me aware of the difficulties she faced in attaining the objectives she established for herself early in life: to have a career as an entomologist, to study under John Henry Comstock at Cornell, and to write factual natural history stories for children. Realizing these objectives, as she did, required extraordinary resources of commitment, intelligence, perseverance, an agreeable personality, and an acceptance of some isolation in a profession and a society that did not readily accept professional women scientists.

Although brief biographies of Edith Patch have appeared in periodicals and collections of short pieces on the lives and contributions of early entomologists, no complete account of her life and work is available.¹ The most extensive treatment of her work is that of her role as a science and environmental educator.² My objective is to document the life and work of this entomologist, all-around naturalist, environmentalist, and author and to trace her pathway to national and international prominence.

The resources and assistance of several institutions and many individuals have helped me in this endeavor. The single most important source of material was the Patch Papers in the Special Collections Department of the University of Maine's Fogler Library, and I acknowledge with thanks the help of archivists Muriel Sanford and Desirée Butterfield-Nagy and their staffs. Most of the items in this collection appear to have been associated with Edith Patch's office at the University of Maine rather than her home at Braeside. There are no personal

journals or diaries and little correspondence with family members or personal friends. Also, there is no correspondence with her publishers although she was known to do her writing for the lay public and children at home. This suggests that this material, if it existed, may have been either dispersed or destroyed after her death or when her home was sold. A set of photographs and a collection of pottery offered for sale at an auction at this time have survived. Maxine B. Clapp and Penelope Karosch provided material from the University Archives at the University of Minnesota; Maurice J. Tauber suggested useful references at Cornell University. David L. Denlinger directed me to material in the Rare Books and Manuscript Department of the Ohio State University Libraries.

Individuals who knew Patch, Jean Burnham Adams, V. Bates, Jennie P. Boynton, Henry Briggs, Janice Fuller, Marion Hannemann, Frances Murray, Ralph S. Palmer, Samuel Ristich, Brownie Schrumph, Geddes Simpson, Charles Smith, Lucia J. Stuart, Elizabeth Tibbetts, Sarah J. Thompson, Stephen Walczak, Miriam Webster, and Betty Weeks provided interesting reminiscences. Many others provided material from family resources. Members of the Fitch family of New Sharon, Maine, early tenants at Braeside and lifelong friends; the Otto family, neighbors of Edith Patch in Orono; and the Geddes Simpson family provided especially valuable collections of memorabilia, correspondence, and reminiscences. Carolyn Benatti assisted with early library research. Mary Jo Sanger and Mary Bird generously shared the results of their research and interviews.

Barbara Harrity, editor at the Maine Agricultural and Forest Experiment Station, Barbara Wicks, Andrei Alyokhin, Harold C. Gibbs, and others patiently provided reviews and corrections for various drafts of this book.

CHAPTER I

ON THE EVENING OF DECEMBER 29, 1936, in Atlantic City, New Jersey, the annual meeting of the Entomological Society of America was drawing to a close. After enjoying the banquet, members anticipated the annual public address, which was the last item on the program. During the break between the banquet and the public address, the members were finishing conversations, discussing and evaluating research papers presented during the scientific sessions, and wondering what they would hear from the speaker at the annual public address, which was due to begin at 8 P.M. For the older members of the society, the name of the speaker, Edith Marion Patch, was familiar as that of a former president of the society and from past meetings as a presenter of papers on aphids, her specialty. If they did not recognize Patch, they may have decided that the tiny, elderly, gray-haired woman was the accompanying spouse of one of the older members. They might also have speculated about what they would hear from the speaker—what information might come from a presentation titled “Without Benefit of Insects?” The introduction of the speaker would have revealed to the uninformed that Edith Marion Patch was one of the most respected entomologists in the country, founder of the Department of Entomology at the University of Maine, an international authority on aphids and their close relatives, the first woman president of the Entomological Society of America, and a prolific writer, not only of scientific papers, but also of books on natural history topics for young people and many articles for children and adults in nationally circulated periodicals.

Edith Patch is recognized as the first truly successful professional woman entomologist in the United States. She was among the early scientists to write and speak of the threats to the environment from the widespread applications of chemical insecticides and to bring this to public attention. Her numerous technical articles appeared in *Science*, *Annals of the Entomological Society of America*, *Journal of Economic Entomology*, *Canadian Entomologist*, *Entomological News*, and Maine Agricultural Experiment Station bulletins. Her nontechnical articles for the lay reader appeared in *Natural History*, *Garden Magazine*, *Country Life*, *Atlantic Monthly Magazine*, and *Scientific Monthly*. Edith Patch was also widely recognized as a writer on natural history topics for young readers, authoring and coauthoring nineteen books and contributing chapters to other books, some of which were used in

schools. Her numerous articles for young readers appeared in *Junior Red Cross News*, *Christian Science Monitor*, *Ladies Home Journal*, *Natural History*, *Little Folks Magazine*, *John Martin's Book*, and *Atlantic Monthly Magazine*.

Early Years in Massachusetts and Minnesota

The branch of the Patch family from which Edith was descended arrived in Salem, Massachusetts, from Somersetshire, England, in 1636. Descendents of this family eventually settled in Worcester, Massachusetts. They appear to have been mainly farmers, although Edith's grandfather, William Whipple Patch Sr. (1792–1878), owned a sawmill and a gristmill in addition to his farm. Edith's father, William Whipple Patch Jr., was born in 1832. He was educated at Wilbraham Academy and Worcester Academy, and in 1854, he married Salome Jenks. Salome Jenks had also attended Wilbraham Academy and had begun teaching at the age of fourteen. William and Salome began life together on what was probably the Patch family farm in Worcester. Their first three children were born there: Fred in 1859, Florence in 1862, and William in 1864.¹

Following the Civil War, Edith's father was one of the many to respond to the lure of the free, rich land of the West, and in 1865, William, Salome, and their three young children journeyed west to take up land near New Vinton, Iowa. Two more daughters were born here, Alice in 1868 and Anetta in 1871. In 1871, the attraction of land still further west caused William to again move his family, this time to Nebraska. Many years later, at Edith's request, her brother Fred wrote an account of this time in the family's life. This document remains a poignant testament to the harsh life endured by these early settlers as seen through the eyes of a young boy. Initially, William and two other men traveled by covered wagon to locate farmland in Nebraska. William secured land in northeast Nebraska near Ponca and returned to Iowa for his family. During his father's absence, Fred, then twelve, had to assume the responsibilities of an adult in caring for his brother and sisters and the farm animals. Later he would help his father move the young family, its animals, and possessions by covered wagon to the new land in Nebraska. The family faced many hazards along the way, including prairie fires. Fred recalled that these

were common enough but we were well into the western part of Iowa when we had our only real adventure with one. The fire was racing

toward us like wild horses. The grass was tall and sheets of flame would snap off from the burning grass, leap across and set fire to the grass 20 or 30 feet ahead and start fires in advance of the main fire.... We herded the stock close up to the wagon and started a new fire to meet the oncoming flames and then drove onto the ground that our fire had burned over.²

The baby, Anetta, died of whooping cough along the way, and the family stopped briefly to bury her in a nearby churchyard. Reaching their destination in Nebraska in October, it was too late to build, so they rented a home for the winter from a young Bohemian settler who had put up a log house with one large room and two log stables:

He was a bachelor and lived with his folks. He was willing to rent but only if he might sleep there one night each month. He wanted to do that so that no one could jump his claim.... So we moved there for the winter. As I remember it we were all fairly comfortable except mother. But as I look back at it now it was a terrible winter for her. Perhaps you can picture it for yourself. A low log house with a sod roof. One room—a door on the south and a 4 foot sash and its mate (if any) on the west....Mother was not well and it was not long till she was really ill and then homesick. Almost nervous prostration and for weeks, months I think, she did not have one night of good healthy sleep. She did not complain and I think was cheery most of the time and dressed every day....When it snowed a sheet had to be fastened up above the bed so that the snow could not sift down onto their faces. Father had to make the bread and the butter and looked out for our meals. I remember that we used to box bacon fat with sorghum and make “lollypop” to spread on our bread.³

Blizzards were common and severe. Fred recounted one that almost cost his father his life:

The Müllers, our German neighbors a half mile away, were as kind as people could possibly be. Father and Mr. Mülle used to go to the timber eight miles away together for their firewood. Our supply of wood was getting low and they were to go the next morning. It was a beautiful winter morning. We were up earlier than usual and were out sliding down hill when the sun rose. Father had made us a dandy sled. But Mr. Mülle sent one of his boys down saying that he had just remembered that it was New Years Day, a holy day with them (they were Lutherans), and if father needed wood to come to his place for it.

Pretty soon the sunlight faded and without any warning except a terrible roar, one of the terrible blizzards of that winter was upon us. If Father and Mr. Mülle had started for the timber, they could never have come home.⁴

Fred went on to record that the shelter for the animals was filled with snow so deep that the cow could not stand up and had to lie down. This necessitated herculean snow-shoveling efforts. Another blizzard soon followed. For six weeks the family could not get to the nearest town and did not receive or send mail. Although William, his sons Fred and William, and daughter Alice seemed to thrive in their life as homesteaders, their mother Salome did not. Fred wrote, "Later I heard it said that Nebraska was heaven for men and horses but hell for women and oxen." He recounted going to a cemetery where there were "quite a good many graves of women and children but only three men. One of them committed suicide. One was murdered and the other man was the murderer."⁵

The following summer William planted a garden and some wheat and corn on sod ground. During the summer the family saw the sun darkened by clouds of locusts. Only a few locusts came down, but the corn crop was ruined. Salome's growing depression and homesickness led to the family's decision to return to Worcester. With fewer possessions, no cattle, and only the team of horses to pull the wagon, the return trip was much faster. They arrived in Worcester in November of 1872 to a hearty welcome. Fred's recollections tell us that the Patch family was one that cared deeply for and supported each other.⁶

In 1876, in Salem, William and Salome's last child, Edith Marion, was born on July 27. In November, their daughter Florence Eveline, age fourteen, died. In 1879, William again journeyed west, to the gold mines in Denver, Colorado, but this time he left his family behind in Worcester.

Edith's early years were happy ones as she roamed the fields around her home in Massachusetts. As the youngest child, born when her mother was forty and her father forty-four and with much older siblings, she was probably indulged by her parents and perhaps freed from house and farm chores, which allowed her to begin observing and developing an affinity with the creatures and plants of the surrounding woods and farmland:

Not far away, a brook ran between a meadow and a woodland of oak and other broad leaf trees. These were the grounds where I was content

to play.... Like most country children I had a natural interest in the little creatures I met outdoors. As a youthful zoologist, my observations were not confined entirely to birds, butterflies and squirrels. My pets included toads, dainty little green snakes and caterpillars of various sorts. Such catholicity is, I believe, normal for children who have not been influenced by the shudders of certain squeamish older persons who take pride in fastidiously shrinking from mice, spiders and other “horrible things.”

As for plants, they were quite as exciting in their way. Perhaps my earliest bit of “research” was a serious minded investigation in plant flavors, my curiosity having been stimulated by surprising tastes of certain fruits, stems, and leaves. It seemed necessary to ascertain which plants had pleasing savors as did young checkerberry leaves and the bark of black birch: what other plants were as sour as rhubarb and sorrel; whether there was anything more bitter than dandelions: which plants caused smarting like water-pepper,—and so on. Fortunately, I was sufficiently warned against poison ivy, poison sumach [sumac], and deadly mushrooms; but even so, many unpleasant and some painful experiences resulted from these gustatory pursuits.

Of course not all those childhood days were calmly devoted to nature study. Gleeful hours were spent in reckless adventure. For a time no sport was more alluring than sliding sitting in a discarded dish pan while this vehicle skidded down a steep gravel bank where the danger from tumbling boulders seemed always to threaten was a game that had its thrills. On stormy days there was the sheltered excitement of coasting down a chute from the hay-loft to the horse’s manger—wondering as I went whether the bay mare would mistake me for hay. In winter nothing else quite equaled the exhilaration of speeding down the crusty slope of a hill on a low runner sled.⁷

In 1881, William and Salome moved with their four surviving children—Fred, Will, Alice, and Edith—to Minnesota. First they settled in Minneapolis where Edith attended school. Here she had an experience that demonstrated her intelligence and precocious knowledge and established a passion and mission in life. She would later recall the incident:

When I was a child attending a country school in Minnesota, a kindergarten teacher in Minneapolis gave me a kindergarten paper containing a story of an ignoble little cabbage “worm” that grew up to be a gorgeously colored butterfly that fluttered through sunny hours sipping “honey” from flowers. The story was illustrated with a picture

of the *Cecropia* moth—the largest of our native moths. As it chanced, I knew that the cabbage “worm” transforms into a small whitish butterfly that has nothing in common with the *Cecropia* moth, that the *Cecropia* moth is a night insect, and that it does not visit flowers, being tongueless in the adult stage.

This was my first acquaintance with nature-faking literature. I was angry that a grown person should lie to children most of whom would not know about the insects themselves and thus be misinformed. It seemed so very outrageous to me that I can still recall the quiver of rage with which I declared “When I grow up, I will write stories about outdoor things for children and they shall be *true* stories.”⁸

Two years later, in 1886, Edith’s father bought ten acres of prairie land between Minneapolis and Anoka, not far from the old “River Road,” later known as Lydale Avenue. The property was known as “Willowmeade” and was operated by the family as a market garden. Edith later recalled that this new home gave her scope to continue the explorations of the out-of-doors:

The environment of that new country home seemed to me a strange world to be explored with all the eagerness inherent in a child ten years old.

If I walked a mile or more toward the east, I reached the Mississippi River, by passing through a ravined wood land that bordered its banks. If I roamed as far to the west, I came to a little lake with a sandy shore where turtles dug and laid their eggs. A swamp, beyond the lake, was yellow with marsh marigold in the spring and blue with fringed gentians in accordance with the season. And, between the river and the lake, the prairie spread its rich hued flowers and entertained its myriad guests—birds, mammals, and insects—with equal generosity. No child, with curiosity directed toward the phenomena of living things, whether in the realm of flora or fauna, could find existence dull in such surroundings; and each year brought cumulative earnestness to my quests.⁹

In later life, Edith recalled these happy, idyllic years when she gathered plants for her wildflower garden in the corner of the family lawn—“bloodroot and anemone obtained when a log jam gave access to an island in the Mississippi”; the sound of her father’s scythe; the sight in the woods of a litter of skunks at play; the grass fire started by two little girls at play. Her family continued to indulge her interests,

allowing her a room in which to keep the creatures gathered from her rambling.

From among all the intermingled interests the Monarch Butterfly fluttered through the vista like a beckoning sprite. I followed its metamorphic fortunes with fascination: first a pale egg with reticulated engravings; next a larva ringed with yellow and black and white stripes, gay of garb as a court jester; then a noble chrysalid, a jade green jewel touched with gold and jet black; and last the majestic butterfly taking leisurely flight with wings richly tawny above and bordered with black velvet.¹⁰

In the spring of 1896, during her senior year in South High School, Minneapolis, the monarch butterfly was the subject of Edith's entry in an essay contest. She always claimed that the monarch butterfly influenced her life and gave her a first opportunity to combine her skills as a writer with her knowledge of natural history to produce an essay that was well written, scientifically accurate, and interesting to read. Always in her writing, except for when she wrote for a purely technical audience, she combined imaginative imagery with scientific accuracy. Much to the consternation of her teachers, one of the conditions of the award of the prize was that the winning essay would be reprinted on the graduation program. Some of the teachers thought the story of an insect was an unseemly topic for so solemn an occasion. The prize of \$25 must have represented a substantial sum to the family, but they agreed that part of it should be spent on something that Edith wanted for herself. She chose to purchase, for \$3.25, the book she most wanted—*Manual for the Study of Insects* by John Henry Comstock, professor of entomology at Cornell University, and Anna Botsford Comstock, illustrator and member of the Society of American Wood-Engravers. She recalled that it was a dream—the word plan seemed too presumptuous—that she would someday know the Comstocks and study at Cornell.¹¹

It may seem unusual that, at the end of the nineteenth century, a young woman was so keenly interested in natural history and received some encouragement from her family and teachers. It is easy to forget, however, that the pursuit of natural history was popular and as later writers remarked:

It was scientific, and there was nothing more useful than science, as everyone knew. It was morally up-lifting, because it enabled one to find "sermons in stone, and good in everything," it was healthy, since it involved going out of doors. For gentlemen it offered new pretexts

to go out and shoot something, and for ladies it offered new subjects for water colors, for albums, or for embroidery. It also tied in very conveniently with the contemporary mania for forming collections.¹²

At this time, the segregation of professional and the amateur scientists had not occurred and the general population, including women, was much in the main stream of scientific activity. Also, those who have looked at the level of science education in the academies and high schools of the time have found that it was surprisingly good. Women had access to this education, although the purpose of educating them was to make them better wives and mothers, rather than to produce professional scientists.¹³

Some of these women became accomplished scientists, naturalists, and early environmentalists. They were popular, imaginative writers, who reached a wide range of readers through various publication venues; their writing for children, often used as texts in schools, enabled them to educate whole generations. Robert K. Musil traces their lasting contribution to environmental education by showing how they influenced renowned marine biologist and writer Rachel Carson, whose 1962 book, *Silent Spring*, is credited with helping to start the modern environmental movement.¹⁴

University of Minnesota

Edith entered the University of Minnesota in the fall of 1897 when she was twenty-one, a year after finishing high school. She seems to have been the first member of her family to have attended university, and she remained proud of her academic accomplishments. Edith's brothers received only an elementary or secondary school education and held factory and clerical positions or worked with their father in his horticultural ventures. Alice attended teacher's training school in Minneapolis and taught school in that city.¹⁵

During the time of Edith's attendance, the student body at the University of Minnesota showed a steady annual increase from 2,890 in 1897–1898 to 3,413 in 1900–1901. Enrollment was predominately male, with women constituting about 20 percent of the graduating classes. There was no tuition; the cost was only five dollars per quarter plus a small lab fee per term. It was altogether a place where a young woman of Edith's background would prosper.¹⁶

During Edith's time at the University of Minnesota, the university was flourishing under the benevolent paternalism of President

Northrop, who ruled with an authority that was “loose but likeable, slack but efficient” and who found himself responsible for a multiplicity of functions. He was asked to be father confessor, unofficial chaperone, unpaid employment agent, public sustainer of spirit, and one-man committee on student loans, from his own pocket.¹⁷

Edith’s university courses included an admirable mixture for one who was later described to have the “mind of a scientist and the soul of an artist.”¹⁸ She majored in English and took at least one English course each semester. She also took several courses in history, several in German, and one in rhetoric. In mathematics, she studied higher algebra, trigonometry, and analytical geometry. In the biological sciences, she took courses in zoology and six semesters of animal taxonomy with emphasis on entomology. Her work in taxonomy was so good that she was allowed graduate credit in animal biology as a senior elective. Her program also included courses in physical culture, sanitary science, and chemistry, some of which may have been required courses. Three courses in pedagogy in her senior year indicate that she was considering qualifying as a teacher.¹⁹

In later years, she recalled her instructors with affection and frequently acknowledged their influence. Their letters of recommendation when she finished university in 1901 and was applying for teaching positions offer a rare opportunity to see the young Edith as her contemporaries saw her. In her teacher Maria Sanford, she had an example of a successful professional woman. Sanford undertook to instill in students the principles of the good life while instructing them in sound rhetoric and proper elocution. Generations of students called her the best-loved woman in Minnesota.²⁰ Sanford wrote of Edith that she “is one of the brightest of all of our students in the Department of English. She has original gifts as a writer” and “a rare charm of manner and sweetness of disposition.”²¹



*Edith Patch as a young woman.
Courtesy of Fred and Alma Otto.*

The large number of English courses reflected the influence of Richard Burton, who encouraged her creative writing and her submission of verse and articles to the university literary publication, *The Minnesota Magazine*. Richard (Dickey) Burton of the English department was described as “vivid and variable—his temperament was of the kind that sizzles over the flame of contemporaneous interests as readily as over the banked fires of literature.” One of his popular courses was “The Bible as Literature,” but he was quite as passionately responsive to Browning, to Maeterlinck, and to Rostand. His lectures were interrupted by surprising moments when, in apparent excess of passion, he would clasp his hands, roll up his eyes, glittering behind the professorial pince-nez (on a black ribbon) and exclaim “Oh God! How I love literature!” Burton is cited as an example of the inspirational teacher deserving of respect, for his enthusiasm was genuine, his heart was high, and his good will was enormous. He did exactly what he meant to do, which was to open the door for the many on the world of esthetic pleasure. He served many times on Pulitzer Prize juries for both novels and plays, as editor for publishers, and as a visiting lecturer. He described Edith as “a student of extraordinary ability in English literature,—perhaps the finest work of the year has been done by her. Not only is she full of appreciation and intelligent insight, but she also possesses a distinct gift as a writer of verse and prose. I can hardly say too much of my admiration of her work and character.” Burton admired her verse and presented her with a book of sonnets, *The House of Life* by Dante Gabriel Rossetti, bearing the inscription: “To Edith Patch, who wrote the best sonnet in the Senior seminar 1901, from her fellow sonneteer, Richard Burton, February 21, 1901.”²²

Edith published four pieces in 1900 in *The Minnesota Magazine*. One was “A Birthday Tryst,” a romantic short story full of handsome, gallant young men and secret meetings, which was published under the pseudonym of Marion Whipple.²³ Two were sonnets filled with the imagery of birds, flowers and field.²⁴

Blackbird Choristers

They come with the early spring's last snows
And, clinging in poplar and willow hedge,
These mellow minstrels gaily pledge
True hearts for the joyous meeting time.
A rapturous wooing, a passionate chime
From an hundred throats, in a hundred strains,

And, mingling with the wild refrains,
The blithe light wind in rhythm blows.

Again, when the corn is cut in the field
They choir in the leafless trees Cathedraled by the arching blue,
Their jet throats swell with the song they wield,
A glad *Te Deum* in melodies
For prelude to their winged adieu.²⁵

Edith's fourth piece was a critical essay, "The Selfish Man's Apology," refuting the Victorian tendency to attribute human moral values to the actions of plants and animals:

Perhaps some process of egoistic radiation would explain how the idea arose of applying the test of human morality to all animate nature. The mystery enters with the converse proposition to be found in much recent writing—sweet and soothing babble about holding up the other living things as a moral model for us. "Love and all its kindred emotions," I read, for example, the other day, "are natural and therefore good.... Hate and all its kindred emotions are unnatural and therefore bad."

As children well mottoed with praise of the birds of the air and beasts of the field, we start out to verify our information, all ready to admire the perfect harmonies of nature.

We find,—well, we find what the Prince Siddartha found when, watching the bulbul and the jewelled butterflies, he looked deep into the fair show!

For everything succored we find something sacrificed, the sacrifice never being voluntary. Not a violet nor a thrush that has attained the fullness of its perfection but through long aggressive strife.

Marvelous, intricate, fascinatingly absorbing as the life-histories of plants and animals are, we find in the whole range no glimpses of altruism, disinterested support of the weak and the sick,—nothing of sympathy, courtesy, reverence, or loving kindness. Glancing at our own and viewing the thousand blessed traits that make humanity human, we feel that man need not apologize to the rest of nature for the course of his life; and wonder a little at the deluge of how-to-live-literature which attempts to put us in tune with Nature on the basis of Love, Self-sacrifice, and all the Christian Virtues. We are likely to

wonder, too, if there isn't something in Huxley, about opposing the cruel cosmic force, that is more to the point.

And yet — !

Although we have found no argument for morality, we have found no argument for immorality, because Nature, being un-moral, has to do with neither. What it has to do with is Progress.²⁶

In zoology, two of her instructors were Frances Nactrieb and Oscar Oestlund. Nactrieb, head of the Department of Animal Biology, was an active researcher in the broad sense and “an inspired teacher, devoted defender of this trust.” In 1901, Nactrieb wrote of Edith that the “quality of her work was above the ordinary and indicated a student of ability and capacity” and “as a woman we always found her modest, very agreeable and ladylike in every respect.”²⁷ Oestlund, a professor of zoology and teacher of entomology, was the first entomologist appointed on the staff of the University of Minnesota, serving from 1891 to 1927. He was one of a small group of pioneering scholars to promote an intensive study of the biology and taxonomy of the aphids. For many years he taught a course in advanced general entomology that proved to be a great stimulus to a number of graduate students who gratefully attributed much of their success to his inspiration and guidance. It is assumed that Edith was a member of this group.²⁸

Edith would later recall her years at the University of Minnesota with pleasure, saying that she was glad to have studied there. She remembered most of the professors with whom she took work pleasantly, but Burton, Nactrieb, Oestlund, and Fredrick J. E. Woodbridge made the deepest impressions. Their influence did not cease with her graduation from college, but lasted through all the years that followed.

Edith's fascination with insects, begun in childhood, had been given focus by Professor Oestlund, and Edith determined upon a career as a professional entomologist. In the meantime, she taught high school. As she later recalled:

During 1901–02 and 1903 I taught in Minnesota [Crookston and Hastings] while I was flooding the country with applications for a job in entomology. I think I applied everywhere from Florida to Alaska. The only response that was not an unqualified “no chance for a woman entomologist” was the peculiar offer which finally came from Maine. That was the position of “voluntary assistant without compensation” from September 1903 to July 1904 at which date a Department of

Entomology was to be opened at the Maine Agricultural Experiment Station, with me as entomologist—if I made good. Greatly to the horror of my Minnesota friends, I accepted on those terms.²⁹

Examples of Edith's applications for a position in entomology have not been found, so I do not know what type of position she applied for. But Edith said later that jobs in entomology were relatively numerous in the early 1900s. Edith recalled that a friend, Louise Robinson, found her application to the University of Maine to be "too timid" and edited it to be more assertive.³⁰ This may have improved her chances of making a good impression. She was probably familiar with the agricultural experiment station system as there was a station at the University of Minnesota. She would also have been aware that persons in senior positions at these stations usually had entomological work experience, graduate degrees, publication records, or all three. Edith had none of these qualifications, so the possibility of such a position may have made the chance of going to Maine without assured employment worth taking. Edith borrowed money from friends and traveled to Orono, Maine.

CHAPTER 2

Entomology in Maine

IN ADDITION TO THE ENTOMOLOGISTS associated with academic institutions and government agencies, there was an active community of amateur insect enthusiasts working in Maine at the end of the nineteenth and the beginning of the twentieth centuries. The widespread interest in natural history was manifested in the formation of the Agassiz Association, which had numerous chapters across the country and included both professionals and amateurs. The association's publication *Swiss Cross* (1887 to mid-1889) was used by members to contact persons with similar interests and to arrange the donation or exchange of specimens and information. Some insect enthusiasts published in *Entomological News*, *Proceedings of the Portland Society of Natural History*, and *Proceedings of the Boston Society of Natural History*, while others were content to have their specimens examined and reported on by others. The occupations of the amateurs varied. For example, Thomas K. Jones of Portland, a specialist in Maine Coleoptera (beetles), was a sign painter. Most members were men, but Florence Harvey, daughter of University of Maine Professor F. L. Harvey, was a serious collector of Odonata (dragonflies and damselflies). Her father acknowledged her efforts in his publications, along with those of her two brothers, Bartle and Willis. Other women were also Odonata collectors. Kate Furbish, the noted botanist and plant illustrator, collected Odonata during her wide-ranging plant-collecting expeditions throughout Maine. Her collections were given to Harvey, who acknowledged Furbish as the source of his records.¹

Another Maine woman, Mattie (Martha) Wadsworth (1862–1943), a member of the Hallowell branch of the Agassiz Association, was a contemporary of Edith who also spent her early life on a farm and developed a passion for insects. Like Edith, Wadsworth aspired to be a professional entomologist and recalled in a 1912 letter: "I remember those days and how I had hoped to become a real entomologist. But homely everyday duties made that an impossibility and each year gives me less hope for even collecting, but it is better to hope than to despair." Unlike Edith, family duties and tradition denied Wadsworth the time to focus on her entomological interests and the opportunity for higher education. In contrast, Wadsworth's brother Edward was well educated at a Quaker boarding school in Providence, Rhode Island, and became

a lawyer. Mattie lived all her life on the family farm on the Meadow Hill Road in Manchester, Maine. Her time for insect study was limited by her responsibilities on the farm, caring for sick or aging family members, and her own poor health. She did not collect outside a radius of two miles from her home. Through the *Swiss Cross*, Wadsworth made contact with other entomologists including Philip Calvert at the Academy of Natural Sciences in Philadelphia. Calvert encouraged her work with Odonata, used her information in his publications (with proper acknowledgments), and encouraged her to publish six papers in the first and subsequent issues of *Entomological News* between 1890 and 1902. She did not publish further papers in her own name, but her work was used and acknowledged by prominent students of the Odonata—Calvert, E. F. Hitchings, Harvey, E. B. Williamson, and E. Walker. Wadsworth is acknowledged for the first collection records in Kennebec County, Maine, of sixty-five species of Odonata. She is also remembered as having a species of dragonfly, *Celithemis martha*, named in her honor.²

The Maine Agricultural Experiment Station

Edith began her career as an entomologist with the Maine Agricultural Experiment Station (MAES), which was located on the campus of the University of Maine in Orono. The Hatch Act, passed in 1885, had provided federal funds for such stations throughout the U.S. The objective of these stations was to provide a scientific basis for future agriculture. Maine's station opened in 1887, with its headquarters in Holmes Hall, which was completed in 1888. In 1903, the station's director was Charles D. Woods, and the research staff was comprised of James M. Bartlett, chemist; Lucius H. Merrill, chemist; Fremont L. Russell, veterinarian; Welton M. Munson, horticulturalist; Gilbert M. Gowell, stock breeding and poultry; Herman H. Hanson, assistant chemist; and Sanford C. Dunsmore, assistant chemist. The station had an advisory council, which was charged with supervision of the station and its work. Members of the council included the university's president, the station's director, representatives of Maine's agricultural community, and some station staff.

Research at the station emphasized chemical analysis—especially of fertilizers—apple orchards, and cattle and poultry breeding. The budget at that time was about \$15,000 per year from federal funds, with an additional \$4,000 to \$6,000 per year from sales of produce from agricultural enterprises on campus. In 1906, Congress passed the



Holmes Hall, headquarters of the Maine Agricultural Experiment Station, as it looked in 1904.

Adams Act allotting \$5,000 for each station in the U.S. for the first year, with \$2,000 more each additional year until in 1911; the total funds available would be \$30,000. The Adams Act funds were limited strictly to original investigation. These funds allowed the MAES to develop breeding experiments in fruit, spring wheat, sweet corn, and potatoes and enhanced studies of forest insects and plant pathology. Plans were also made at this time to purchase a farm where the research could be carried out.³

Although Edith is credited with founding the Department of Entomology at the University of Maine, research and teaching programs in entomology had been in place for some time before her arrival. C. H. Ferland was appointed professor of zoology and entomology in 1871. Ferland was a graduate of Bowdoin College and became a nationally respected researcher and teacher of entomology, well known for his work on the taxonomy of Lepidoptera (moths and butterflies) and his research on the gypsy moth. Following Ferland's departure to a similar position at the Massachusetts Agricultural College (now the University of Massachusetts at Amherst) in 1886, F. L. Harvey was appointed botanist and entomologist at the station, a position he held until forced to withdraw because of illness. Harvey was also professor of natural history at the university, and his time for station duties was limited. Nevertheless, he produced a number of bulletins covering his

entomological research, the most important of which concerned the apple maggot and the first record of the brown-tail moth in Maine. Harvey died in 1900 at the age of 50. Entomological work at the station between 1900 and 1903 was continued by Gilman A. Drew, station zoologist, and Horace W. Butcher, assistant zoologist. In 1903, Butcher published observations on the chinch bug and information on canker worms was included in a publication coauthored by Munson, the station horticulturist.⁴

Edith in Orono—Early Research and Publications

Edith was in Orono by July 1903, and even without a formal appointment at the MAES, she immediately set to work organizing an entomology department and becoming familiar with the insect fauna of Maine. Starting that fall, she taught entomology and English at the university and was referred to as an assistant in entomology. There seems to have been no question that she would remain in Orono, and Edith's formal appointment as assistant entomologist at the station began in the fall of 1904. Station Director Woods, responded to criticism for hiring a woman who "could not climb a tree, nor catch a grasshopper" by saying that he was not hiring an acrobat and that it would take a "lively grasshopper to evade her." The following year, Edith was listed as entomologist rather than as assistant entomologist in MAES reports, and beginning in 1908, she was listed as professor in university catalogs. For at least part of the time during the early years in Maine, she lodged at the Mount Vernon House, a women's residence on campus.⁵

Her verse "First Autumn in Maine" tells us that Edith missed her native Minnesota: "In Maine the fall of 1903 was so warm and gracious that violets, wild strawberries and many other plants blossomed in October—a mingled season of spring flowers and autumn leaves. That was my first fall in Maine and I spent peaceful solitary hours becoming acquainted with an outdoors so unlike those Minnesota places I so loved."

First Autumn in Maine

I pray, devoutly, for a day again
Like this: All near a cedar lane
Where sun-glints fell upon a stone
Gray and scarlet with lichens grown.

The incenses, winter green and fir,
Lifted to heaven. The censers were
The winds that listed all their way
Gently in peace on this dear day.

After the foothills, autumn-clad
And sunned upon, were quite, quite glad.
Anear, one violet looked to be.

Procession—wise lambs passed the vale,
While crickets chanted on their frail
Viols as ever was their wont
Days when they played to Keats and Hunt

A little river, music-still,
Imaged the trees, with joy a-thrill
To catch the glorious tints above:—
As hearts reach up for a look of love.

I pray, indeed, for it all once more
And then, whatever there be in store
Of grief for me, the grace thus won
Will help me bear what must be done.

October 6, 1903.⁶



Mt. Vernon House women's dormitory where Edith Patch lived when she first came to Orono.

Since Edith was the only entomologist on the station staff between 1904 and 1909, answering public inquiries and identifying specimens must have occupied a large portion of her time. The station encouraged public communication with its staff as a mechanism for gaining information about insect problems. Edith frequently sought help from specialists in other states or in Canada in identifying specimens. If submitted insects were alive, they were retained in one of the two insectaries, one open air and the other in a green house. Here, Edith maintained the insects to maturity or reared parasites from them. She kept records of these submissions and added representative specimens to the growing insect collection. Laboratory and field records were hand written or typed on 8×5-inch sheets and stored in hard-covered loose-leaf binders. Edith assigned lot numbers to the specimens to link them to information and photographs in the binders. A number of these binders still exist in Fogler Library at the University of Maine and the Maine State Museum.

Edith also traveled about the state making field observations on the habits, life histories, predators, and parasites of troublesome insects, bringing specimens back to the laboratory for additional observations. Edith's research involved careful observations in the field and laboratory rather than experimental trials. The results of her observations were usually published as MAES bulletins. Findings that were of national or international interest were submitted to journals such as the *Annals of the Entomological Society of America*, *Science*, *Entomological News*, or the *Journal of Economic Entomology*.

During her early years in Maine, Edith received letters of encouragement and assistance from Oestlund, her former mentor at the University of Minnesota. In 1904, he wrote with directions for sending specimens and a wish to see specimens from Maine. In 1906, he sent congratulations: "Your Bulletin is also at hand and examined for which I wish to thank you. Criticize it I cannot. It shows your careful and conscientious work, told in a delightful way and forms a valuable contribution. I would congratulate you on your progress as a scientific worker." Edith must have traveled to Washington as Oestlund added, "I see you are enjoying your Washington trip and making the most of it." Again, in 1909, he wrote thanking Edith for the copy of her paper on the "Homologies of the Wing Veins of the Aphididae, Psyllidae, Aleurodidae and Coccidae" published in the *Annals of the Entomological Society of America*.⁷



One of the first greenhouses at the University of Maine, late 1800s.

Charles Emerson Sanborn was another correspondent during Edith's early years in Maine. Sanborn was a student of aphids who would amass an aphid collection at the Department of Entomology at Oklahoma Agricultural and Mechanical College during his tenure as department head and entomologist at the experiment station there (1909–1934). In 1905, while he was working at College Station, Texas, he wrote to Edith complimenting her on having had a new insectary built. On April 2, 1906, Sanborn wrote that his wife had been glad to hear from Edith and wished that Edith could see and enjoy some of the spring flowers they were having in Texas. Edith made a habit of knowing and developing friendly relationships with her male colleagues' wives. On May 30, 1907, Edith and Sanborn exchanged aphid slides. In 1908, Sanborn wrote to Edith, "It seems that you have been quite fortunate all the way around for a long time. I have thought you were a fortunate person when I first saw you a few years ago." Edith must have radiated success!⁸

In June of 1906, Edith gave a talk to the Orono Grange on a theme she would return to throughout her life—in the large economy of nature, insects are beneficial; any negative effects of insect activity are outweighed by the benefits they convey. Her talk was titled "Benefit of Insects." In it, Edith stressed their beneficial roles as parasites and predators in controlling the abundance of insects attacking human sources of food and fiber and in controlling weeds. She described their



Edith Patch and other staff of the Maine Agricultural Experiment Station, 1914–1915. Back row: C. D. Woods, R. Pearl, W. J. Morse, F. M. Surface. Front row: J. M. Bartlett, E.M. Patch, M. Shapovalov, H. H. Hansen.

usefulness as processors of organic waste and carrion and as human food, either directly or indirectly through poultry, game birds, and fish. She discussed their importance as pollinators of food crops and in medicine, using as an example the Spanish Fly, beetle of the family Meloidae, which was employed during the late 1800s as a blistering agent and aphrodisiac.⁹

Though chemicals such as arsenate of lead and Paris green and emulsions of kerosene and soap were used for controlling insect pests and Edith recommended them occasionally, she favored more focused methods of dealing with insect pests. She often recommended hand picking insects to destroy a vulnerable stage in the pest's life cycle, or burning or feeding to livestock any crop refuse that might contain overwintering insects. Edith would suggest that farmers try to encourage parasites and predators of pests, or cultivate to destroy soil-inhabiting pests. She had confidence that insect parasites, pathogens, and predators would eventually bring relief from high densities of pests.

“Insect Notes for 1904” reports the immigration of the brown-tail moth into the southern part of Maine in July; the reappearance of the white marked-tussock moth, *Orgyia (Notolophus) leucostigma*, on the shade trees of Portland; and the occurrence of the red-humped caterpillar, *Schizura (Oedemasia) concinna*, in all parts of the state. The publication also notes a conspicuous outbreak of cottony grass scale (*Eriopeltis festucae*) in many localities and a general infestation of aphids:

Just the right conditions (whatever they may be) have existed for aphids this summer. From April to November black alders have been white stemmed with *Schizoneura tessellata*.... About the middle of July the maples along the Penobscot were clustered thick upon leaves and leaf stems with aphids of the same genus, and the river two miles above Old Town had a milky white cast caused by the bodies and molts. In June whole hillsides were sticky with honey dew, the coniferous trees present being covered with aphids which for the most part belonged to the genus *Lachnus*. The leaves of apple, elm, high bush cranberry, snowball, and currant were among those which were especially attacked. *Chermes pinicorticis* was conspicuous in some localities on white pine. Perhaps the most interesting of the gall producing aphids present was a species of *Chermes* which was distorting the branches of the Norway and red spruces in eastern Maine.¹⁰

Orchard insect pests received special attention in a station publication from 1904, “Brown-tail Moth and Other Orchard Moths.” At the beginning of the twentieth century, the brown-tail moth (*Euproctis chrysorrhaea*) was one of the most serious pests in Maine. The larvae defoliated orchards and also attacked oak, elm, and many other shade and forest trees. In addition to damaging plants, the barbed hairs of the caterpillars caused skin irritation, severe illness, or even death, when they came in contact with human skin or as sometimes happened with young children, were accidentally swallowed. In the bulletin, Edith recommends destroying neglected orchards and fruit trees that might serve as breeding places for the pest and destroying nests in which the overwintering caterpillars were found. The gypsy moth had not yet been reported in Maine, but its arrival from neighboring states was anticipated.¹¹

Another major publication of 1904, “The Apple Maggot (*Rhagoletis pomonella*)” was also concerned with an orchard pest and was co-authored by the station horticulturalist, Munson. The maggot was

a well-established pest of orchards. The bulletin recommends meticulously destroying maggots in windfalls and picked fruit to prevent infestation of the succeeding year's crop. According to the publication, this could be accomplished by maintaining sheep or hogs under the trees to eat the windfalls, or hand gathering them and destroying all apple refuse. This publication also reports that there were seventy-one varieties of apples grown in Maine in 1903, a tantalizing possibility for present-day apple lovers. In dealing with practical entomological problems involving the management of orchards, garden crops, meadows, and woodlots, Edith's background in farming and market gardening must have been valuable and lent authority to her recommendations.¹²

The brown-tail moth continued to be the most serious insect pest in Maine in 1905. In response to the infestation of 1903 and 1904, state appropriations were made

to provide for the protection of trees and shrubs from the introduction and ravages of dangerous insects and diseases....This act provides for the inspection of nurseries in the State and of nursery stock shipped into the State, by a competent entomologist to be employed by the Commissioner of Agriculture; and places with the Commissioner of Agriculture the duty of making full investigations of any locality when the presence of the brown-tail or gypsy moths or other injurious insects or plant diseases may be suspected.¹³

Red-humped caterpillars were also numerous, sometimes defoliating entire orchards, and tussock moths, tent caterpillars, and apple maggots were common. Aphids continued to be numerous, and eighty aphid collections were made during the summer, mostly near Orono. Edith was quick to point out that the ants and lady-bird beetle larvae associated with the aphids did not cause damage to plants. Extensive injuries by aphids were reported on cucumbers. When plants were small enough to cover, carbon bisulphide was used as a fumigant.¹⁴

In "The Strawberry Crown Girdler (*Otiorhynchus ovatus*)" from 1905, Edith reports that adults of this snout beetle were sometimes present in houses in large numbers. Though they did no damage, housewives were disconcerted by their presence. Repellents such as camphor and pyrethrum powder proved useless in preventing the entry of the adult beetles, and the only remedy was making the house "as tight and beetle proof as possible." The larvae of this beetle girdled the strawberry plants by eating through the roots causing wilting and death. Damage was minimized by not planting in newly broken soil.¹⁵

MAINE
AGRICULTURAL EXPERIMENT STATION.
ORONO, MAINE

Brown Tail Moth

DANGER!



Winter Nest of Brown Tail Moth.

THE Brown Tail Moth is probably the most dangerous insect pest that has even threatened this State. Not only does the caterpillar eat the leaves from fruit, shade and forest trees, but its hairs, coming in contact with the skin, produce an irritation similar to, but worse than that caused by poison ivy. Last year it was at Kittery. Now the insects are scattered over a large area. Any hard wood tree or shrub near a railroad, or steamboat landing in any part of the State may already be infested. The conspicuous winter nests, formed of two or more leaves held together by a web, (see cut above) contain 150 to 200 caterpillars, now about one-fourth of an inch long. There is no law concerning this and no State or town officer has any authority in the matter. Unless most drastic measures are taken to destroy them, or unless some natural enemy appears to insure their destruction, incalculable damage may result. Individual action of each citizen is necessary to check this insect. **COLLECT AND BURN EVERY NEST AND THE PRESENT BROOD IS EXTERMINATED.** Do not wait for State action.

Bulletin 108 of the Maine Agricultural Experiment Station describes the Brown Tail Moth and will be sent on application.

CHAS. D. WOODS,
Director.

Orono, Dec., 1904.

Example of a Maine Agricultural Experiment Station poster with information about an insect pest and announcement of a new bulletin.

Another of Edith's major publications of 1905 was "The Cottony Grass Scale, *Eriopeltis festucae* (Fonsc.)." This insect had not been regarded as a problem until 1904, when there were reports from a number of towns in Maine of enormous numbers of egg sacs of this scale: "My mowing lands look as though scattered with swollen rice grains." Where the infestation was heavy, there was a decrease in the hay crop and, in some cases, dead grass and brown plots throughout a field. This insect was also associated with the presence of rust on the vegetation. The bulletin states that burning the infested grass in the spring, which would destroy the overwintering stage, seems to produce a satisfactory relief from the pest. The publication acknowledges assistance from taxonomists at the Bureau of Entomology, U.S. Department of Agriculture, and Dr. W. H. Ashmead, of the U.S. National Museum, in identifying parasites.¹⁶

In 1905, members of the station council were informed by Director Woods that “Miss Patch is proving a valuable acquisition to the station’s staff. Her work is thorough, intelligent, painstaking. She has the capacity to set herself at work upon new lines as they present themselves. The newly organized department is proving a very helpful one to the agricultural interests of the State.”¹⁷ Her work had apparently justified the confidence that Director Woods had placed in her and she was to remain part of the Maine Agricultural Experiment Station for the remainder of her professional life.

“Insect Notes for 1906” reveals that the brown-tail moth remained a major concern and “in December, 1906, gypsy moth egg clusters were found in Kittery and Eliot.”¹⁸ The publication also provides a discussion of insects associated with the potato crop, as over the previous 16 years, approximately 6,000 acres of land in Aroostook County had been opened up to potato. It is apparent that Edith had spent considerable time in the Houlton area during 1905 and that she had become quite involved with the crop. Edith mentions that two aphid species, *Nectarophora solanifolii* and an unidentified species of *Aphis*, were abundant. Another aphid, *Pemphigus tessellata*, continued to be abundant on alder. In the publication, she makes interesting observations on syrphid larvae and ants associated with these aphids. Also in 1906, Edith made a small survey of mosquitoes in the state, identifying five species from Orono and Trenton. Although mosquitoes were recorded as being excessively troublesome at times, in none of her notes does she mention black flies as troublesome, even though she lived and collected extensively in Orono.¹⁹

In 1906, MAES prepared a series of concise circulars, often accompanied by photographs, and distributed them to persons making inquiries about troublesome insects. The circulars addressed white grubs and June beetles, red-humped caterpillars, yellow-edged caterpillars, mourning cloak butterflies, yellow-necked caterpillars, tussock moths, and elm leaf curl. No credit for authorship is given on these circulars, and Edith does not claim credit in her list of publications, but it seems likely that she was involved in their preparation as she has included copies in a bound volume of her publications.²⁰

Brown-tail and gypsy moth larvae continued to damage shade and forest trees in the state. In “Insect Notes for 1907,” Edith describes a large population of *Heterocampa guttivitta* caterpillars, one of the prominent, defoliating a large area of hardwood forest. During the summer, Edith had visited South Leeds and Upper Gloucester to make

personal observations on the development and life history of this pest and on the activity of its predators. The report goes on to describe the damage caused by grasshoppers, with the red-legged locust *Melanoplus femur-rubrum* causing the most damage. They attacked potato fields, large orchards, and raspberry and blueberry bushes. And according to the publication, rose chafers were also abundant. One poultry keeper from Clinton reported that 400 young free-ranging chickens out of a flock of 2,000 had died as a result of gorging on these chafer beetles.²¹

Edith took the opportunity in this bulletin to exhort Maine orchardists on one of her favorite themes:

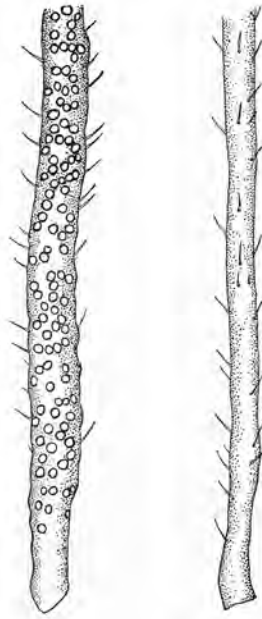
There is probably no reason so far as insects are concerned why apple raising should not be as profitably carried on in Maine as in other parts of the country. The conditions are, however, in many places far more promising at present for the production of insects than apples. Almost unbroken lines of neglected and therefore dangerous apple trees stretch for miles along the roadsides, scattering ungathered windfalls as food for apple maggots, curculio grubs, and larvae of codling moths. There is rarely a farmyard in which a few apple trees have not been planted and then in many cases left undisturbed as food for whatever insects chance that way. Wild cherries and hawthorn as well as native apples are permitted to grow within insect flight of cultivated apples and form entirely satisfactory breeding places from the standpoint of orchard pests. Paramount inducements are thus offered for every apple pest that can endure the climate. In the face of this cordial standing invitation to apple insects, there is many an orchard owner in the State who is grumbling because the invitation is annually accepted, and who has about decided that there is not much use trying to get perfect apples enough for his own family use. There is a panacea for most of this trouble to be found in clean culture, by which is understood in part the clearing out of worthless trees, both cultivated and native, that serve as breeding places for orchard pests; the proper pruning and spraying of all apple trees not cut down; the tilling of orchard soil to disturb insects hibernating or transforming there; and the persistent destruction of windfalls.²²

The major publication of 1907, and Edith's first entirely on aphids, was "The Potato Plant Louse."²³ Edith's choice of aphids for her life's work was certainly influenced by Oestlund of the University of Minnesota, who had inspired her interest in this group. Also, beginning work in Maine in the years when aphids were extremely numerous and causing damage to a variety of plants justified the commitment

of her time. In the bulletin, she reviews her work on aphids to date and evaluates its significance in controlling the pest. Edith believed that chemical control of the pest with available materials was not practical. Her suggested alternative control method involved determining if an alternate host plant existed, and if one did, eliminating it. To clarify this strategy and stress the complexity involved, she provides a generalized outline of aphid life history:

In the north such a plant louse may be expected to winter in the egg stage. From the egg emerges in the spring a wingless form which is commonly spoken of as the stem mother. The stem mother does not deposit eggs but produces living young, and is the first of a long series of forms designated on this account as viviparous females. The young plant lice begin at once to feed upon the sap of the plant and in 8 to 10 days produce offspring. The

first few spring generations may be wingless or at any time winged individuals or an entire winged generation may appear and fly away to fresh plants and there start new colonies where a succession of generations are produced as before. Such a winged generation is called the migrant generation and with many species the migrants desert the host plant upon which they have been feeding and seek a plant of an entirely different species. Thus the plant louse destructive to hops passes part of its life cycle upon plum trees. This alternation of hosts is a point in the life history of Aphidae of great economic significance, for it sometimes happens that a species can be controlled on one plant and thus its attack upon the alternate host be prevented.



Example of illustrations in "The Potato Plant Louse, Nectarophora solanifolii Ashmead." The drawing on the left is of the basal two-thirds of the hind tibia of a oviparous (egg-laying) form of the potato louse. The drawing on the right is the same feature for a viviparous (live-bearing) form.

After spending a few weeks or a few months upon the second host plant, winged individuals called fall migrants appear and return to the same kind of plant, the winter host, upon which the stem mother and the spring generations had lived, and there continue the series of generations. Up to this time no males have appeared and all of the forms, whether winged or wingless, have been females giving birth to living young as was the case with the “stem mother.” But after the fall migration they are likely to develop the true sexes, males and egg-laying females. These oviparous females deposit a few comparatively large eggs, in which stage the insect winters and from which the stem mothers hatch in the spring.²⁴

Combining field observations with tests involving a variety of host plants made available to aphids in the insectary, Edith reports that it was not known upon which plant species the spring generation of potato aphids occurred. She also reports that the species would accept hosts other than the potato, including peas and shepherd’s purse, and that sexual forms did not appear in the fall. Female aphids deposit their eggs on both shepherd’s purse and potato in the fall. Given this fact, it did not seem feasible to attempt to combat the aphid in Maine through the medium of the winter host. Instead the bulletin advises clean culture with the practice of fall plowing and burning grassy and weedy places. The bulletin also describes naturally occurring controls such as weather—especially heavy or continuous rains—predaceous insects such as ladybird beetles and syrphid fly larvae, parasitic insects, such as brachonid wasps, and fungal pathogens. The bulletin also includes a detailed description of the potato aphid to help people to differentiate it from other aphid species.²⁵

According to “Insect Notes for 1908,” the gypsy moth and brown-tail moth remained pests of primary importance, but the saddled prominent caterpillar caused the most damage. The bulletin describes damage from other species of caterpillars including the rosy-striped oak-worm and the green-striped maple worm, which added to the defoliation caused by the saddled prominent, and the activities of a new spruce tortrix. Edith notes that aphid infestations were numerous as were grasshoppers and that pine, weakened by white pine blight, was attacked by an unusual number of pest species. In 1908, Edith also published her first papers in national entomological journals. One was a description of the larva, pupa, and feeding habits of a lepidopteran, *Crocigrapa normani*, previously known only from the adult stage.

The other paper was on the alternative host plant (maple) and the life cycle of the alder blight aphid, *Pemphigus tessellata*.²⁶

In 1908, Edith began a study of the saddled prominent, “a caterpillar so remarkable that the writer from sheer interest in it, put aside other work so far as possible to keep in touch with the situation.”²⁷ In 1907 and 1908, the station received numerous specimens from infested areas and a number of individuals throughout the state helped Edith’s investigation by acting as guides to infested forest areas, collecting pupae for parasite rearing and life history records. Around the state, large acreages of beech and maple were defoliated along with orchard trees. Edith and her citizen scientists recorded observations on the life history and descriptions of the life stages, habits, parasites, pathogens, and predators of the caterpillar. In the bulletin, Edith recommends spraying orchard and shade trees with arsenate of lead or Paris green. To prevent larvae from moving from one tree to another, she suggests banding the tree trunks with a sticky substance such as Tree Tanglefoot. She also suggests that caterpillars could be dislodged by shaking the tree or sending a boy into the tree to shake the branches. There are no recommendations for forest trees except to wait for reduction of the species due to pathogens, predators, and parasites.²⁸

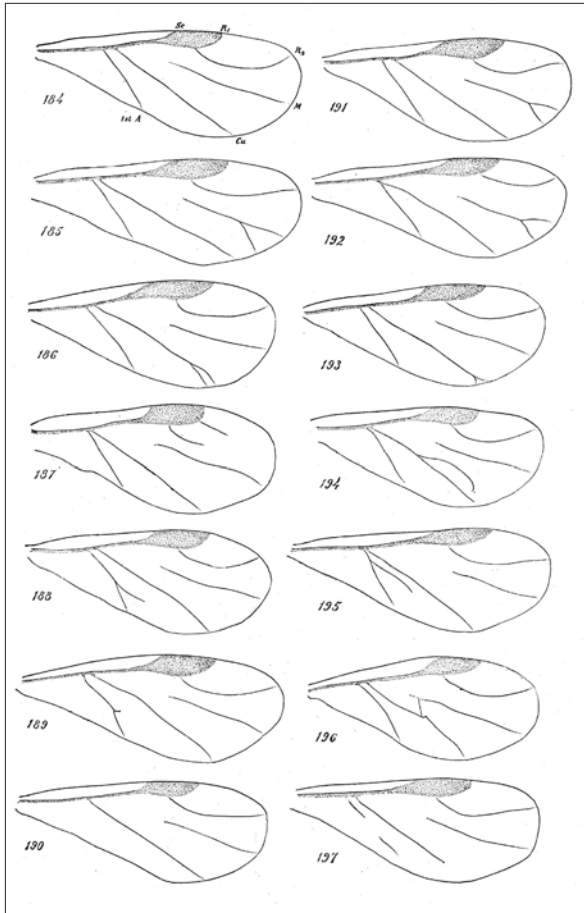
The June 1909 issue of the *Cornell Alumni News* announced that Oskar Johannsen, assistant professor of civil engineering at Cornell University, had resigned to accept the professorship of entomology at the University of Maine. The article adds that Johannsen was proficient in both engineering and entomology, but preferred entomology. He served as associate entomologist at the Experiment Station between July 1909 and December 1910 and entomologist during the remainder of his time in Maine. During this time Johannsen assumed responsibility for much of the insect work at the station, including authorship for most of the station “Insect Notes” from 1909 to 1913. His presence at the station must have relieved Edith of some responsibilities as she completed the requirements for her Ph.D. at Cornell. In addition, Johannsen produced major publications on the fungus gnats (Mycetophilidae: Diptera) of Maine and authored publications on the potato flea beetle and one of the first records of the spruce budworm, which would be one of the major recurrent forest pests in Maine during the 1900s. References to Johannsen’s publications while at the MAES can be found in David Smith’s bulletin, “An Annotated Bibliography of the Maine Agricultural Experiment Station.”²⁹

In 1909, Patch published seven papers on aphids and related species, five in national journals. Three papers described species new to science,³⁰ and three papers detailed the plant species with which various species of *Chermes* were associated.³¹ The seventh paper would be presented as her dissertation at Cornell in 1911.

In June of 1910, Edith completed the requirements for a M.S. at the University of Maine. Her research was conducted under Gilman A. Drew, and her thesis, "Gall Aphids of the Elm," was published as a bulletin in 1910. Her thesis reviews the published information on the six species of aphids, comments on possible taxonomic problems, and adds her own findings on life histories, alternative hosts, and fate of migrants. She acknowledges assistance and the loan of specimens from J. T. Morrell, J. J. Davis, F. A. Serrine, and O. W. Oestlund. Photographs are by station photographer R. Hammond and figures by illustrator Charlotte M. King.³²

In "Four Rare Aphid Genera from Maine," Edith describes rare aphid genera she had found in Maine. In "Insect Notes for 1910," she reports on psyllid and aphid species encountered in recent years. Four of the psyllid species were new to science, and she provides species descriptions and illustrations. Among the aphids, *Mindarus abietinus* (*Schizoneura pinicola*) was abundant and seriously damaging the tips of white spruce and balsam fir. Edith notes that these aphids were generally attacked by larvae of flies in the family Syrphidae. Of particular interest is her report of *Aphis sedi*, a European aphid species not previously reported from America. It was found on the "garden orpine" or "live-for-ever" (*Sedum purpureum*). In "*Macrosiphum destructor* and *Macrosiphum solanifolii*," published in 1911, Edith reports on aphid host plant associations and life cycles for *Macrosiphum* spp., which would provide a basis for future research on the transmission of pathogens of potato. Also in 1911, in "*Pemphigus thesellata* (*acerifolii*) on Alder and Maple," she documents that aphids on alder and maple are the same species.³³

Edith's publications were frequently accompanied by excellent photographs and illustrations. Although biological illustration was not one of her particular talents, Edith's own drawings were included in many of her publications. Starting in 1906, the station employed Royden L. Hammond as seed analyst and photographer. Hammond provided many of the photographs in Edith's early papers, including those made with the aid of a microscope of aphids mounted on slides. Hammond sometimes made drawings to illustrate Edith's papers,



*Example of illustrations of aphid wings from "Gall Aphids of the Elm."
These drawings show abnormal venation found in the 13 wings out of 2000
examined. According to the caption, "in even these 13 cases the wing on
one side was normal."*

and Charlotte M. King, an illustrator temporarily employed by the station, also produced illustrations for some of Edith's papers. Edith would later become adept at photography and frequently used her own photographs in her publications. Summer students such as William C. Woods, son of Director Woods, and A. Perly Skofield, worked with Edith on her projects, and she acknowledged their contributions in her publications.

Graduate Work at Cornell

Edith had always dreamed of studying entomology at Cornell University under the distinguished teacher and researcher John Henry Comstock, and she appears to have moved quickly to make that dream a reality. It is not known when she made the first contact with Comstock, but she appears to have been at Cornell during February and March of 1907 and 1908 and the spring of 1911. At Cornell, she would have had access to Comstock's superb library, which was kept current in European as well as American entomological literature. His students were allowed to borrow freely from this personal collection and were thereby exposed to the best scientific literature of the day. Much of Edith's work, however, was done in Maine. At Cornell, Edith worked under Comstock's general direction, but under the immediate supervision of A. D. MacGillivray. Her research project was on the homologies (evolutionary origins) of the wing veins of the Aphididae, Psyllidae, Aleurodidae, and Coccidae.³⁴

Early taxonomists had grouped insects according to superficial characteristics, and often the same structure was given a different name in different groups of insects or by different researchers. This created great confusion, and Comstock sought uniformity in the naming of structures. The publication of Darwin's *The Origin of Species* provided a framework into which biological principles, such as the classification of organisms, could be fitted, and Comstock became a proponent of phylogenetic classification. It was assumed that all insects were derived from the same basic form and that those within a taxonomic group were more closely related to each other than to those in other taxonomic groups.

A careful study of the wings of many insects shows that the fundamental types of venation are the same in all orders of winged insects. However, this is evident only when more primitive members of different orders are compared with each other. It is still more evident when the wings of nymphs and pupae are studied. In the development of the wing, tracheae (air-conducting tubes that precede wing veins) grow out into the wing-bud, and later the wing veins are formed about them. The wings of nymphs and pupae are broad at the base, and consequently these tracheae are not crowded together as are the wing veins at the base of the adult wings. For this reason, the identity of the wing veins can be more definitely determined in immature insects than they can be in adults. This is especially true where two or more veins coalesce in

the adult wing while the tracheae that precede these veins are distinctly separate in the immature wing.

With the assistance of colleagues and students, Comstock undertook the task of identifying the basic patterns of the venation of insect wings and determining how it is modified within the different groups. For her Ph.D. dissertation, Edith undertook to study the homologies of the wing veins of the aphids and their close relatives the psyllids, aleuronids, and coccids. She chose aphids based on her interest in this group of insects and because they had not been previously studied; Edith had been collecting aphids in Maine since 1903. She relied on two greenhouses at the University of Maine to provide specimens at the appropriate stage of development—specimens taken during the first few minutes after the final molt to the adult insect. She needed large collections of aphids in the final immature stage for this procedure to be successful, and she ended up examining the wings of more than 2,000 newly emerged adults from one hundred species belonging to sixteen genera. Edith acknowledged the support and assistance of her former mentor from the University of Minnesota, Professor Oestlund. Her research was published in the *Annals of the Entomological Society of America* in 1909 as “Homologies of the Wing Veins of the Aphidae Psyllidae, Aleuronidae and Coccidae” and was presented to the faculty at Cornell University as her Ph.D. dissertation in June of 1911.³⁵

The process of pursuing graduate work at Cornell and having her thesis paper published in the prestigious *Annals of the Entomological Society of America* demanded more of Edith than time and commitment, as her correspondence with Herbert Osborn, then editor of the *Annals*, shows. Since it was thesis work, the station did not bear the publication expenses or cover the cost of her time in its preparation. Although Comstock and the station paid for the copies that they ordered, there were extra costs related to the preparation of the plates. Furthermore, Edith sacrificed \$1,000 of salary for the time she spent on the three-year investigation. However, Edith felt that “the experience has been worth the price to *me*. I hope the results will seem worth while to a few other entomologists.”³⁶

In addition to the opportunity for research and contact with other entomologists, Edith valued the opportunity to know Comstock’s wife, Anna Botsford Comstock, a noted illustrator and author of natural history books for young people and leader in the Nature Study Movement. I do not know when Edith first met Anna Botsford Comstock, but in

1908 Edith received a postcard from her sent while the Comstocks were traveling in Egypt.³⁷

The Nature Study Movement, centered at Cornell, was a popular education movement in America in the late nineteenth and early twentieth centuries. The movement attempted to reconcile scientific investigation with spiritual, personal experiences gained from interaction with the natural world. It was led by progressive educators and naturalists such as Anna Botsford Comstock, Liberty Hyde Bailey, and Louis Agassiz. It changed the way science was taught in schools by emphasizing learning from tangible objects, something that was embodied by the movement's mantra "study nature, not books." Anna Botsford Comstock defines the idea extensively in her book *Handbook of Nature Study*: "Nature Study is for the comprehension of the individual life of the bird, insect or plant that is nearest at hand."³⁸ The book includes sections on how to teach the subject to children and on different animal and plant species. The movement came at a time when society was concerned with the future of the next generation and with nature conservation. In association with the movement, the American Nature Study Society was founded in 1908 and still exists today. The society is considered to be America's oldest environmental organization. Anna Botsford Comstock was one of the society's presidents, and Edith was also associated with the society from its early days and eventually served as its president.³⁹

At Cornell, Edith was influenced in major ways by both Comstocks, and she remembered her association with Cornell as a happy time and a chance to form friendships that would last a life time:

I knew J. Chester Bradley first as an advocate of hot mince pie and rarebit as the only proper menu for a late evening luncheon. As a demonstration he served the course to a group after a coasting party or some such function and convinced the skeptical as to the truth of his thesis. Later I learned that he was an authority also on hymenoptera. But I've never seen him since without recalling his earnest dissertation on hot mince pie.

H. E. Ewing with his spiders, one Foster (was it S.V.?) Fanny Hartman, Paul Hayhurst, J. S. Houser, H. H. Knight, M. B. Leonard, Nobert Matheson, Anna Morgan, Edna Mosher, Ethel Gowan, Wm. T. N. Forbes, a Miss Richards, a nice cousin (?) "Alice"? of Mrs. Comstock, Mr. Lloyd, Mr. Hammer, Lucy Smith are the names and faces of

students that come back to me, though they were not all together any one year.

I recall one kindergarten party which graduate students had at the home of Dr. and Mrs. Riley (then out Forest Avenue way). On the way out we stopped at Dr. MacGillivray's to show our costumes there and to rehearse first names for use during the evening.

My impression of Entomological Cornell was that it was a sort of family with the faculty acting as older brothers to the graduate students and everybody loving the Professor and Mrs. Comstock better than they did anybody else and that Cornell was the friendliest group of people in the world.

Contact with the Comstocks was especially valued by Edith:

I was permitted to "listen in" at a lot of the lecture courses. The Comstock—Riley ones (called I think the general lectures); Dr. MacGillivray's coccids, Dr. Needham's water pets: and found information in them all. I have to thank Dr. MacGillivray for keeping me informed that "to-day at _ o'clock the Professor will lecture."

Comstock was nearing retirement and not in good health, but Edith was pleasantly surprised by his efforts and those of Anna Botsford Comstock to maintain contact with the graduate students, even a transient such as herself:

As for The Professor and Mrs. Comstock, the centre of the devotion of the whole clan. I had no expectation of more than enjoying their general proximity—breathing the same atmosphere, so to speak, for their lives were so full of teaching and writing and home and people and events, that it hardly seemed possible that I should meet them except in the most general way. I had reckoned without a knowledge of their special gift of giving pleasure; and was frequently both surprised and joyous to find their personal generosity extending even to such a straggler as I was, for my stays were all so short that I was never one of the Cornell family proper—a sort of transient guest each time. So it is that though I remember the Professor's lectures with delight, I remember, too, that *Jugatae* (moths) party at which he brought me tea and took time to get a bit acquainted. The Sunday evening suppers, with the servants having an off day and the guests having the family fun of serving and doing the dishes. The readings from Kipling, musical evenings—the friendly home! So that though

I went to Cornell to learn and to admire—I remained to love. Just so all the Professor's students have. There are so many especially dear things to remember that there would not be room for them all so I will select three: The privilege of being taken to the room of the beautiful Mrs. Botsford who happy and serene because she "still loved poetry and still loved nature—more than some people ever have". A never-to-be-forgotten week at the lake cottage. And the fact which gave me cause for both pride and pleasure when the Professor, who did not usually go to commencements, came to mine.⁴⁰

CHAPTER 3

THE YEARS FOLLOWING THE COMPLETION of her Ph.D. in 1911 and the beginning of the U.S. involvement in WWI were highly productive years for both Edith and the MAES under Director Woods. The distinguished geneticist Raymond Pearl recalled this period as

banner, halcyon years for the Maine Agricultural Station....ten of the happiest years of my life. The Maine Agricultural Experiment Station a quarter of a century or so ago, under the guidance of Charles D. Woods, of revered and affectionate memory, and with Miss Patch, Morse and Bartlett on staff, provided more nearly perfect conditions for research of the highest type than any I have encountered in any institution anywhere in the world. The ideals and standards were of the highest. It was, and is, completely unthinkable that anyone in the same building with Miss Patch would turn out hasty, ill-considered or sloppy work. She was the model and paragon of thoroughness and scientific caution.¹

In 1913, Edith initiated a plan to bring entomologists from other institutions to work at the station during their summer vacations. These summer staff included Alex D. MacGillivray, 1913; Charles P. Alexander, 1913; William C. Woods, 1913 to 1918; Herbert Osborn, 1913, 1914, 1917, and 1918; Henry H. Severin, 1914 and 1915; Edna Mosher, 1915; Clell Lee Metcalf, 1915, 1916 and 1917; and Albert P. Morse, 1920. Since the active agricultural season and peak of biological activities in Maine are concentrated during the few summer months, it was particularly appropriate to concentrate studies during this period. These short studies—many of them surveys of regional fauna—led to an increase in the knowledge of Maine fauna and an expansion of the insect collection begun by Ferland and continued by Harvey and Patch. The summer residents added to the collection according to their specialties: Osborn, leafhoppers, froghoppers and spittlebugs; Morse, orthopterans, beetles, and moths and butterflies; Metcalf, syrphid flies. The presence of these scientists in Maine also furthered Edith's professional relationships with some of the leading entomologists in the country.²

Braeside

The year of 1913 was a busy one for Edith. In addition to beginning the summer program for visiting entomologists, she purchased a house and property from Abraham L. Johnson on December 9. The original



Braeside. Sketch by Arline Thompson.

lot was 100 acres on Marsh Island in the Stillwater River, but a portion of this lot had been sold and Edith received fifty acres, a narrow strip reaching from the bank of the Stillwater River half way across Marsh Island. The lot was in Old Town on the border with Orono.³ Edith described the house on the lot as “a typical 100-year-old New England white house situated about a mile from the University of Maine campus. The fifty-acre home lot is a combination of river front, meadow, and woodland.” She named her home “Braeside,” with reference to its location on the sloping bank of the river. Edith stated several times that the reason she bought the property was to obtain this land along the river. In her explorations of the area near the university, Edith had identified the river frontage of the property as one of her favorite places:

I know a girl who, once upon a time, came to a bluebell swinging above a cranny in a rock ledge beside a river. She did not pick it, for they who love flowers most, pick them least. But she remembered it and ten years later returned and bought the rock ledge and nearby acres. For the sake of the bluebells still growing there she thought of the place as “Bonnybrae.”⁴

Edith claimed that her house had historic interest: “Lincoln Colcord roomed here during part of his college course and you remember he wrote the words of the University of Maine stein song.”

Her garden would eventually include flowers brought from Colorado, Massachusetts, and Vermont and she always grew milkweeds—“as an invitation to the Monarch butterfly.”⁵ Edith would later add a small summer house to her property, “a little screened lichen-grey house on a lichen-grey ledge as near the river as the spring floods will permit.”⁶ This would be Edith’s retreat, a shelter from the sun, rain, and mosquitoes where she did much of her nature writing during the summer months.

Edith later found that Braeside had been home to the parents of Director Woods from 1896 to the early 1900s. Alice S. Patch, Edith’s older sister, retired from teaching in Minneapolis in 1918 and joined her at Braeside as her companion and housekeeper. Braeside would be their home for the remainder of their lives.⁷

Edith sometimes rented part of her home to families associated with the university. One was the Fitch family, who shared Braeside with Edith and Alice from 1919 to 1922. Albert Lewis Fitch, who served as head of the university’s physics department from 1919 to 1937, arrived in Orono in September 1919, bringing with him his wife, Emma Elizabeth Leeson, sons Donald Max and Karl Albert, and daughter Bula Louise. The family became close friends with Edith and Alice and the children became Edith’s adopted family, always referring to the sisters as “Aunt Edith” and “Aunt Alice.” Karl Albert Fitch later recalled that

Being only four years old at the time, I do not really remember too many details, however, we moved into ½ of the house towards Stillwater belonging to Aunt Edith and Aunt Alice Patch. Aunt Edith and Aunt Alice both were very interested in nature and natural things. We would go on walks and picnics in the woods with them or on a small island in the Stillwater River by the summer cottage Aunt Edith had on the banks of the river.⁸

Albert Fitch recollected that

While we were living in Miss Patch’s house (then called Braeside) we had a pet crow. In fact I think two pet crows. One we got back in the woods back of the home, the other on the island near Stillwater. The crows grew very tame. They would steal anything. Once they stole Miss Patch’s watch and another time they stole Mrs. Southerland’s glasses. One of them would follow me to the university and fly into the class room to carry off crayons. They seemed afraid of nothing. One would sit on the trolley tracks and make the motorman stop the car to chase him off.

The Fitch family moved to 32 College Avenue in Orono in 1922 and had two more children, Glen Leeson and James Henry. Albert Fitch left the University of Maine in 1937, and the family moved to a farm in New Sharon, Maine. Edith's friendship with the Fitch family, however, continued throughout her life.⁹

Aphids

The volume of entomological correspondence addressed to Edith that survives at the University of Maine indicates that she continued giving her time generously to persons who requested information or help with aphid identifications.¹⁰ Sometimes, however, these requests frayed even Edith's patience. In reply to one request for identification of specimens, Edith writes:

Young Man, the next aphids you send drop alive into thin balsam on a slide, clap on a cover glass and transport whole. It has taken my assistant half a day to collect the fragments from the debris which arrived, and me half an hour to examine the different portions of wrecked antennae and select one with the sixth segment entire. An aphid is a delicate animal and swishing it around in a large vial of fluid works havoc. Alcoholic material of the larger species does very well if you crowd a smooth plug of absorbent cotton down as close as to prevent swishing. If you hear of anybody thinking of sending the material,—just pass my advice along if you don't mind. It makes me savage to see perfectly good aphids broken to bits.

After which tirade I will express my appreciation for the privilege of seeing this interesting species which is new to me, and is apparently undescribed for America at least.¹¹

In another letter to a young aphid specialist, A. C. Baker, Bureau of Entomology, Washington, Edith sends an appeal for civility in entomological communications:

Dear Mr. Baker,

I was glad to receive a copy of your *Pterocommini* paper and interested in the valuable information it contains. There was something about the tone of it however,—by the way, would you take a bit of advice with becoming grace? I've given you enough praise—you ought to be willing to swallow one pill!

It set me to wondering whether you are going to set sail into all our mistakes antagonistically? Aphidology is complex and difficult. There are not many people working out its problems. None of us are infallible. We all need the help of the rest of us. You may find this is true of yourself,—you are publishing a good deal and rapidly,—it is possible we may find some of your statements will not stand the test of time and further study. Why knock down the other chap? Of course, published mistakes have got to be corrected, —the sooner the better,—but it need not be done in the spirit of intolerant criticism. You can be gracious enough when you feel that way. For the sake of American Aphidology drift into sympathy with the complexities and help us straighten them out,—tolerantly, young man, *tolerantly*.

Oh, no, you needn't say 'Yes, Ma'am,' or anything else unless you want to about this sermon not to be 'continued in our next.'¹²

Sometimes Edith's advice to young entomologists was of a more personal nature. P. B. W. Wiltberger wrote from Michigan Agricultural College on September 28, 1917, that he was distraught at the uncertainty of the timing of his commitment to report for military duty at the War Department in Washington where his work would be the eradication of mosquitoes, flies, bedbugs, lice and other vermin and the bacteriological work relative to this service. "If I am away from here at the time this order comes for me to report somewhere and I cannot report on time I will be court-martialed." This uncertainty about the "turmoil of World War I" resulted in his being unable to sleep at night.

Edith replies:

Do you ever try detective stories as a sedative? The more effective as they hold the attention and give temporary rest due to change of thought. At times of nerve strain are the only occasions when I care for that type of trash, but I've blessed it more than once in this capacity.¹³

Through her national and international contacts Edith continued to add to her growing collection of aphid specimens and increase her familiarity with aphid literature and specialists from around the world. This was especially helpful in the case of aphids not native to North America. Since the arrival of the first Europeans, plants used for food and fiber or as ornamentals had also been arriving on this continent along with their insect associates. These invasives, as they are now called, either spread and multiplied along with their host plants or found new associations with native plants. Thus an aphid not previously

identified in North America was not necessarily a species not previously known to science. Contacts within the U.S. sometimes helped Edith with her research by sending living aphid and plant material for use in her indoor food-plant host trials.

Edith published thirty-six scientific articles between 1912 and 1921. Some were in national journals such as *Science*, *Psyche*, *Annals of the Entomological Society of America* and the *Journal of Economic Entomology*; most were published as MAES bulletins. The subjects of the papers varied and included descriptions of species new to science and lists of species from particular geographic areas, but emphasis was on the identification of aphid food plants and the determination of aphid and coccid life cycles.

The compilation of information on the food plants of aphids is one of the most important parts of Edith's work as a scientist. Between 1912 and 1918, she published the *Food Plant Catalogue of the Aphidae of the World* as five MAES bulletins.¹⁴ This early catalog aims to be a bibliography on host plants rather than on aphids. It maintains a systematic sequence of the families of host plants, but it was neither systematic nor critical from the aphid standpoint. An example is the entry for the cattail family of plants:

TYPHACEAE. CAT-TAIL FAMILY.

TYPHA. (Thypha) Cat-tail Flag.

T. angustifolia L.

Mysus persicae Pass. Passerini Flora

T. latifolia L. (major). Common Cat-tail.

Rhopalsiphum nymphaeae (L.) Koch (*A. butomi* Schrank) (*R. majadum* Koch). Passerini, 1863, p. 21.

T. shuttlesworthii Koch.

Mysus persicae Pass. Passerini Flora.¹⁵

Here Edith includes three species of cattails with their two associated aphid species. Species names in parentheses were no longer valid at the time of publication. These bulletins are an early version of her 1938 catalogue on the same subject.

Edith frequently emphasized the need to study the life cycles of aphids and coccids along with their associated food plants. She felt strongly that the time and money spent on acquiring this information



Insect house at the University of Maine. Behind it are the livestock pavillon and Winslow Hall.

was justified and could lead to increased ability to control species that damage valuable crops and ornamentals. She published extensively on the subject during this period and felt that this information was needed before recommendations could be made for reducing the damage caused by these insects.¹⁶

Edith needed to determine early in the study of a particular aphid if the aphids feeding on different plant species or in different locations were indeed different species—as early taxonomists frequently assumed—or were the same species. If they were the same species, she needed to be sure of the correct name and the characteristics that defined the species. She made extensive literature searches, compared specimens, and consulted with other aphid experts. Then she studied the life stages (eggs, nymphs, winged or wingless adults), modes of reproduction (sexual or asexual, eggs or live births), and numbers of generations that were associated with their seasonal distribution on plants in the field. She might then test plant associations in the greenhouse or laboratory. Assembling these data often required years of work. The projects that Edith undertook frequently involved plant species that were economically important in Maine such as potatoes, apples, and ornamental shrubs and trees.

Aphid species that accept only one food plant, depositing their eggs upon it and passing their whole life cycle there, usually present no difficulties greater than those of other insect pests and are even easier to combat. But aphids that select different kinds of plants for their fall, winter, and spring or summer generations frequently change their manner of life to suit the different environments. Edith needed to look carefully at these insects, so links in their life cycles were not missed.

This was the case of the pink and green potato aphid, *Macrosiphum solanifolii*, which caused extensive damage to Maine's potato crop. When Edith began studying this aphid, the only food plants recorded for it were two in the night-shade family, the "pepper vine" and the potato. Her studies over the next eight seasons, however, revealed that the situation was more complicated. In spring, Edith found this aphid on rosebushes feeding on the succulent new growth and especially abundant near the flower buds. She noted that the species migrated to the potato during the first two weeks in July; by the middle of September, the fall migration was over, and the aphids had deserted the potato fields. Edith's indoor studies revealed that the aphid preferred the rose when it left the potato plants, but would colonize a variety of plants, some of which were common weeds. It was not known at this time on which plants a spring generation would develop, but in Maine it had only been collected on roses.

Summarizing her research up to 1915 in "Pink and Green Aphids of Potato, *Macrosiphum solanifolii*," Edith gives details on the life cycle of this insect. She describes its serious impact on potatoes and provides a list of plants on which the aphid had been collected. She also gives a description of the species to aid those attempting to identify it and lists currently available chemical control methods, which were mainly decoctions of tobacco or commercial preparations containing nicotine. The association of the aphid with roses was especially significant in Edith's recommendations for its control. She also wrote of it for the general reader in "The Traitor Aphid that Robs Potatoes: Strange Story of the Part that Roses Played in Helping along Last Year's Trouble" published in *Garden Magazine* in 1917. Here, with reference to WW I, she likens this aphid, a native North American species, to a war-time traitor helped along by the rose.¹⁷

Edith labored to unravel the complex life history of another aphid, the woolly aphid of apple, *Eriosoma (Schizoneura) lanigera*, which causes extensive damage to apple trees. White masses, looking like patches of thick mold, often occur on apple trees, especially around

pruning wounds or other scars on the trunk and branches. Beneath this substance are colonies of rusty colored or purplish brown aphids known as woolly aphids on account of their white covering, which is composed of waxen filaments. On tree roots, the aphids cause enlargements, and increases of these malformations occur in clustered masses. The damage is particularly serious in nursery stock and young trees. It is less important after the tree has become well established and attained some size, though it can still be troublesome. A badly attacked tree assumes a sickly appearance and grows unsatisfactorily; the leaves are dull and yellowish. Even if the tree is not killed outright, it is so weakened that it becomes susceptible to the attacks of borers and other insects. In 1911, it was found that from 20 percent to 25 percent of the apple nursery stock was infested by the woolly aphid. The woolly apple aphid has a complex life cycle and is associated with a variety of plants in addition to apple; in the early 1900s in Maine, the most important of these was elm. Edith's work revealed that in the summer the aphid completed a number of generations on apple before migrating to the elm in the fall, where they passed the winter. In the spring, the aphid completed several generations on the elm before migrating back to apple trees for the summer.

Edith believed that the presence of elm, with its potential as a source of spring migrants, was critical in Maine. In "Elm Leaf Rosette and Woolly Aphid of Apple (*Schizoneura lanigera (americana)* in part)," she advises avoiding raising elms and apples in the same nursery and encourages planting young orchards in locations without elms. Edith notes that during years when the species was abundant on apple, it was also a serious pest of American elm. According to the bulletin, in some springs nearly every branch of many trees was tipped with an unsightly cluster of deformed leaves or "rosette" galls. Such an infestation marred the beauty of the large elms and was a heavy handicap for the young trees. As part of her research, Edith identified important natural enemies of the woolly apple aphid. Observations in Maine over a period of ten to twelve years showed that syrphid fly larvae were the most efficient predators of the woolly apple aphids. These observations were supplemented by Metcalf's, a syrphid specialist and one of the summer staff at the station. Metcalf gave special attention to study of the larval habits. The syrphid species *Pipiza pisticoides* was identified as the most important natural enemy of the woolly apple aphid in the Orono area. The larvae feed so extensively on the aphids that the aboveground colonies of the apple pest are almost exterminated by



Edith Patch in 1916. Courtesy of Alma and Fred Otto.

late summer. These findings came to the attention of Australian scientists contending with a severe woolly aphid problem in their orchards and they made plans for a shipment of *P. pisticoïdes* and possibly other syrphids to be sent to Australia.¹⁸

“Aphids on Your Plum Tree,” published in *Garden Magazine* in 1917, is a detailed piece about how Edith worked and how her knowledge of worldwide aphid species and the associated literature led to answers to questions about another migratory aphid. She recounts that in 1761 the great Swedish naturalist Linnaeus found an aphid on a pond lily that

he called *Aphis nymphæae*, after the plant on which it was living, a common practice at that time. Many years later, a man in Ohio found a colony of these aphids and called them *Aphis aquaticus*, never suspecting that they had already been given a name. The man from Ohio described what was unusual about this aphid:

One peculiarity which attracted my attention was the ease with which the aphids walked over the surface of the water, or were found half submerged in an attempt to feed on aquatic plants. An accurate examination of the forms showed that on either side of the thorax were located three pairs of wax glands....

It is quite clear that this waxy secretion would be of the greatest value in keeping the insect from getting wet, as it not only projects out from the body, but is also powdered over the entire ventral portion of the thorax. While walking on the water this secretion is always in contact with the surface and serves as a float while the insect pushes itself along, moving quite as rapidly as on a dry surface.¹⁹

In 1910, another entomologist reported that the aphid the man from Ohio had found was the same species that Linnaeus had described in

Europe and that its correct full name should be *Rhopalosiphum (Aphis) nymphaeae* (Linne') (*aquaticus* Jackson) Davis.

In 1915, Edith was in the process of describing a new species of aphid that was attacking plum in Maine when she received a letter from a man in Russia containing the description of a new species of aphid on plum, which he called *Aphis prunorum*. In its picture it looked remarkably like the unnamed plum aphid that Edith was about to designate as a new species. The description of the Russian aphid placed it in the genus *Rhopalosiphum* rather than in the genus *Aphis*, a decision with which Edith agreed. But she wondered, What if the aphid on the water plants, now called *Rhopalosiphum nymphaeae* (Linne'), migrated to plum in the fall and deposited overwintering eggs on plum twigs and the aphids lived on the plum in the spring until it was time to go to the water plants in the summer months?

To test this speculation, Edith brought potted arrowhead (water plants) into the laboratory early in the spring before winged aphids appeared on plum. On June 15, she captured some migrants taking flight from plum and placed them on the arrowhead in the laboratory. These aphids immediately settled down and began to feed. Five days later, the arrowhead supported a population of young aphids covered with wax; if they dropped into the water, they paddled off in search of another water plant:

So the daughters and the granddaughter and the great granddaughters of the aphids that migrate from your plum tree last spring, dwelt on cool water plants for the summer, taking a swim now and then if they happen to drop. And then in the fall a generation with wings appeared and they returned to the plum where the overwintering eggs were left to provide for the messy sticky colony on your plum this spring.²⁰

Writings for General Readers and Children

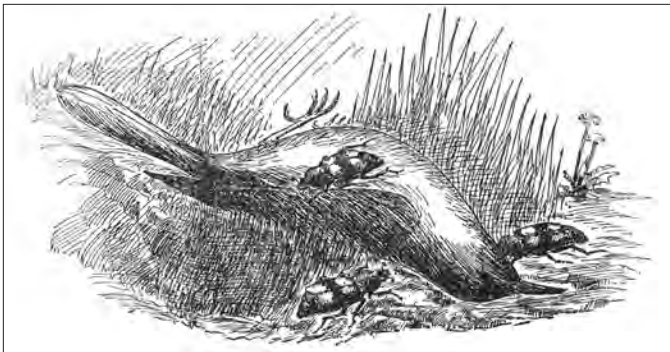
Although science would continue to be Edith's primary focus, her wish to increase the scope of the audience for her writing and to allow for more artistic expression in her work led her to new styles of writing and venues for publication. In 1913, Edith established her own publishing company and published her first book for children, *Dame Bug and Her Babies*. With *Dame Bug*, Edith began to fulfill her early dream of writing stories for children that would be both biologically accurate and appealing: "When I grow up, I will write stories about outdoor things for children and they shall be *true* stories." *Dame Bug*

was a series of stories about how eighteen different insect mothers provided for their young. Illustrations were by Edith's colleague Oskar A. Johannsen. She provided informal names for the insects such as Dame Potter for a potter wasp and The Dragon Guard of Maple Sugar for a parasitic ichneumonid wasp, reflecting the behavior she wished to emphasize. Ever the entomologist, Edith included the scientific names of her subjects in the back of the book. In the preface to *Dame Bug*, Edith gives her objective in writing the stories:

We do not, however, offer this book as stories merely, but as introductions to a few of the fascinating denizens of grove and field and brook, choosing those so from the eastern coast to the western coast of our country, that any little runner may read for himself in the original out-door language these same stories.²¹

She urged the children to observe the insects, but to do nothing that would interfere with them or harm them.

One of the essays of particular interest today is "The Burial of Cock Robin," which is about the American burying beetle, *Necrophorus americanus*. Edith and her contemporaries spelled this generic name "*Necrophorus*"; "*Nicrophorus*," however, is the current accepted spelling. This exceptionally large beetle, dramatically colored black with red markings, feeds on carrion. In Edith's story, the female beetle moves the carcass of a robin to an area of friable soil where she excavates a hole for it. She then covers the carcass with soil, deposits her eggs on the carcass, and remains in the excavation, feeding the larvae from the carcass until the larvae have matured and pupated.



"Burial of Cock Robin" illustration by Oskar A. Johannsen in *Dame Bug and Her Babies*.

Although these beetles were widespread at the time the book was written, occurring in thirty-five states, by 1923 the beetles had disappeared east of the Appalachian Mountains. It is now found, only rarely, in Nebraska, Oklahoma, South Dakota, and Arkansas. Currently there are attempts to reintroduce it into Ohio and Massachusetts. Research on the beetle has shown that both parents participate in the burial of the host carcass and the feeding of the young—a level of parental care that is unusual in insects. In 1989, the beetle was placed on state and federal endangered species lists.²²

Dame Bug was printed privately by the author in 1913 under the imprint of the Pine Cone Publishing Company, Orono, Maine. A brochure announcing the book provides reviews by some of the most prominent entomologists in the country. John Henry Comstock, professor of entomology at Cornell University, and Anna Botsford Comstock, lecturer in nature-study at Cornell University wrote:

DAME BUG AND HER BABIES is the best collection of insect stories we know for small children. They are written in a charming style and are vividly interesting. The illustrations are attractive and pertinent. And above all the high standing of the author as an entomologist, makes certain that these are true stories even though they are fairy tales.

Alex. D. MacGillivray, associate professor of systematic entomology at the University of Illinois wrote:

Nothing troubles the mind of the naturalist so much as the printing of nature stories with only a thin skimming of nature facts. *DAME BUG AND HER BABIES* is not of this class, but gives full and true accounts of the several common insects, presented in a way to interest both young and old.

The price of the book was seventy-five cents, plus seven cents postage. Because of the high quality of the paper and binding, many copies can still be found. Original drawings of some illustrations have also survived.

Edith's professors at the University of Minnesota thought that she had considerable potential as a writer of verse, and Edith continued to write verse throughout her life. Some verses were published, but most exist only in manuscript form among her papers. The Pine Cone Publishing Company issued several examples of Edith's verse illustrated with sketches by Elizabeth Miles Derrickson: *Corbie Craw* is one of these. It is an unusual publication, similar to a large greeting



*Corbie Crow, illustration by Elizabeth Miles Derrickson.
From How Laddie Tells the Time O' Year.*

card and printed on cream-colored cardstock. The cover is an attractive watercolor of a crow sitting on the branch of a tree and inside is a verse about crows:

Black Prince Corbie is ruler o' the field,—
A tax he levies on the good farmer's yield;
But he banishes grasshoppers with all his might and main
And so they cannot harvest all the growing grain.
CAW-CAW-CAW.....²³

It is not clear if it was intended as a vehicle for presenting Edith's verse or as a note card. Only a few copies have survived. Edith published another card of this type, only smaller, with the same illustrator; it had sketches of geese in a pond on the cover.

Corbie Crow was followed in 1914 by *How Laddie Tells the Time O' Year*. The theme of the book is that the outdoors is full of information for those who will look:

Some people tell the time o'year
By calendars and printed lines:
Now don't you think that rather queer,
When ALL OUTDOORS is full of signs?²⁴

With verse by Edith and charming illustrations by Derrickson, Edith chronicles the progression of the year with the changing lives of plants and animals. This book was also published by the Pine Cone Publishing Company, but because fragile material was used for the cover, few copies have survived intact. Throughout her life Edith had cards illustrated from her publications printed for various occasions. Some verses and illustrations published as note cards are from *How Laddie Tells the Time O' Year*.

No more is heard of the Pine Cone Publishing Company, and Edith does not mention titles published by Pine Cone Publishing Company in a list of her publications she compiled late in life. It is possible that since the books were essentially self-published, she did not think of them as professional publications.

After completing her Ph.D. at Cornell, Edith felt she faced a dilemma in 1912 that was the reverse of that in 1901. She no longer lacked the scientific foundation for nature writing, rather she worried that she had nothing available but a technical habit of expression. To address this “for six years, off hours and holidays were devoted to the attempt to get facts expressed in such a way that they would hold the interest of the general reader or a child.” There were many rejected manuscripts. In 1919, her first story in the new style sold for \$100 a page.²⁵

Between 1917 and 1920, Edith published fourteen articles for the general reader interested in gardening and natural history in periodicals such as *Scientific Monthly*, *Garden Magazine*, and *Country Life*. Occasionally these articles mirrored her scientific research articles—but without the scholarly detail and in a style acceptable to the casual reader—but most were on general topics.

These articles are delightfully written. A particularly enjoyable article is “While We Prune the Orchard,” published in *Garden Magazine* in 1918.²⁶ Although it is filled with information, its objective is to encourage the readers to go outside, look for themselves, and make their own informed decisions about the fate of insects that they might encounter based on alternatives that Edith suggests. Edith carefully guides the readers in their discovery of a cecropia moth cocoon:

With a proud sense of being judicious we select the branches that must fall if we shape the tree for grace as well as strength and have in mind the proper distribution of sunshine among the summer leafiness of boughs.

But all the time we know that it is not simply remodeling the orchard that we are about. The side issues of that operation are no less important than what we speak of as the main item and it is a wasteful person who neglects the by-product of any enterprise.

With eyes alert we glance up and along the branches and with a smile we recognize, in the large gray-brown object securely woven to the underside of a twig, the cocoon of the cecropia moth. Destroy that? Well, not while there are any kiddies, young or old, in the house. We'll take that treasure box of snugly woven silk in to the warmth. Later on some day we shall hear from inside it the sound as of a mouse nibbling and know that a newly hatched moth has broken the pupal cell and is making its way out through the walls of its prison. Have you ever tried to tear one of these tough structures with your strong fingers and wondered how so frail a thing as a moth succeeds in making its escape? On each shoulder it wears a tiny sharp edged tool and with these it cuts an opening through the enveloping fibers. 'Tis worth the task of a day's pruning alone to win the pleasure of watching that wonderful creature emerge from its winter nest and cling by its downy legs while its soft limp miniature wings increase in size. The veins in them are swollen with an amber fluid which rushes into them in the process of rapid growth. Even as you watch you can see the wings expand, the color pattern spreading its area, the four small wobbly flaps become four broad wings which hang quiet, except for an occasional shift, while the moth bides the night time for its first flight.

No, do not destroy the cocoon of the cecropia moth unless you have become so inured to the sight of beauty that you have no further need of seeing colors that the richest oriental rugs or pan velvets cannot rival.²⁷

Evidence of other overwintering insects was less enthusiastically received, and she includes a list of "Winter Lodgers in the Orchard and How to Destroy Them."

In "Sign Language of the Caterpillar," published in *Country Life* in 1918, Edith tells us how to determine the age of the saddled prominent caterpillar by the feeding patterns on the leaves of birch. The information and illustration for this article were previously published in 1908.²⁸

In “The Quiet Grasshopper,” also published in *Country Life* in 1918, Edith provides an explanation of the sudden cessation of activity and sound by the grasshoppers inhabiting the fields and the appearance of the silent and still grasshoppers at the tips of vegetation and fence posts. The grasshoppers are victims of a fungus disease, *Entomophthora gryllis*, which appears whenever numbers of grasshoppers reach a high level. The peculiar effect of the disease is to force the dying grasshopper to creep to a height and fix itself with a frantic clutch, which enables the fungal spores to infect a relatively wide area as they are thrown out over the food of the grasshoppers below. “Thus nature wages a protective war for the crops of man, shooting fungus spores in their defense; and the quiet locust is the symbol by which we recognize her victory.” The information and illustration for this article were previously published in 1907.²⁹

It is clear that Edith liked crows. She loved to watch the antics of wild crows, she had several pet crows at different times, and she wrote about crows. She forgave them for killing the occasional small bird and robbing the corn field. She claimed that these indiscretions were compensated for by their removal of many crop-damaging grasshoppers. The sight of the flocks appealed to her imagination: “Bold and rollicking fellows, they accept life with voluble humor, their raucous laughter announcing merrily that they find the world joyously adapted to the delights of crowdom.” Her pet crow was named Corbie and she wrote about him in “Corbie,” published in *Country Life* in 1919. His wings had been clipped and he could not fly, but he joined Edith in her gardening, feeding on the June beetles revealed in the overturned earth. He amused Edith’s guests and the neighborhood children by his antics as he bathed in a pan of water in the garden.

No less contagious was the spirit of his bedtime mood, for at dusk he would cease his gambols, and, creeping up into my lap, tuck his head under my arm with a soft teasing, “Ch-ch-ch,” which betokened the tired baby who was ready to be cuddled to sleep. There was something appealing in the faith with which he came, so sure in his trust that my protection would suffice for the night of his helplessness.³⁰

If Edith liked crows, she did not like cats. In “Fall Plowing, Fewer Cats and More Birds,” in *Garden Magazine*, 1920, Edith promotes cultural methods of insect control over chemical applications. One cultural method she highly endorsed was proper tillage, which from

the entomological perspective, always included fall plowing. Here the pupae of insect pests such as the corn-ear worm were exposed to birds and other predators, breaking the life cycle of this destructive insect. In this article, Edith also chastises the owners of cats who let them roam and kill the birds that support the battle against insects that attack gardens. She also answers a question of consumers of fresh corn about why, even in a season with many corn ear worms, is there usually only one larva feeding in an ear of corn? She explains that the corn ear worm larvae are highly cannibalistic and will vary their usually vegetarian diet by eating each other until only one remains.³¹

Farmers and gardeners frequently asked Edith about how aphids could suddenly appear on their crops in substantial numbers. In “The Migratory Aphid and the Landscape Gardener,” published in *Garden Magazine*, she tries to answer this question by discussing the migratory habits of some species, which allow them to move seasonally from one plant species to another. She supplements this discussion by supplying a list of aphid species along with their primary and secondary host plants in “Flights and Frivols of the Aphids,” also published in *Garden Magazine*.³²

Edith also began an ambitious series of short essays in children’s periodicals. Between 1915 and 1920, thirty-three articles were published in *The Churchman*, *Little Folks Magazine*, and *Storytellers’ Magazine*. Unfortunately, copies of these articles are not readily available, and I have been able to review only a few of them. One of these is “The Story of a Little Christmas Guest,” which was published in the December 1919 issue of the *Ladies Home Journal*. Here Edith tells the story of the life cycle of Abbot’s bagworm, *Oiketicus abboti*, a moth of the family Psychidae. In her story, the small caterpillar, called Ketj Abbott, is brought into the house on holly used to decorate the home for Christmas. During the festivities, the little insect continues to construct its traveling home from bits of vegetation and observes the children during their Christmas activities. Most of Edith’s stories about insects are set in the insect’s natural environment; in this case, having the small caterpillar in the family living room interacting with the Christmas Eve preparations, makes the scene appear contrived and unnatural although the complicated life cycle is related with charm and accuracy. The story was illustrated by a series of thirteen small sketches, only some of which were relevant to the story.³³

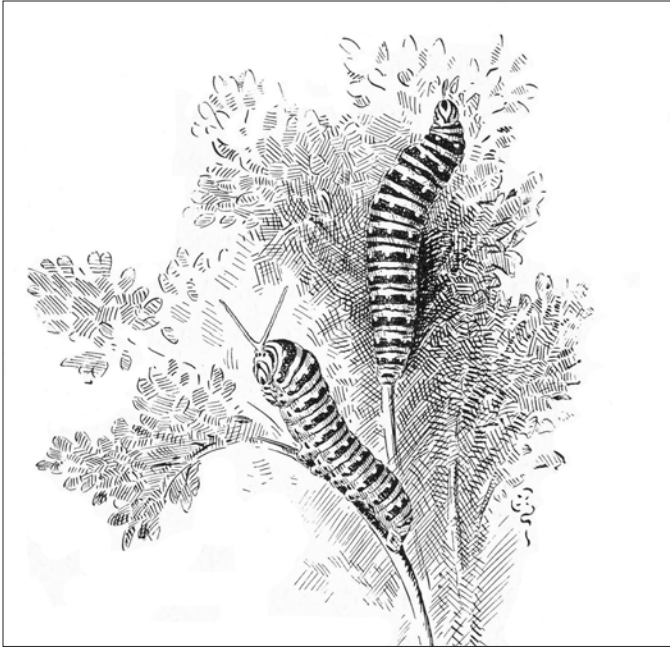
A trial story about an aphid that Edith sent to the Atlantic Monthly Press led to her submitting to the press a manuscript for a book of stories about insects. The manuscript was well received by Ellery Sedgewich, editor and publisher:

Your pleasant manuscript (the first book in the Little Gateways to Science series) makes me sorry for these forty years for I should love to be in a class which had Hexapods for a text and you for a teacher. My more technical and learned friends tell me the book will go. All I know is that it is very attractively done, and that I shall be very proud and happy to publish it.³⁴

Little Gateways to Science: Hexapod Stories—Edith’s first book with an established publisher—was published by the Atlantic Monthly Press in 1920.³⁵ Edith dedicated the book to her sister Alice, who had recently arrived in Orono to live with Edith. The format is similar to that of *Dame Bug and Her Babies*, with chapters devoted to individual insect species or a group of species. As in *Dame Bug*, the insects are given informal names often related to their common or scientific names. While *Dame Bug* only deals with how female insects provide for their offspring, *Hexapod Stories* describes much of the insects’ life cycles, including descriptions of Old Bumble, a bumble bee; Poly, a black swallowtail butterfly (*Papilio polixenes*); Jumping Jack, a tree hopper; Lampy, a firefly (*Photinus pyralis*); and Carol, a grasshopper (*Dissosteira carolina*). “The Story of a Little Christmas Guest” (Abbot’s bag worm), originally published in *Ladies Home Journal*, is also included, but the relevant illustrations and larger type greatly improve its presentation.

Hexapod Stories is a delightful book, bringing together Edith’s knowledge of insects and her skills as a writer for children. She explains complex details of insect development and behavior in terms to which children can relate. She also addresses the always puzzling question of how do caterpillars grow?

The first day they rested quietly, but the second day they acted as if they were having bad dreams and tossed their heads a great deal. In fact Sister Essa jerked so hard that at last her little skull came off like an empty shell. By that time she was wide-awake and crept out of her tight skin through the collar-hole the skull left when it tumbled off. Before she had time to turn around, all her brothers and sisters were jerking their skulls off, too, and creeping out of their skins through the collar hole.



Poly, the Easter Butterfly—“If you find a caterpillar like Poly, she can teach you a great deal.” From Hexapod Stories, illustration by Robert J. Sim.

Something funny had happened to them and they never looked the same again. They now had new heads, with bigger jaws and fine new stretchy skins.³⁶

Another often asked question is how do insects accomplish an activity correctly the first time it is called upon?

Ah, but Essa could do several things you would never think she could! She had never done them before—why should she now? You might not think she could creep head first down the trunk of the tree, and take a walk, as fast as she could hurry, along the ground, until she came to an old fence; and climb the fence, and spin a silk peg on the lower edge of a board, and fasten her hind-legs, and hang there head-down until her skull split and her skin ripped down the back seam!

You wouldn't know how Essa could do that, would you? And if you ask the wisest man you see *how* a caterpillar can do wonderful things like that just once in her life, without learning or without any one to show her about making a silk peg, maybe he will tell you he doesn't know, either.³⁷

The illustrations are beautiful and appropriate. The book is well put together, with the type large enough for both grandmothers and their grandchildren to read with ease. Because of the high quality of the cover, paper, and workmanship, many copies have survived in good condition for almost 100 years.

The critical comments were enthusiastic:

I have examined ‘A Little Gateway to Science – Hexapod Stories’—with much pleasure and satisfaction. When I read these little stories of actual life I seemed to be a child again, sitting at the feet of Mother Nature in the midst of out-of-doors, listening spell-bound to her tales of the marvels all around. Perhaps there are no fairies left, yet somehow I feel that I have heard their lightsome laughter and caught the flint of their gossamer wings, such is the joyous, piquant quality of the spirit in which these stories are also and hope to see more from the same pen.

—Albert P. Morse, Peabody Natural History Museum, Salem, Mass.³⁸

A few days ago a friend lent me a copy of ‘A Little Gateway to Science’ by Edith M. Patch, and I have read it with much pleasure. Among the great number of children’s books, it is rare to find one that is scientifically accurate and at the same time written from the child’s point of view by a pen inspired with imagination. *Hexapod Stories—First Book of the Little Gateways to Science*—fulfills all of these qualifications, and is so well done that I hope you can persuade the author to write more stories of the same kind.

—C. Clyde Fisher, American Museum of Natural History, New York City.³⁹

Edith intended the book for use in schools, and the book includes notes for teachers. In the notes, Edith suggests that teachers with no enthusiasm for nature studies should not try to teach the children at all, but let them learn for themselves. She also suggests that children be allowed to bring insects into the classroom where they could be cared for and observed. Edith provides directions for making simple enclosures for these insects and a list of references for the teacher (or parent) who wished to pursue insect study further.

Edith seemed confident that insects were present in limitless numbers and destined to remain so:

They are not far away, not farther than the flowers or the trees or the nearest brook. And there are so many millions of them that every child in the world might have some for pets and they would never be missed.⁴⁰

Hexapod Stories must have sold well. It was priced at \$1.25 and by June 1922, two years after publication, it had undergone four impressions.

CHAPTER 4

Post–World War I: The 1920s

REGRETTABLY, THE GOOD TIMES AT the experiment station during the pre–World War I years did not last. When the U.S. entered the war, Raymond Pearl, an animal breeder and geneticist, was called to Washington. He left in June 1917 to help with the war effort and took several other station staff with him. In December, Herman Hansen of the chemistry department left to deal with food inspection. Edith Patch and Warner J. Morse were both effectively placed on the rolls of the extension service with responsibility in insect control and plant disease. Morse was a plant pathologist who had come to the station in 1907 primarily to address potato diseases. Curtailment of ordinary work was the order of the day during the wartime period. In 1919, Pearl, Frank Surface, and John Rice Miner all resigned and went to more prestigious jobs with higher salaries; with their departure, the golden days of the Maine station were over. The war had done great damage. After the war, the station could not afford to replace the scientists who had left.

This loss of senior scientists was accompanied by a series of reversals, and Director Woods was attacked many times by the agricultural press. On November 29, 1920, Woods was asked by the station's advisory council to submit his resignation. His services were terminated on December 1. He was also instructed that his sons were not to be employed again by the station in any capacity. His son William Colcord Woods had worked with Edith summers during his high school days and later as summer staff and published the results of his work with insects of economic importance. Woods's family and friends resented the unproven implications that he had misused public funds.¹ In 1921, Morse was appointed director of the Maine Agricultural Experiment Station, filling the vacancy left by the forced resignation of Woods. Although Woods had brought Edith to the station and had supported her work, by 1920 she was firmly established in her position and the change of station director cannot have affected her beyond the loss of a close friend and associate.

Except for the visiting summer staff from 1913 to 1920, there had been no increase of the permanent staff of the Department of Entomology until the passage of the Purnell Act in 1925. Funds secured from this act were used to continue or initiate work on apples, blueberries, potatoes, and other vegetables. In July 1925, Clarence Ritchie



Edith Patch's office in Holmes Hall in 1926.

Phipps joined the entomology staff in charge of the Purnell project. Phipps's previous experience was with fruit insects and he continued this work in Maine, conducting research and publishing on insect pests of blueberries and apples. John H. Hawkins was appointed assistant entomologist in 1926. His research and publications were concerned with wireworms and the European corn borer, which had arrived in Maine in 1922. With this increase in entomological staff, Edith's areas of responsibility were decreased, and she was able to concentrate on her aphid research.

The 1920s saw an increase in Edith's nontechnical publications for adults and publications for juveniles. Frequently material from her technical publications was reformulated for her lay audience of adults and children. During this period, she published fifteen entomological research papers, eighteen articles for the adult general public, four books and nine periodical articles for children, two articles on writing for children, and one book review. The total number of publications, the range of interests of the targeted audiences, and venues of publication, constituted a substantial publication record. During this time she was also maintaining and adding to one of the finest aphid collections in the world. Entomologists from Denmark to South Africa came to Maine for the express purpose of studying this collection. She always

had material on her desk from foreign countries that she had been asked to identify, and in this way she kept in touch with the aphid situation in all parts of the world. Her department maintained three catalogues of all available information on aphids: one indexed by authors who had written on the subject, a second by plants infested with aphids, and a third by the scientific name of the aphid.²

Research and Writing for Adults

Edith's aphid work, the determination of their food plants and life cycles, continued with emphasis on species important to Maine agricultural crops, particularly those affecting potatoes. In the early 1920s, the role of the green and pink aphid (*Macrosiphum solanifolii*) as carrier of certain potato diseases became known, and Edith's work with these aphids assumed significance beyond that of direct injury by heavy infestations. Potato mosaic disease, caused by a virus, was particularly critical to Maine's valuable seed potato industry. The southern states were dependent on northern-grown potatoes for seed. Potatoes with mosaic disease were much more seriously affected when grown in the South, than when grown in the North. For this reason, southern growers did not want to buy northern-grown potatoes tainted with mosaic even though they were suitable for table use. Mosaic was, therefore, an economic danger to the seed potato business, and northern growers who could produce mosaic-free stock could command southern markets that were closed to growers who could not.

In the fall of 1920, the threat of potato mosaic disease justified placing research with potato aphids on the official station schedule, and the Potato Council voted to make potato aphids a new entomological project for 1921. As a result, Edith traveled to the Aroostook Farm at Presque Isle, Maine, for three months to participate in an intensive study of potato aphids, with particular reference to their probable relation to the spread of certain potato diseases. This included a survey of potato fields producing certified potato seed in Aroostook County, Maine, and in neighboring New Brunswick, Canada. Her role as entomologist was to confirm (and there were skeptics) that the presence of potato mosaic depended on the presence of rosebushes on which the aphids overwintered. She discussed the significance of the rosebush in Aroostook County:

in seventeen years' collecting of Maine aphids, [I] had not found the pink and green potato aphid on any primary or spring food plant other



The Maine Agricultural Experiment Station's Aroostook Farm in Presque Isle, Maine.

than the rose...together with the circumstance that wild roses had been reported to be not abundant in northern Aroostook, [I] made an entomological visit to the potato fields of this part of the State desirable to provide answers to several questions. Was the species of aphid accepting (feeding on) in that vicinity a primary host or not recorded for other parts of the country? If not, were there actually enough roses in northern Maine to support the aphid infestations that occur there, on potatoes?³

During her three months in Presque Isle, Edith traveled on foot to complete her inspection to verify the presence of roses near the potato fields known to harbor potato mosaic. She published the results of the survey as "Rose Bushes in Relation to Potato Culture."⁴ For gardeners and naturalists, she wrote "Marooned in a Potato Field" in *The Scientific Monthly*. These findings confirmed that Maine potato fields that supported mosaic were always associated with the presence of roses and resulted in her recommendation that roses near potato fields be eliminated where possible. Edith knew that rosebushes were often associated with the ruins of abandoned houses of early settlers and that some might have been brought from Europe. She acknowledged with regret that destroying these plants could result in the destruction of memorials to these early inhabitants.⁵

Since aphids had been found to transfer potato diseases, there was also considerable interest in other insects with piercing and sucking

mouthparts that could be instruments of disease transfer. In 1921, Edith published “Aroostook Potato Insects,” a list of the Hemiptera (true bugs) that had been collected on potato plants. These insects had been identified to species by Herbert Osborn, but none of these hemipterans were implicated in the spread of potato diseases.⁶

In “Potato Aphids,” published in 1925, Edith reviews the findings on the roles of the three aphid species that she considered the important carriers of certain diseases of potato. Two species had worldwide distribution, the potato aphid (*Macrosiphum solanifolii*) and the green peach or spinach aphid (*Myzus persicae*), and could attack the potato plant in sufficient numbers to cause serious injury. The third species, the buckthorn aphid (*Aphis abbreviata*), which also had worldwide distribution, could cause serious damage to potato only under certain conditions. All three species could spread certain potato diseases under experimental conditions in the greenhouse or insectary, and it was assumed that they functioned similarly in the field. In the publication, Edith reviews the life cycles and damage caused by the two most important species, the potato aphid and the green peach or spinach aphid. The publication also provides a key to the aphids of the nightshade family (the potato and related plants). Additionally, she describes various control methods, including destruction or treatment of overwintering host plants, treatment of potato plants, and roguing (culling of host plants showing disease symptoms).⁷

Edith admired the nature writings of William H. Hudson (1841–1922), who spent his childhood in Argentina and later lived in England. He was particularly known for his ornithological writings and books on the English countryside, which helped to foster the back-to-nature movement of the 1920s and 1930s. Edith was inspired by a passage from Hudson’s *Book of a Naturalist*, published in 1919, describing his early observations on the potato plant in its original environment in Argentina:

When I was a small boy running about wild on the pampas, amazingly interested in everything and making wonderful discoveries every day, I was attracted by a small flower among the grasses – pale and meek-looking, with a yellow centre, petals faintly washed with purple, and a lovely scent. It charmed me with its gentle beauty and new fragrance.⁸

In a piece written in May 1923, “Romance of the Potato,” Edith traces the changes in the potato that had occurred as a result of its

association with humans following its discovery in South America: the proliferation of different varieties to meet different needs and tastes and the change from a species that grew on a mountainside in a diverse plant community to one that grew at all elevations in vast potato monocultures. She uses the story of the potato to reveal the problems of insect and disease attacks caused by these changes and the widespread use of toxic chemicals to combat these problems. She also tells the story of the Colorado potato beetle, first known to humans when it occupied the eastern slopes of the Rocky Mountains and fed on a weed known as buffalo bur or sand bur and was of little interest to people. The settlers moving west brought this beetle a new food, the potato. The beetle then largely deserted its original food source (weeds) and began moving eastward from potato patch to potato patch, often destroying the entire crop. It was recorded in Nebraska in 1859, Illinois in 1864, in Ohio in 1869, and reached the Atlantic Coast in 1874. Eventually, farmers needed to use chemical insecticides extensively to control this insect. I can find no evidence that Edith ever published this piece although she did prepare a final draft with illustrations.⁹

In 1922 and 1923, Edith made observations on an aphid identified as the green apple aphid, *Aphis pomi*. Her review of the literature indicated that this species had been described as spending its entire life cycle on apple and had not been identified as a migratory species. It came as a shock to Edith to discover that early in the summer winged forms developing on apple flew not only to fresh, vigorously growing shoots of apple, but also to a wide range of other vegetation where they established colonies that thrived during the summer. These field observations were confirmed with trials with different plant species conducted in the greenhouse and were included in the 1923 publication "The Summer Food Plants of the Green Apple Aphid." The publication includes lists of plants on which the aphids overwinter and on which they spend the summer. Her detailed measurements of body structures of the aphids show a wider range of structural variations than expected in a single species.¹⁰

Also during the 1920s, Edith unraveled the identity, life cycle, and food plant associations of the buckthorn aphid. Small aphids, sometimes green and sometimes yellow, had puzzled Edith for some time. Because of some anatomical variations, she was uncertain if they were one or several species. It was not until the summer of 1923 that she determined that they were a single species that overwintered

on buckthorn (*Rhamnus*) and in the spring migrated to weeds and vegetable and flower gardens. This established the buckthorn aphid as the progenitor of a set of economically troublesome aphids, which had been masquerading under several names. Edith decided to use the name *Aphis abbreviata*, a name she had given it eleven years earlier. Her 1924 report on the buckthorn aphid includes a detailed description of the aphid to help people to identify it. Edith's record of the buckthorn aphid life cycle greatly improved the understanding of a complex chain of events.¹¹

The buckthorn aphid passes the winter in the egg stage on the branches of buckthorn, usually tucked about the leaf buds. In the spring, the eggs hatch into females only—"stem mothers," which without mating, produce a large brood of live young. These young, also all females, attain their full growth by feeding on buckthorn leaves. In this second spring generation, some aphids are wingless, and some are winged. The wingless forms remain on the buckthorn while their winged sisters migrate to nasturtium, dock, potatoes, and many other plants. Later generations disperse to still other plants. The wingless second-generation females produce mostly winged young that follow their migrant aunts to secondary food plants. On these various plants, the aphids produce a succession of female generations, mostly wingless, but with a fair proportion of winged forms that scatter the species to still other plants. Late in the summer and in the fall, two forms with a special mission develop, one winged—known as the "fall migrant"—and one wingless. The wingless females of this fall generation give birth to young that develop into winged males that fly to buckthorn. The fall migrants arrive at the buckthorn before the males and give birth to small, wingless egg-laying females, which females attain their growth by the time the males appear. They then mate with the winged males and deposit the overwintering eggs on buckthorn twigs, usually near the leaf buds. This returns us to the starting point of the cycle, as it is from these overwintering eggs that the stem mothers hatch in the spring.

In the publication, Edith evaluates the buckthorn aphid's economic importance to the landscape and vegetable gardener and as a carrier of plant diseases. She also reviews the published information on the food plants on which it occurs in Maine and suggests possible control measures including destruction or treatment of buckthorn and chemical treatment of the summer food plants. The publication includes a detailed description of the various stages of the aphid and lists the many names

that had been associated with the species. Edith also acknowledges the contribution of research assistant Miss Edith Merchant.¹²

In “Is the Buckthorn Discredited?” published in *Garden and Home Builders*, Edith relays this information to the gardening public. She emphasizes that this aphid could damage many of the plants and flowers valued by home gardeners and points out that the aphid could also disfigure the buckthorn where it is used as a foliage plant. She also discusses the gardener’s dilemma of destroying one plant species for the benefit of another.¹³

In “The Melon Aphid” and “Where the Melon Aphid Overwinters,” Edith reports the results of her research on the melon aphid (*Aphis gossypii*). During the mid-1920s, this non-native aphid attacked melons, cucumbers, and squash in Maine. Edith’s effort to control the melon aphid was frustrated by lack of information on the plant species on which the aphid overwintered. After three years of research, she identified the overwintering host plant as the common orpine or live-for-ever (*Sedum telephium*). A native of Europe, this stone crop plant with fleshy leaves and pink or purple flowers is widely cultivated and occasionally naturalizes in North America. Historically, it was valued for helping heal wounds. Based on her research, Edith recommended eradicating the plants or cutting and burning its stems, which held the aphid eggs, in the fall as a way to control this pest of melons in Maine.¹⁴

In “Two Currant Aphids that Migrate to Willow-herbs” Edith addresses two other aphids that were damaging and reducing yields of a Maine fruit crop—the variable currant aphid, *Aphis varians*, and the green gooseberry aphid, *Aphis sanborni*. According to this publication, a heavy infestation of the variable currant aphid causes dwarfed bushes and prevents the proper setting of fruit. Edith describes finding it on five species of currants and gooseberries in Maine and notes that currants and gooseberries (*Ribes*) are its primary food plants, and willow-herb (*Epilobium*) is its secondary food plant. In this bulletin, Edith describes the seasonal history of green gooseberry aphid as similar to that of the variable currant aphid. She addresses the confusion of names associated with these aphids, something that occurred frequently with migratory aphids where they were given a different name on every host plant on which they were found. To control them, she suggests spraying the currants or gooseberries with nicotine sulphate in the spring and fall. She also suggests destroying any willow-herbs in the vicinity of currant gardens if it is practical to do so.¹⁵

In Maine in 1926, the pea aphid (*Illinoia pisi*), along with unfavorable weather, caused a sharp decline in the supply of peas available for canning. Historical outbreaks of this aphid had caused substantial economic losses in Canada and the U.S. In Maine, Edith found the pea aphid overwintering in the egg stage on red clover and the spring migrants leaving red clover for more succulent plants belonging to the same family. Peas, when available, are the favorite plant for colonization. In “The Pea Aphid in Maine,” Edith notes that this aphid is exceptional because its primary and secondary hosts are in the same family. She also provides information to allow identification of the species and lists the food plants on which it has been found.¹⁶

Also during the 1920s, Edith identified the aphids collected during faunal surveys of the Pribilof Islands in Alaska and in Connecticut. A species new to science, *Macrosiphum constrictum*, was collected in the Pribilof Islands, and Edith received credit for her contribution when the results of these surveys were published.¹⁷

Edith’s expertise took her away from Orono to give talks on her research on migratory aphids. In 1922, she was invited to deliver an address to the Cambridge Entomological Society on Saturday, March 18, in Boston. The lecture was titled “Seven Lives of the Elm Aphid *Eriosoma lanigerum*” and was the fifth in a series of six lectures on insects, treating in a popular and nontechnical way their habits, growth, and structure; their adaptation to their surroundings; and their relation to agriculture. Two days later, on March 20, she spoke to the students of Wellesley College on “The Story of a Migratory Aphid,” at the invitation of Professor A. P. Morse and Dr. Alice M. Boring.¹⁸

“The Blueberry Maggot in Washington County,” published by Edith Patch and William Colcord Woods in 1922, represents a final report on work done by Woods in 1913, 1914, and 1915 in the Cherryfield area (published in 1915 by Woods) and from different areas from Harrington to Jonesboro in 1922 by Edith and Woods. The authors stress that it represents only a preliminary report on a large and complex topic. This report provides an interesting description of the blueberry lands under production at that time and a summary of the history of the industry up to 1922. The authors also review the history of the blueberry maggot—the most serious insect pest of blueberries at that time—and evaluate approaches to controlling the problems it causes. It is interesting that the edict issued by the administration that children of the former station director W. D. Woods should not be employed by the

station appears to have been put aside to allow his son to work on this project during the 1922 season.¹⁹

During this period, Edith also wrote a series of articles for a lay audience on topics other than insects. “Mullein—A Naturalized American Plant” was published in *Nature Magazine* in 1924, and Edith draws on her extensive knowledge and her botanical files to tell the story of this common plant. Although it is an invasive species, having crossed the Atlantic Ocean many years before, it was so well established on the North American continent that it was referred to in England as the American velvet plant. Edith relates its centuries of use in Europe: the Romans dipped its dried stalks in suet to burn as candles; the Greeks soaked its leaves in oil to use as wicks in their lamps; and its seeds were used in fourteenth century Spain in anesthetizing fish. In this country, infusions of leaves were used medicinally for catarrh and dysentery; hummingbirds sometimes collect the hair from the leaves to line their nests. The article is a wonderfully eclectic mix of information about a common and usually overlooked plant.²⁰

Addressing the general reader in *Garden Magazine*, Edith again raises the subject of the effect one domestic cat’s predation on birds could have on insects attacking garden crops. This is a scathing condemnation of cats! She presents astonishing calculations on the potential insect menace created by a single cat’s unrestricted access to insect-eating birds. “A cat that kills 50 birds a summer potentially releases 2,500,000,000 insects during two seasons.”²¹ Edith’s dislike of cats cannot have been a family affair. On August 28, 1932, Edith received a letter from her brother Fred who was doing family history research. It appears that his maternal grandfather Jenks had been a fine carpenter in Pottersville, New York, and some of the houses that he had built had circular openings in the doors for “the convenience of cats.”²²

In 1927, Edith was invited to spend six months conducting research at the Rothamsted Experimental Station at Harpenden, England, where she continued her investigations of food plants used by migratory aphids, especially *Myzus pseudosolani*. This aphid—a native of England—had recently become significant in North America. In England it was known only from potatoes where it was especially abundant on the “sprouts of the seeds.” Because in Maine they are most commonly associated with the common garden foxglove, *Digitalis purpurea*, Edith thought the common name of foxglove aphid was appropriate. Edith was interested



Photograph from Edith Patch's travels in England.

in examining the foxglove aphid in an area where the foxglove plant is native, as it is in England. She decided to take advantage of being a research guest at the Rothamsted Experimental Station by examining wild purple foxgloves in several parts of the British Isles for the presence of the foxglove aphid. In Great Britain, Edith found the aphid on foxglove plants in different parts of England, Scotland, and Wales, and that the aphids readily transferred to potatoes from other host plants.²³

She published the results of her research in the British Isles and Maine in 1928 in "The Foxglove Aphid on Potato and Other Plants." The publication begins with descriptions of Edith's first encounters with the foxglove aphid, starting in 1912, when specimens collected from peas in San Jose, California, were sent to her for identification. In 1916, she was sent more specimens collected from Easter lilies growing in a greenhouse in Canada. In the early 1920s, the aphids were found in Orono on a wide variety of plants, and in 1926 MAES staff found this aphid species infesting potato seedlings in a greenhouse at the Aroostook Farm in Presque Isle. Its potential as a carrier of potato diseases justified Edith's detailed study on the aphid. In the publication, Edith describes the aphids' reproductive cycle. The aphids deposit their overwintering eggs on the garden foxglove from late September through October. The eggs hatch in the spring, and the aphids of the first generation, the wingless stem mothers, produce living young. In the third generation, they develop wings and fly to a variety of other

plants for the summer generations. The summer generations produce both wingless and winged females that disperse to other plants. Late in the summer, winged females—the fall migrants—return to foxglove, and in October, wingless males and females appear, mate, and deposit overwintering eggs. The publication lists plants in thirty-one families that were known to be acceptable food plants for the foxglove aphid.²⁴

Edith and her sister Alice, who had accompanied her on the trip, returned from England at the beginning of November. They arrived in Boston after a rough voyage and completed the remaining miles to Orono by train after a day's rest. The thrill of being on Arden Common in England at 3 A.M. and hearing the song of a skylark was an experience that Edith long remembered:

Suddenly, a lark went up, singing as he rose. Straight up his strong wings took him until he poised high overhead to pour forth the notes of his joy. Above him a white cloud was spread, and against this he could be seen clearly—even to the motion of his quivering wings.

No music is happier than the sweet clear tones that reached us from far above. It is not enough to say that the song of the skylark rings with joy. More that it has the power of evoking happiness.

Even in memory, I see a hillside gold with gorse, and hear from far above that blithe bird sing.²⁵

In 1928, Edith collaborated with the U.S. Department of Agriculture on a publication designed to explain its policies to the public. "Bread or Barberries" explains the need for the removal of barberry bushes because of their role in the spread of the enormously destructive stem rust fungus, which annually destroyed millions of bushels of wheat, oats, barley, and rye. Edith recounts the life cycle of the rust fungus and the history and uses of the plants it affects. She suggests that because boys and girls love to roam through fields and woods that they could assist with the project by reporting barberry plants that had eluded detection by other means.²⁶

"The Mystery: A Nighthawk Furnishes Thrills with His Trick" is a short piece by Edith published in *Nature Magazine*. In the article, a party in the woods is startled by a repeated sound of "boom!" The sound is described as half-way between a groan and a grunt—queer and ethereal—and is repeated many times. An experienced naturalist arrives and identifies the sound as that of a nighthawk. He then takes

the party to a place where they can see the rapid downward flight and sudden turn to fly upward that produces the sound, made by the rush of air through the wing feathers.²⁷

“Upstream with the Alewives,” published in *Nature Magazine* in 1927, is a celebration of spring, full of the sound of rushing water, the smell of damp earth, the call of bobolinks, and the struggles of the fish against the forces of current and tide. Edith chronicles the mid-May, three-mile upstream migration of alewives from the Atlantic Ocean at Surry Bay (now called Patten Bay), Surry, Maine, via Patten Stream and Six-foot Falls to Lower and Upper Patten Ponds. The article features several of Edith’s own photographs. Material in this article later appeared in a chapter on alewives in *Holiday Pond*, published in 1929.²⁸

Edith had the ability to present her scientific findings to both technical and nontechnical readers of varying ages. This skill is demonstrated by her treatment of observations on a moth known as the Virginian ctenucha (*Ctenucha virginica*). This insect, which feeds on meadow flowers, is a small, dark, day-flying moth with thread-like antennae. The hairy larvae are yellowish when young, but darken with age, and feed on meadow grasses. In 1920, the caterpillars were abundant, with reports of more than 4,000 per acre, but in 1921, their numbers were much reduced. Edith attributed this decline to the action of parasites. In 1921, she published her observations for a technical audience as “A Meadow Caterpillar.” The bulletin includes a section on the benefits of natural control agents and a colored illustration of the life stages of the insect by Robert J. Sim.²⁹ She published this material for the general reader in *Natural History* as “The Adventures of Ctenucha: A Meadow Caterpillar” (1921) and in *The Maine Naturalist* as “A Winter Caterpillar” (1926). In 1930, Edith included this article as a chapter titled “The Adventures of a Meadow Caterpillar” in her children’s book *Holiday Meadow*. Modified versions of Sim’s original illustration were included with each of these publications.³⁰ Monica Russo, a natural history writer, remarked on this piece that “the article is closely detailed, exciting and a wonderful ‘observation’ piece—something to get the young or older observer outside, and to realize that you don’t need to collect or kill or even handle specimens to enjoy natural history skills.” Russo also noted that this species was a good subject for school children to study as it hibernated as a caterpillar and was thus available for study in the spring.³¹



Colored illustration of the life stages of a meadow caterpillar (Ctenucha virginica) by Robert J. Sim, which accompanied Patch's 1921 bulletin, "A Meadow Caterpillar."

Books for Children

A second *Little Gateways to Science* book, *Bird Stories*, was published in 1921 by the Atlantic Monthly Press. Robert J. Sim provided the illustrations and also contributed to the text. The book is dedicated to "Junior Audubon classes and to all other boys and girls throughout the land who are friendly to birds."³² The stories of twelve birds are told in a clear and compelling way. Edith notes the severe adverse effects of human activity and greed on some species: the passenger pigeon,

which was extirpated during Edith's lifetime, and the snowy egret whose populations had been much reduced by plume hunters. The book pleads for conservation of birds. Edith presents the complex issue of applying human ethical standards to animal behavior, as when an eagle steals a fish from another bird, in terms that children can understand. The book provides additional notes and references for older children.

I suspect that the "Corbie" chapter is based on the pet crow referred to by the Fitch family, Edith's tenants from 1919 to 1922. If this is correct, then Albert Fitch was

the father of the Brown-eyed boy and the Blue-eyed girl who climbed way, way up in that big tree...[and]...looked over the five homely, floundering little birds and, choosing Corbie, put him into his hat and climbed down with him. He was a nimble sort of father, or he never could have done it, so tall a tree it was, with no branches near the ground.³³

It is surprising that Edith does not comment on the removal of a small bird from a nest, an activity hazardous for both the climber of the tree and the young bird.

"The Lost Dove," the story of the passenger pigeon, which went from extreme abundance to extinction during Edith's lifetime, is an especially moving chapter. To capture the reader's attention, Edith poses a reward of \$1,000 for the location of a nesting pair of passenger pigeons. After all, how could a billion large, beautiful birds have disappeared forever? Edith suggests that one might look for the passenger pigeons where they had once been so numerous. She describes how in Kentucky Audubon once saw the birds filling trees over a space 40 miles long and more than three miles wide in a forest near the Green River. They perched so thickly that the branches of the great trees broke under their weight. Yet, they would not be found there. In Michigan in May, these birds nested and almost every tree on one hundred thousand acres of forest once had at least one nest. "The lowest ones were so near the ground that a man could reach them with his hand." "Once so many Passenger Pigeons flew by that the sound of their wings was like the sound of thunder, and they went through the air faster than a train on a track, and the numbers in their flocks were so many that they hid the sun like great thick clouds."³⁴ Edith goes on to tell the children that no one will ever find the birds and win the \$1,000, but that the disappearance of the passenger pigeon is not their fault:



*“Through all the lonesome woods there is not one dove.”
The “ghost dove” from the chapter on the passenger pigeon in Bird Stories.
Illustration by Robert J. Sim.*

Even though this bird is gone forever and forever and forever, there are many other kinds living among us. If old Mother Earth has been robbed of some of her children, she still has many more - Many wonderful and beautiful things. And that she may keep them safe, she needs your help.³⁵

The illustration of the ghost pigeon flying through the forest adds to the sense of loss.

Bird Stories won praise from a variety of critics:

Bird Stories is accurate in statement and interesting in manner, and the child who has been in the country will find them fascinating reading after he has returned to city life.³⁶

The romance and thrill of these bird stories will delight readers of all ages as well as the children for whom they are intended. They are sure to give one more of the friendly spirit for feathered folk and a livelier purpose to help protect them. Excellent pictures by Robert J. Sim add to the interest and value of the book.³⁷

Bird Stories was placed on the list of Best Books for 1921 by the book selection department of the New York State Library. It was sold for \$1.25 and underwent five impressions between 1921 and 1930.

Edith's next book for children was *First Lessons in Nature Study*, published in 1926 by Macmillan Company. Intended for use in the classroom, the book is filled with an astonishing amount of information. The fifteen chapters cover topics such as seeds, meat, and hunters; buildings of earth and stone; traveling homes; and included reference to many types of plants and animals from insects to humans. It featured thirty-three drawings by Robert J. Sim and a number by other illustrators including Elizabeth Miles Derrickson. There were numerous photographs, including some of Edith's own: one is of her dog, Alexander Macgreggor McLeod, and another of her writing retreat on the banks of the Stillwater River after an early snow fall.³⁸

In this book, Edith ventures away from living organisms in their natural environments to include nonliving materials such as sweeteners, fur, fiber, and seeds of special value to humans. She draws on her own experience as a child to guide children through their relationships with wild animals. In the section on bats, she recounts her own experience with a bat in her bedroom at night, her attempts to keep it in a cage, and her eventual decision to release it. She includes lines of verse to lighten the flow of information:

When rabbits hop on a winter's day,
They throw their feet in the queerest way;
For their long legs reach ahead in the snow
And 'tis hard to tell how the rabbits go!³⁹

This book does not include references to additional sources of information, but Chapter XV has sections of "Questions and Answers" and "Something to Do Indoors and Outdoors" for each chapter of the book. Edith hoped that the suggested activities would allow the readers to continue learning on their own. The book appears to have sold well and was reprinted six times between 1926 and 1930.

Edith's next series of books for children was the four books in the Holiday series, also published by the MacMillan Company. This series of books was designed to give younger readers, from eight to ten, accurate information about interesting plants and animals associated with a pond, a meadow, a hill, and a shore. A human framework for the stories is provided by the farmer at Holiday Farm and two young cousins, Dick and Anne, who lived there. The first of these books, *Holiday Pond*, was published in 1929.⁴⁰

In *Holiday Pond*, Edith invites children to go down to the pond and see the stories associated with the pond. “Real stories—live stories—and so many of them going on at the same time that you may choose the ones that please you most!” This book features green frogs, raccoons, damsel flies, alewives, painted turtles, cardinal flowers, aphids inhabiting aquatic plants, bank swallows, yellow pond lilies (and the insects and other animals associated with them), and black ducks. The illustrator was listed as Wilfred S. Bronson, but many of the illustrations are photographs by Patch and others. Material and illustrations for some of the chapters come from earlier publications. For example, material on the aphid found on aquatic plants is from “The Pond-Lily Aphid as a Plum Pest,” and material on the alewives is from “Upstream with the Alewives.”⁴¹

Holiday Pond was chosen by the Book League of America as one of the 120 standard books of the year. The Book League of America was a U.S. book publisher and mail-order book sales club established in 1929. Approximately 5,000 subscribers received monthly fliers that offered selections from a variety of contemporary and world classic choices, including *Holiday Pond*.⁴²

The second book in the Holiday series, *Holiday Meadow*, was published in 1930. The frontispiece of the book by Wilfrid S. Bronson represents an assemblage of the plants and animals covered in the book. Edith writes, “You do not need a map to tell you how to reach this place. You can tell when you find it by the scent of the blossoms and by the song of the birds and by the happy feeling you have when you look at it. Then you say, ‘Why, this must be Holiday Meadow’.”⁴³

Edith tells us that parts of *Holiday Meadow* may be found in almost every county in Maine. The book includes chapters on meadowlarks, Queen Anne’s lace with associated insects, woodchucks, spittlebugs, the farm’s hay crop, star-nosed moles, winter on the farm, ctenucha moths, and funnel web spiders. The chapters are filled with information on the life cycles and habits of her subjects, and as usual, Edith urges the readers to go out and make observations for themselves. Many illustrations in the book are photographs taken by Edith in or near Orono and Old Town; one is of her home Braeside in winter, another is of a haystack taken during her trip to England.

In the chapter on the spittlebugs, Edith says “If you wish to know what went on in each little bubble house, you may read this story over again. Or, better yet, you may go into a meadow some day in June and find out for yourself.”⁴⁴ The chapter on winter, which features snow



*"Wejack sniffed the air for danger." Frontispiece from Holiday Meadow.
Illustration by Wilfrid S. Bronson.*

buntings feeding on seeds placed directly on the snow, probably reflects what took place at Braeside. The seeming abundance of meadowlarks and snow buntings in the 1920s stories is in contrast to their rarity in many areas today and reminds us of the decline of many bird species once common in Maine.

On Writing for Children

Following the publication of *Bird Stories*, Edith contributed to a "Series of Autobiographical Letters on the Genesis, Conception, Development, and Writing of Short Stories, Poems, and Articles Published in Current Periodicals" in *The Editor*. In this piece, she discusses her early interest in natural history and determination to write factually for children as important factors in her choosing to write on this topic. She also credits her disapproval of the current literature being produced on natural history as an incentive:

But the study of the current literature for children, which occupied the off hours of several years preceding the writing of that book [*Bird*

Stories] and its companion volume *Hexapod Stories*, was not without psychological interest. We are experiencing a high-tide of artificial 'nature' books for children, the prevailing tone of which is exemplified by the gentleman-like rabbit, who uses sausages for the tires of his automobile; and according to the reviewer, 'these stories convey no little instruction in animal lore'!

These are sprightly tales— children giggle over them with something of the same amusement as they feel when watching a clown at the circus. They are easy to write, requiring little knowledge of animals or acquaintance with their habits. Their educational demands on the artist are not severe. They please the purse of the publisher with their prolific series. Parents welcome them because they serve as a pastime for the child. With these considerations in their favor, they have probably come to stay, and it is not within the purpose of this letter to pass judgment upon them either pro or con. It is appropriate enough to inquire, however, whether the clown is the real function of the circus.⁴⁵

Edith reports that publishers had told her that dignified nature-study books that are honest books with real facts told and illustrated do not sell. She concludes that "if a nature story was to satisfy the critical demands of the scientist on the one hand and to fascinate on the other hand, it must be both truthful and interesting."⁴⁶

Of her own books, *Hexapod Stories* and *Bird Stories*, she left it to the reader to judge them on the score of interest, but she could vouch for the truthfulness of the stories and that the amount of observation and verification that had gone into her insect and bird stories were equivalent to that invested in a doctorate thesis:

It was a pleasant task. The story of 'Corbie' was written with the jolly rascal perched on my ledge-chair, slyly extracting hair-pins, or tugging at my shoe-laces or scolding because I refused him my pencil or teasing me to come down to the river-brim and hunt snails with him. Nor did I have far to stray for the sand-piper material, for some Peter Piper nests on 'Braeside' ledges every summer and his young teeter beside the Stillwater River. It took, however, a night-time exploration of 'Nearby Island' in moccasins over the sharp rocks to make sure that the father of the family camped near the mother and the young during the night, but this bit of information was obtained by flushing the grown birds from near the spot where the young were led at dusk.⁴⁷

Edith gives additional examples of her methods of obtaining facts and states that in recording them she had two things in mind: to keep faith with her own scientific traditions and colleagues and to record them in a manner interesting to children. The first meant that she invested the same time and patience that any scientist would and the second “meant limbering up a pen stiff with many years toil at technical stuff. This took what off-time I had for about seven years.”⁴⁸

In 1922, Edith was thinking deeply about the value of her writing to children to encourage their interest in nature and of what permanent benefit children might derive from it. She put her thoughts on paper in “Nature for Children,” as a *Norwich Bulletin*. First mentioned is mystery and surprise:

as a tied package, a locked room or a shutter drawn has an attraction for a child because it contains something unknown and stimulating to his curiosity, any mystery fascinates the child, and most of all the mysteries of life itself. Fortunately, the child is surrounded by miracles that he can watch, for life is everywhere abundant. The mystery of a plant, with roots and leaves sealed within a tiny box called a seed or the secret that the cocoon holds of the caterpillar that will one day be a butterfly.

Interest and companionship can come with the careful care of a pet, whether it is a plant that was once a seed, or a caterpillar that will one day be a butterfly. The tending of these pets will grow into a sense of companionship. Many a lonely hour is eased in some such simple ways.

Responsibility that comes with the interest in one life, intimately watched, naturally reaches out to other live things not so near, such as the bird in the bush. This may lead to the development of a proper sense of responsibility for decent treatment of bird, beast and blossom.

Edith points out that all this is “free instruction.” “In this school enriching this pleasure of the child and making him a broader-minded denizen of the world, tuition is free to all, for the teacher, Mother Nature charges no fee.”⁴⁹

Years later, Edith spoke to a church school class of young people on the satisfaction that comes with being outside and observing the natural world, either in the company of friends or alone. “It is worth finding out that you can be perfectly happy both ways—with your friends or just with yourself.” She suggests that with friends young people can form nature clubs or play nature games, but that it is important to be

able to enjoy time spent alone also. She refers to the books by William Hudson who spent a solitary boyhood in Argentina. The pleasure of the solitary naturalist was an experience that Edith knew well.⁵⁰

Edith in the Community

Although Edith must have been extremely busy with her work as a scientist and as writer and did not have direct contact with undergraduate students through teaching, she was well regarded on campus and found time to develop rich relationships with young people both within and outside the University of Maine. In 1924, she was listed as one of the three most important educators at the University of Maine, along with the dean of women, Caroline Colvin, and associate professor and acting head of home economics, Ester McGinnis.⁵¹ In addition to her importance as an educator, she was known on campus for her agreeable personality: "Patch is one of the most interesting characters at the University. She has a fine sense of humor, is interested in everything and everybody. And has a great many friends who greatly appreciate her quiet ways and cheery disposition."⁵² Edith and her sister Alice created a warm and welcoming home. A number of descriptions of Braeside, known for its antique furniture and paintings of natural history subjects survive. Jennie Boynton, a much-revered secretary in the university's zoology department, remembered Edith and her bird feeder.

As I remember, she was the first person to maintain a bird-feeding station in Orono. This was quite different from our 'fancy' bird feeders, set on a post or nailed to a tree. Her station was an area on the ground where the food was spread out....Many people went to her house to watch the birds feed, but I never had the privilege. She believed (and I think this is incorrect) that if the birds came and found no food, they would not come back: therefore food was always available. I believe I have heard her say that, in the wintertime, she would look out before daylight, and if snow had fallen to cover the food, she would put out more. She didn't buy the bird seed in 2- or 5-lb bags like most of us; rather she purchased it by the ton.⁵³

In a talk given to the Bangor Bird Club, Edith recalled her pleasure in rising at dawn and watching the arrival of the snow buntings at the feeding station, their calls and conversations. She compared their interactions when approaching food to those of people in comparable situations and reported that their sounds varied over the season. She ended her talk about the buntings with a verse:

Triolet on the Snow Buntings

The snow has buried all the weeds - -
 The buntings must be hungry now
I'll offer them some grain or seeds,
The snow has buried all the weeds
I'll gladly satisfy all their needs
I'll try my best to, anyhow
The snow has buried all the weeds
The buntings must be hungry now.⁵⁴

Alice shared Edith's love of the out-of-doors and "each May when the hummingbirds are visiting the columbine blossoms, the Misses Patch are hostesses to the Bangor Bird Conservation Club who gather for an annual outing on Braeside ledges."⁵⁵

An unusually domestic picture of Edith is given in a 1921 article in the *Bangor Daily News*: "She does some of the most dainty work with the needle, and the chances are that if you call at her home you will find her doing some of those things in which femininity delights, for an illustration doing knitting."⁵⁶

Sarah Jane Thompson entered the University of Maine in 1925 and recalled occasional invitations to Braeside when ten or twelve girls were invited for Sunday tea. Usually Edith would read a section from an inspirational book or she would read poetry and sometimes she would tell them about her work. Sarah remembered Edith telling the girls about a pompous man she met at a conference who told her that "there is a species named after me," and Edith had replied in her quiet way: "I have a genus named after me." One Sunday the girls were asked to help burn the galley sheets of a book, *First Lessons in Nature Study*, published in 1926. Frances Murray was part of this group. Both Frances and Sarah recalled that Miss Alice always prepared the tea table with dainty sandwiches, sweets, and a beverage.⁵⁷

Nor do the sisters [Edith and Alice] lose touch of nature during the rigors of a Maine winter. Out-of-doors there are snowshoe tramps over the fields to the evergreen woods. In-doors their house is a meeting place for a group of college women (both students and faculty) who read together from William Beebe, Henri Fabre, William Hudson, and other naturalists.⁵⁸

Edith's idea of a vacation was a week or two at Lake Meddybemps, Maine, enjoying such country events as a day in a bog with rose pogonia



Edith Marion Patch ca. 1930.

orchids, and a trip to a loon's nest, also several quests to the "blueberry barrens," a land with its own peculiar delights—edible and otherwise.⁵⁹

Henry W. Briggs was another young person whom Edith befriended. Sometime during the early 1920s, Briggs, a student at the East Corinth Academy, was looking at an exhibit of the Bangor Bird Conservation Club in a store front in Bangor when a "charming and gracious white haired lady" came out and addressed me—"Little boy," (I weighed about 98 pounds soaking wet in those days) 'wouldn't

you like to come inside and look at our exhibits?' I hesitated "There is no charge," she continued—and, that did it. Five cents was a fortune."

When Edith discovered that Henry Briggs was a knowledgeable collector of Maine butterflies, they formed a bond that lasted to the end of Edith's life. Briggs recalled that once, when traveling to Florida, he had an attack of acute appendicitis and was rushed to hospital for emergency surgery. "Dr. Patch heard about it, contacted the hospital, and paid the bill. Those days I had ten cents and owed twelve." Henry Briggs became a respected naturalist, filmmaker, lecturer, and photographer of natural history subjects who won many international awards. He delighted audiences with lectures featuring photographs of nature taken during his travels from Maine to Alaska. He also invented one of the first projectors that allowed one image to fade into another. Patch followed his career with interest and once came from the audience to tell him that this was the seventh time she had seen his film about black ducks, "A Journey into the Forest," and that she had seen something new each time.⁶⁰

The Presidency of the Entomological Society of America

On New Year's Day in 1930, a telegram arrived at Braeside from Des Moines, Iowa, announcing one of the triumphs of Edith's professional career:

Des Moines, Iowa 1930 Jan 1 AM 5

Dr Edith M Patch
Orono ME

THE ENTOMOLOGICAL SOCIETY OF AMERICA SENDS GREETINGS AND CONGRATULATIONS ON YOUR ELECTION AS PRESIDENT OF OUR SOCIETY STOP WE CONGRATULATE OURSELVES IN YOUR SELECTION AS THE FIRST WOMAN PRESIDENT OF A NATIONAL ENTOMOLOGICAL SOCIETY

J J DAVIS.⁶¹

Her election as president of the Entomological Society of America (ESA) was the culmination of many years of service to the Society. Already an active member of the American Association of Economic Entomologists, Edith became a charter member of the ESA when it was established in 1906. She was an ESA fellow in 1914, and she remained a Fellow and Life Member until her death in 1954. She regularly attended ESA meetings and gave presentations in 1913, 1915, 1919, and 1923. She served as first vice president in 1928, second vice president in 1920, member of the executive committee from 1924 to 1926, nominating committee in 1922, resolutions committee in 1915, and editorial board of *Annals of the Entomological Society* from 1925 to 1927. Serving with Edith in 1930 were R. E. Snodgrass as vice president, R. W. Doane as second vice president, and J. J. Davis as secretary treasurer.⁶²

Letters of congratulations to Edith poured in to the experiment station. Her old friend and colleague Herbert Osborn wrote, "I guess I do not need to tell you that your election to this office has been a wish of mine for several years and very nearly accomplished at least once before. I can tell you now how gratified I am that an honor so richly deserved has finally been accorded." In reply to this letter, Edith wrote:

I have never felt either desire or disappointment in connection with the possibility of this office, though it has warmed the cockles of my heart to realize on at least one occasion that certain friends of the "liberal wing" have felt both on my behalf. My feeling in regard to the matter went only so far as the resolution, in view of the attitude of certain "conservatives," that I would not assist at a meeting of this society by presiding as vice-president. Under the somewhat peculiar circumstances it seemed to me that it would not be dignified to do so.⁶³

Edith is often cited as a woman who, against formidable odds, rose to attain high status in a male-dominated profession by overcoming a general resistance to the hiring and advancement of women. In a letter thanking R. W. Harned, former president of the American Association of Economic Entomologists, for his letter of congratulations, Edith included a statement on her perception of these obstacles and her approach to overcoming them:

You speak of the 'too conservative' attitude toward a woman working in a field chiefly occupied by men. Men held the exclusive 'right of way' to the professions so long that until comparatively recent years it was, apparently, natural for most of them to take it for granted that said right of way was on a perpetual basis. Even to-day, of course, there are 'fundamentalists' who stand as pat as circumstances will permit to this creed of many centuries.

Of course I was aware of such a creed before I decided to enter the entomological field (if I could find an opening). It has never seemed to me a logical creed; but I have not had a militant attitude in regard to it. I have preferred to consider it a challenge to be accepted in the light of a 'dare' rather than to be viewed with personal resentment or antagonism. There is a somewhat tonic stimulation in such circumstances.

I should say, however, that I doubt if I could have entered any related field and found, on the whole, a more friendly reception. The 'conservatives' may have been in the majority on certain occasions but the personnel of the 'liberal wing' had seemed to me more significant.

Attached to this letter was a further statement:

Before I was invited to come to Maine, C. D. Woods called a meeting of his Station Staff and asked them whether they were willing to work with a woman on the staff. They put themselves on record in the affirmative.

After I arrived Director Woods made to me this statement 'So far as the people on my staff are concerned I am not at all concerned whether they are attired in trousers or skirts,—just so *they do the work.*'

As a child in a country school I played baseball in a boy and girl team. None of the boys seemed to resent the fact that I could run from base to base as fast as they could. No resentment of 'running equality.'

I attended a coeducational University, an institution where there was a spirit of cooperation among the men and women students. Both were represented among class officers, editorial boards etc. There were women on the University faculty—one head of a Dept.

At Maine: Head of Expt. Sta. Dept, full professor on the Maine Faculty, appointed on the Faculty of Graduate Studies by the Dean of that Faculty when that faculty was organized. Member of the Expt. Sta. Council.

My salary has been on the same basis as that of the men heads of Sta. Depts.⁶⁴

Not only did Edith have to prove her worth as an entomologist to be accepted into the profession, she had to overcome social prohibitions on the presence of women at professional gatherings called “smokers.” Margaret Rossiter determined that this was a serious deterrent to women fully participating in scientific gatherings.⁶⁵ In her speech at the Silver Anniversary Entomologists dinner on December 31, 1930, Edith recalled her first encounter with this social convention.

With my AAS book for guide, I followed arrows through the labyrinthine halls and came at length to the room where discussion on economic insects was in progress. It did not occur to me that so small and unobtrusive person as myself could enter the side door without interruption of the progress or, instead, without being noticed, and yet, between the quiet opening of that door and the equally quiet slipping into the nearest empty seat, a dramatic incident occurred. For in those few seconds every cigar and pipe in the room went down. I call the gesture dramatic because of what it implied—for as I glanced across the room at the faces visible through the smoke, I noticed that the air was not alone in being blue. The cold of the haze, indeed, seemed somehow to be reflected in the grimness of certain countenances I beheld. As a happy sequel I hasten to report that at subsequent conventions the same presence ceased to function as a fire-extinguisher and ever after the fumes of nicotine, so appropriate as an entomological background, has pleasantly hovered over more cheerful countenances.⁶⁶

When considering Edith’s success in a profession dominated by men it is relevant to consider her history of close association with males from a young age. This probably led to ease in day-to-day relationships with men in her professional life. She grew up with two older

brothers and, as mentioned, she attended primary and high schools with boys as well as girls, an experience different from that of attending a girls-only school. At the University of Minnesota, the majority of students with whom she had daily contact in classes were men and the situation was the same at Cornell. This was also quite different from that encountered by women who attended women's colleges. She appeared to be at ease doing field work in remote areas with only men as companions; her potato work in northern Maine and her blueberry work in eastern Maine were conducted under these circumstances. Her professional correspondence with men is relaxed, yet she adhered to the formal conventions of the time and she was always Miss Patch to Herbert Osborn and he was always Dr. Osborn to her after a life time of letter writing.⁶⁷

Edith's private feelings are sometimes expressed in her unpublished verse. Perhaps she was more ill at ease with her unique position than others realized.

Just One of Life's Little Ironies

She had not deemed herself procrustean
in childhood or in later years.
She played baseball at ten (a boy-girl team)
and made home runs mid cheers.

Without a qualm she entered a profession
in spite of no-admittance signs
Posted for woman applicants. She viewed herself
avoiding more traditional lines.

She had not deemed herself procrustean
until one day a keen friend styled
Her a person "esoterically conservative,"
she took the biting jibe and – smiled.

'Burns, it would seem,' she said 'was quite aware
how good a mirror is a friend's clear eye,
As others do, I see myself,' she laughing said,
With lips, albeit, tremblingly awry.

Edith M. Patch⁶⁸

CHAPTER 5

Winding Down Her Research Career

EDITH DOES NOT APPEAR TO have had any field research projects or to have published any entomological research papers after 1929. Geddes W. Simpson was appointed assistant entomologist at the Experiment Station in 1931. Building on the foundation Edith provided, he spent the next ten years determining the precise relationships of aphids to the transmission of potato viruses. He worked in fields in Fort Kent, New Canada, Woodland, Perham, Masardis, Smyrna, and Benedicta, and at Aroostook Farm in Presque Isle. His results improved the quality of foundation stocks for seed potatoes. A major work of Simpson's was "Aphids and Their Relation to the Field Transmission of Potato Virus Diseases in Northern Maine," published in 1940. Other changes at the station during this period came with the sudden death of Clarence Ritchie Phipps on February 11, 1933. Edith wrote Phipps' obituary for the national entomological community and created a file on his life and accomplishments while at the University of Maine. In 1934 Frank H. Lathrop replaced Phipps as entomologist in charge of Purnell projects.¹

Edith must have been seriously ill at some time during the late 1920s (when she was in her early fifties), and there are suggestions of recurring ill health throughout the 1930s. In reply to an enquiry about the decline in numbers of scientific publications in the 1930s, Edith wrote

You ask what happened after 1930 to my scientific publications. A natural question.

When I returned to the office, after this illness, I asked to be put on a 'morning schedule only.' I knew that I could not put in full time at my professional work and have any strength to put into books or periodical 'natural history' informal writing. This request for a morning schedule—at reduced salary of course, was granted by the Expt. Sta. Director (Doctor Morse) and the University Trustees. Since then, there have been several times when I have asked for 'leave without salary.' These requests ranging from 3 to 6 months have also been granted. So you see that my time at the Station has been much more limited during this time. And all the time for writing I have had during Station Hours since 1929 I have put on my FOOD PLANT CATALOGUE OF THE APHIDS OF THE WORLD. This manuscript, I do not know just how many pages, is not yet quite ready for the printer but I expect that it will be within a few weeks.²

In addition, she found that the vocabulary of technical papers was restricted. Writing of this sort was not why her inspiring English literature professor, Richard Burton, had praised her sonnets, or Dr. Ellery Sedgewick, editor and publisher of the *Atlantic Monthly*, had been enthusiastic about the prose of her early children's nature study books.

Not being two persons, there has seemed but one way for me to meet the dual demands of vocation and avocation: so to divide the day that I may spend the mornings in the role of professional entomologist, while during the afternoons I may frequent the fields of Maine much as I once roamed the meadows of Massachusetts, and the prairies of Minnesota.³

Although Edith published no research papers during the 1930s, she did increase in her publications in other areas. Between 1931 and 1937, Edith published ten books in three different series for children, fifty-eight pieces in periodicals for children, and various contributions to encyclopedias and educational and natural history periodicals. Even with her mornings-only schedule at the station, Edith found it difficult to meet some of her commitments for children's books. She applied for, and was granted, a leave of absence for six months beginning September 2, 1931, to complete the last three books in the *Nature and Science Readers* series, under contract for publication by Macmillan. In 1934, she was again granted a leave of absence for one month to complete the books *Holiday Shore* and the sixth *Nature and Science Reader*, *The Work of Scientists*, both under contract with Macmillan. These leaves were always without salary and resulted in substantial reductions in her income from the university. Her salary in 1926–1927 was \$3,500 (about \$46,000 in 2014 dollars), but was reduced to \$2,400 in 1927–1928 and \$2,600 in 1929–1930. For the remainder of her time at the station, Edith worked a reduced number of hours at the reduced salary of \$2,700. No records are available for her income from the various publishers of her work outside the university.⁴

In 1932, Edith wrote a section on insects for the *National Encyclopedia*,⁵ and in 1933, "Seven Lives of the Elm Aphid" appeared in *Nature Magazine*. "Seven Lives of the Elm Aphid" was the last article for the lay naturalist that Edith published; it is adapted from the 1916 paper "Elm Leaf Rosette and Woolly Apple Aphid of the Apple (*Schizoneura lanigera (americana)* in part)," and other scientific papers on her work with this aphid. This essay reads like a family history with seven generations each year. The stories of the upheavals

as the aphids migrate between apple and elm trees, their difficulties establishing themselves in new surroundings, and their need to move yet again in the face of vicious, aggressive parasites and predators are exciting. Edith expresses her sense of wonder at the complexity and intricate adaptations that allow this insect to survive and thrive.⁶

During the early 1930s, Edith considered putting her thoughts on environmental issues into a book for adults. In notes for a letter, she outlined her plan:

And by the way, speaking of pipe dreams about books, here's one I've long resolved to do for grown persons when a few more books for children are released:

The title will be WITHOUT BENEFIT OF INSECTS and will be as much of a thriller as L. O. Howard's THE INSECT MENACE only the other (and quite as important) side of the picture. No, I'm not planning to deny the quite true charges of tremendous damage by an actually large number of comparatively few species of dangerous and destructive insects. I let said insects plead guilty to all that. But for thirty years now these words of that old Minnesota Dane, O. W. Oestland, have been echoing through my own observations and studies—"In the large economy of nature, insects are beneficial."

This book was never written, but later Edith put some of her thoughts on this subject into an important speech.⁷

Books for Children

The remaining two books of the Holiday series—*Holiday Hill* and *Holiday Shore*—were published in 1931 and 1935, respectively. *Holiday Hill* is probably partly modeled after locations in the Maine blueberry barrens. A photograph of a woman, believed to be Edith, sitting on a large boulder was most likely taken by William Colcord Woods during their collaborative studies of the blueberry maggot. As with other books in the Holiday series, Edith depicts the geology and plant and animal life in a particular type of environment. In *Holiday Hill*, Edith discusses the boulders found there and the work of Louis Agassiz that explained their movement to the hill from other locations. In other chapters she discusses heath plants such as blueberries, bear berries and checker berries (wintergreen); the northern white cedar and the use of its cones by red squirrels; evening primroses and the moths and caterpillars that feed on them; sweet fern and the case bearing

leaf beetles that feed on it; garter snakes; the elm tree and its insect and bird associates; juncos; and snowshoe hares. Edith includes an abundance of fascinating information to encourage readers to go out and investigate for themselves.⁸

The last book in the Holiday series, *Holiday Shore*, features a new collaborator and illustrator, Caroll Lane Fenton.⁹ Fenton (1900–1969) was born on a farm in Butler County, Iowa. Between the ages of five and ten, he lived in Saskatchewan, Canada, where the birds, coyotes, and other wildlife along with the books of Ernest Thompson Seton stimulated his interest in nature. After his return to Iowa, fossil deposits near his home in Charles City extended his scientific interest to paleontology. A graduate of the University of Iowa, Fenton received a doctoral degree in geology from the University of Chicago and held positions at the University of Michigan, University of Cincinnati, University of Buffalo, and Rutgers University. He also conducted seminars in nature writing at Northern Arizona University. He published numerous articles in periodicals including the *American Midland Naturalist*, *Pan-American Geology*, *Nature Magazine*, *Scientific Monthly*, and the *Bulletin of the Geological Society of America*. Many of his books were illustrated with his own drawings. Fenton's wife, Mildred Adams Fenton, was also a graduate of the University of Iowa. The two worked and traveled together with Mildred often acting as critic, research assistant, typist, photographer, and finally coauthor. Fenton collaborated with Edith on many of her future publications for children, and although the contribution of his drawn illustrations is clear, his contributions of photographs and to the text are not.

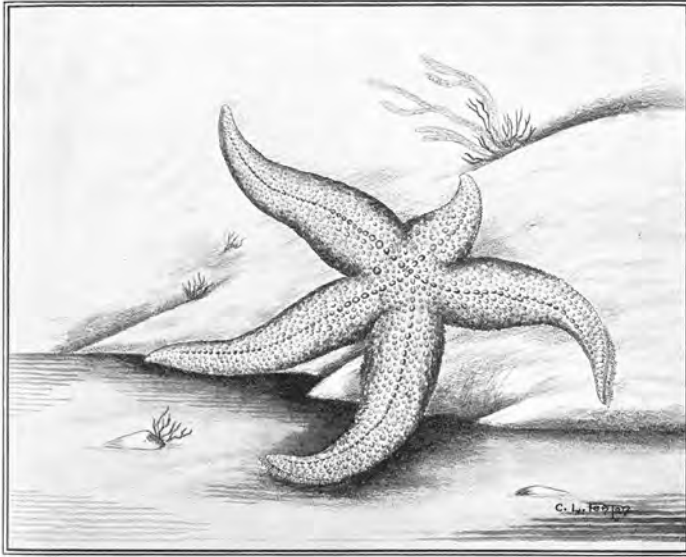
The introduction to *Holiday Shore* welcomes the reader:

Have you ever spent a day or a summer at a place called Holiday Shore?

Probably not, for most shore places are named for towns, or people, or bays. Yet there are thousands of holiday shores on the Atlantic and Pacific coasts. There are ways by which you can tell them at once, whatever their names may be on maps.

A really fine holiday shore lies at the end of a cove or bay. It will have cliffs or rocks on which gulls rest. There will be big stones sticking up through sand, or shingle, and round cobbles that rattle when the waves break.

A good shore, too, must have a beach—with the shape of a half-moon of wet yellow sand when the tide is out. There you may wade or dig



“One of Aster’s arms was eaten by a crab....”
Illustration by Carol Lane Fenton from Holiday Shore.

for clams. Or you may look for shells and seaweeds washed ashore when the waves are high. You may also see the tracks of gulls that come to find food.¹⁰

The book includes chapters on how the shore changes over the course of a day and over long periods of time. Edith explains how these changes affect the animals and plants living in the area—invertebrates such as sea anemones, sea cucumbers, sea squirts, clams, star fishes, sea urchins, snails, whelks, limpets, abalones, sea hares, squids, crabs, barnacles, and worms and vertebrates such as fishes, eels, lampreys, sea horses, gulls, sea ducks, and sand pipers. The beautifully drawn studies of the subjects give a clear conception of these creatures. The book was aimed at children from four to ten years old. As always with Edith’s books, there is an abundance of information for all ages to stimulate exploration on a visit to the shore. In 1936, *Holiday Hill*, *Holiday Meadow*, and *Holiday Pond* were listed as selling for \$1.50 and *Holiday Shore* for \$2.00. The copy given to the Friends of Dr. Edith Marion Patch (FDEMP) by Ralph Palmer is inscribed: “To Ralph Palmer, with thanks for the photograph on page 140 [a down-covered infant gull among the rocks], from Edith M. Patch, April 1, 1935.”

When Macmillan Company decided to publish a series of nature and science readers for the elementary grades, they selected Edith to write them.¹¹ The result was the *Nature and Science Readers* series published with Harrison E. Howe, editor of *Industrial Engineering Chemistry*. This series consists of six volumes: *Hunting* (1932), *Outdoor Visits* (1932), *Surprises* (1933), *Through Four Seasons* (1933), *Science at Home* (1934), and *The Work of Scientists* (1934). Illustrations are mainly drawings by Eleanor O. Eadie, with photographs from various sources. This series was designed for use in schools, with the first book written for children just entering school. Each additional volume in the series carries the story of science to a more challenging level, and the complexity of the language increases with the age of the children. The publishers planned that the books could be used to educate a child in science, step by step, as their mental ability increased. According to the publishers, L. O. Howard, chief of the bureau of entomology, U.S. Department of Agriculture, praised Edith's work from the point of view of the language used and added, "Yet everything she writes is sound from a scientific point of view."

The first book, *Hunting*, was published in 1932. It is divided into four parts: "Hunting for Holes," "Hunting in the School Garden," "Hunting in the Park," and "Hunting in the Zoo." "Hunting for Holes" includes a number of short stories about various holes a child could find. "Ted's Hole," describes the hole of a little boy featured in the story. There are also descriptions of holes produced by animals: an ant, a mole, a swallow, a woodpecker, a woodchuck, and a bumblebee. The section ends with a word game and a verse:

If I find a hole
Down in the ground,
I'll keep still
And not make a sound.

I'll watch for moles
And woodchucks, too.
If you find a hole,
What will you do?

If you find a hole,
Up in a tree,
Will you keep still
As you can be?¹²

The book also includes word lists based on the recommendations of *A Reading Vocabulary for the Primary Grades* (1926) by Arthur I. Gates and *The Teacher's Word Book* (1927) by Edward L. Thorndike, both of Teachers College, Columbia University. The word list for *Hunting* is comprised of 485 different words. Drawings and colored pictures by Eleanor Osborn Eadie illustrate the book.¹³

The second book, *Outdoor Visits*, was also published in 1932. This book contains 404 words in addition to those used in *Hunting*. This book also has four parts—"Fall Visits," "Winter Visits," "Spring Visits," and "Summer Visits"—with stories about bees, golden rod, galls, spiders, bumble bees, trees with cones, lady bird beetles, frogs, sedges, fish, and turtles. *Outdoor Visits* is illustrated by George M. Richards.¹⁴

Surprises, the third book, was published in 1933. It also adheres to the use of the word lists, but does not give a specific number of words added in this book. It includes sections that discuss familiar fibers used for clothing such as cotton, silk, linen, and wool and the creation of buttons and dyes for cloth. Other sections feature food from plants such as sugar, seeds, juicy fruits, and vegetables; humans' use of mammals such as cattle and horses; a discussion of air; some insects; water; animals with feathers; beginning geology and information on light, the stars, and electricity. Book sections include word games, observations, and simple experiments based on the information covered. Illustrations are photographs and drawings by Eadie.¹⁵

The fourth book, *Through Four Seasons*, was published in 1933 and shows increasing complexity of language and subject matter. In the introduction, the authors say that the book is about the changes that occur in people, animals, and plants with the changing seasons. As with much of Edith's writing, she ends the introduction with a plea that readers go out and make observations for themselves: "So suppose that you read the chapters in the book and think about them in a special way. Think about them as samples of what the world has to show. Then perhaps you will wish to look at the things of the world for yourselves."

The book starts with fall, with the apple tree, the potato harvest, the seasonal migrations of birds, insects, and fish, and the preparation for winter by plants and animals. The section on winter describes the sources of food for animals that do not migrate from cold northern areas—"Some sleep. Some hunt. Some store food"—and goes on to give examples of such strategies. Snow, changes in light, and the season in the southern hemisphere are also discussed. The section on spring

discusses different words that mean the same thing, maple trees and the production of maple syrup, insect pollinators, fish migrations and the custom of sending the first salmon caught in the salmon pool in Bangor, Maine, to the president of the United States. The summer section discusses summer skies, summer in the desert, snakes, plants without chlorophyll, and boulders. At the end of the book, Edith encourages the students to write about one or more of the seasons and challenges them to write a verse with as many rhyming words as the verse she provides:

My Favorite Season

My favorite season is springtime, I think,
When apple-tree boughs are all flowery pink!

Or perhaps I like winter and chickadees best,
While slumbering woodchucks and bumblebees rest!

But of course the fall's jolly. Its colors are gay.
I'll never forget one bright autumn day!

And summer? Well really, I like that best, too.
For I find the year pleasant—all the way through!

Each chapter provides learning activities: word games and exercises, directions on how to make maps and conduct experiments, and extra reading. A list of references is included at the end of the book along with an index. In this book, Edith uses information and illustrations from previous publications: life on the pampas by William Hudson, the migration of smelts, boulders, and insects. The book is enjoyable and informative, with drawings by Eadie and Mary L. Morse and photographs from a variety of sources including Edith's own.¹⁶

Science at Home, the fifth book, was published in 1934. Its subject is homes and common, everyday objects found in homes. The authors remind the readers that they may find that their own home is somewhat like a museum—full of interesting things. The book includes sections on the home itself and the various types of shelters that are used as homes. The book describes the work of bird, insect, and human masons who build with stone, brick, concrete, and mortar. It includes information on wood and carpenters and on wood paints and varnishes. The authors describe the work of plumbers and electricians and how fuels are used to maintain a comfortable air temperature in the home.

They also discuss the different types of fiber used in the home: cotton, silk, wool, rayon, fur. The book ends with a discussion of the function of different components of food. Eleanor Edie and Mary L. Morse illustrate the sections with drawings and there are photographs from various sources including one of Edith took during her survey of wild foxgloves in Wales. The *Bangor Daily News* reported on the publication of *Science at Home*, saying that although it had only been out for two months, it had already gone through its second edition. The publishers of the series reported that each year saw increasing numbers of schools all over the U.S. adopting the entire series for their work and that praise for their effectiveness was almost universal. A 1943 copy of the book shows that the book had been reprinted nine times since its publication in 1934.¹⁷

The final book of the series, *The Work of Scientists*, was published in 1934. It comprises five units: “Earth Sciences and Astronomy,” “Chapters from Biology,” “Chapters from the Sciences,” “Science in Industry and Art,” and “Science Helps Progress and Communication and Transportation.” The first unit on geology and astronomy is authored by Harrison E. Howe and the second, “Chapters from Biology,” by Edith. The remaining units are written by guest authors. Edith’s unit describes how animals protect themselves from attack with various forms of coloration such as underwing coloration in moths, concealing coloration, camouflage, chemicals as weapons of defense, and by “freezing” or “playing possum.” As most of Edith’s examples are insects, she must have enjoyed writing this part of the unit. The remainder of the unit discusses how plants defend themselves. There are accompanying photographs from various sources and drawings by Eleanor O. Eadie, Bruce Horsfall, and Adrian J. Iorio. The book had three printings in 1935—an initial printing in July, followed by one in September and another in October—indicating a continuing demand.¹⁸

Edith’s final book series, the Neighbor series (*Mountain Neighbors*, *Desert Neighbors*, *Forest Neighbors*, and *Prairie Neighbors*) was published between 1936 and 1940. The books were written in collaboration with Carroll Lane Fenton. *Mountain Neighbors* takes Edith into the western mountains, territory not as familiar as the pond, meadow, hill, and shore of the Holiday series, but perhaps more familiar to Fenton. The book contains fourteen tales of birds and mammals that live on the mountain sides and deep in the forests of the Rocky Mountains. The birds include two species of jays, the water ouzel, an osprey, and a nutcracker. The mammals are porcupine, golden-mantled ground

squirrel, marmot, pika, skunk, weasel, grizzly bear, mountain goat, bighorn sheep, puma, and elk. Several species of trout are also described in detail. There are excellent illustrations by Fenton. The only plant mentioned is the limber pine.¹⁹

In 1936, Edith, Carroll Lane Fenton, and Mildred Adams Fenton made an expedition to desert areas in the Southwest to gather information and photographs for the anticipated book *Desert Neighbors*. President Hauck approved a request for two and a half months leave for Edith on February 20, 1935. In a note included with the request, Edith remarked that her health was not good and that she wished to spend her leave out of doors in the Southwest. Edith and the Fentons planned to spend April and May visiting desert and semi-desert areas in New Mexico, Arizona, and California and an oasis in California, making observations on the landscapes, plants, and animals of deserts and taking photographs.

Edith described the Fentons as experienced campers. They traveled 8,000 miles by car and camped along the way,

not spending a single night during the whole trip in a hotel. The Fentons had a good-sized tent (with room enough for us all to use at meal time if it was raining) and I slept in a little 'pup tent,' using a bed-roll spread on the ground. There was a canvas flap from the front of the tent across the ground under the bed-roll that gave no chance for snakes, etc. to enter and there was a screen across the opening in the front flap.



The car and trailer carrying Edith Patch and the Fentons on a camping exploration of the Southwest desert habitat in 1936. Courtesy of the Friends of Dr. Edith Marion Patch.

They sometimes took walks at night with flash lights to see desert dwellers that were out after dark.²⁰

The camping trip was a success, with Edith reporting only two unhappy days—one in Blyth, California, when the party was attacked by a large swarm of hungry mosquitoes. The second one was in Tucson, where Edith was forced to look at “slide after slide of aphids” at the University of Arizona. Fortunately Edith was rescued by Mildred Fenton, who insisted it was time to start for the Baboquivari Mountains to watch kangaroo rats for most of the night.

Edith was a good camper and the Fentons, who had never before asked anyone to go camping with them, asked her to accompany them in the future. “We ask you here and now, to travel with us again. Come with us all the way from the Teton Mountains to the Canadian Rockies. Join us on a Canyon Expedition. Spend a winter with us in the marshes of Louisiana & the swamps of Florida.” To help cover expenses of the desert expedition, Edith donated the income from a number of publications resulting from the trip.²¹

Desert Neighbors, published in March of 1937, includes an introduction to the general characteristics of deserts and the adaptations plants there make to desert conditions. The book also describes the habits of the blacktail jack rabbit, white-throated and kangaroo rats, various lizards, snakes, and birds. There is much more emphasis on the plants, insects, and spiders than in the first book in the series. The drawings and photographs are excellent and the text is informative and easy to read. The book also provides an index and references to previous publications by Edith and Fenton.²²

In addition to *Desert Neighbors*, a verse, “Deserts Are Not Desolate,” came from this expedition. The verse was published in *Nature Magazine*. It reflects some of the concern over the Dust Bowl disaster of the era.



*Edith Patch in the Southwest in 1936.
Courtesy of the Friends of
Dr. Edith Marion Patch.*

Deserts Are Not Desolate

To those who can accept the deserts' lure
(And not insist on universal grass
And woodland shade), their charms surpass
Vistas of prairie and rolling moor.
In spite of thorns they give a welcome sure:
Even the cholla's spines do not harass
The cactus wrens that rest their woven mass
Within its arms – and voice their loud rapture.

Nature's deserts, rained on, blossom and set seed,
Only where Man, unfaithful to his trust,
Has over-grazed his fertile fields in greed,
He reaps as his reward, bitter though just,
A whirlwind harvest and its futile dust-
These barren wastes are desolate, indeed!²³

Between 1931 and 1937, Edith published approximately sixty pieces for children in periodicals such as the *Christian Science Monitor*, *Junior Red Cross News*, and *Picture Story Paper*. These pieces are either authored by Edith solely, or coauthored with others. Edith did not include much detail on these pieces in her list of her publications, especially of page numbers, and few locations have retained collections of them. A series of short pieces describing various plants and animals in their natural habitat appeared in the *Christian Science Monitor* every second week of the month between October 12, 1936, and February 13, 1939, authored by Edith and Carroll Lane Fenton and illustrated by Fenton. The pieces are long enough to contain interesting details on the biology of the subject, but short enough to keep a child's attention. Each includes one or two illustrations by Fenton. Many of the animals and plants, some of the text, and many of the illustrations had previously appeared in or would appear in other publications by Edith or by Edith and Fenton, especially in the *Holiday* and *Neighbor* series of books.

In "Nature Study Naturally Considered," published in *Progressive Education*, Edith again addresses the teaching of natural history to children by adults who are not experienced or trained in this area. She believed that most adults have sufficient knowledge to guide children step by step with occasional stops for simple research. In the article, she provides an example of how this would work.²⁴

Without Benefit of Insects

In the summer of 1936, Edith prepared a talk, “Aphids, Aphids, Everywhere” for the Maine Agricultural News Radio Program to be broadcast on August 26. Edith begins by discussing the reproductive potential of aphids—“A single aphid might in one year of uninterrupted breeding under favorable conditions become the progenitor of 5,904,900,000 individuals.” With nearly 400 different kinds of aphids in the U.S. and potentially 12,000,000 aphids on a single cherry tree, the possible numbers of aphids is overwhelming. Yet, as Edith points out, plants still survive. Edith goes on to describe various reasons for this: aphids’ dietary restrictions, which limit them to certain plants; birds that feed on their colonies in summer and their overwintering eggs in winter; insect predators, such as lady bird beetles and syrphid maggots, that devour enormous numbers of aphids; minute parasites that develop in aphid bodies and destroy them; and fungal and bacterial diseases that can wipe out whole populations of aphids. Thus, she argues, there are many natural factors controlling aphid populations, and it is not necessary to rely on nicotine sulphate sprays to keep the aphid numbers in check.²⁵

The discovery, in about 1868, that the dye Paris green kills insects launched a new era in the deliberate use of toxic substances for insect control. Oil, sulfur, nicotine, rotenone, pyrethrum, and other materials were used before the advent of Paris green, but pyrethrum may have been the only material that had been produced on a significant scale. The toxic ingredient of Paris green is arsenic—the element subsequently used in London purple and lead arsenate. By 1910, Paris green and lead arsenate were the most widely used insecticides sold on a commercial basis. In 1917, it was found that calcium arsenate was effective in killing the cotton boll weevil, and the market for calcium arsenate was consequently large. From 1917 until after World War II, calcium arsenate and lead arsenate were the leading insecticides.

Following World War I, the development and manufacture of synthetic insecticides increased dramatically. Paradichlorobenzene (PDB) was found to be highly effective against peach tree borer, which formerly could only be controlled by hand removal from the bark of infected trees. Another synthetic, phenothiazine, was used as a substitute for lead arsenate for control of codling moths, the larvae of which are serious pests of apples. During the early 1900s, an increasing reliance on large commercial operations for the production of food and the public demand for perfect fruits and vegetables, free of insects or

insect damage, increased the need for efficient insect pest control. The rising cost of labor discouraged labor-intensive methods such as the hand removal of insects. Reliance on parasites, predators, and pathogens and cultural methods such as crop rotations, all favored by Edith, were regarded as inefficient. The application of toxic chemicals increasingly became the method used for the control of insect pests.²⁶

On December 29, 1936, at the invitation of the Entomological Society of America, Edith delivered the “annual public address” at the end of their annual meeting at Atlantic City, New Jersey. It was a plea to those present to address the effects of chemical insecticides on insects other than those at which the insecticides were directed.

Edith’s talk was titled “Without Benefit of Insects.” It begins with a reference to Professor Oestlund at the University of Minnesota and the principle he tried to instill in his students: “in the large economy of nature, insects are beneficial.” In her talk, Edith focuses on applications of insecticide to crops that are directly or indirectly beneficial to humans, or the flowers and birds that give aesthetic pleasure. She further quotes Oestlund as saying, “If the time ever comes when insects are fought to the extent recommended by economic entomologists, there will be in consequence the greatest of economic disasters—due to the scarcity of insects.” The talk focuses on the role of insect pollinators in maintaining these important crops. She states that if the current rates of insecticide applications are maintained or increased, these pollinators, especially the solitary and bumble bees, would be threatened with serious decreases in numbers or even extinction. She describes how orchardists are forced to rely on hive (honey) bees to pollinate their fruit trees as the populations of wild bees decline and that even the hive bees have been negatively affected by insecticide applications. Edith goes on to report that the decline of pollinators is also of importance to growers of seed crops and ornamental flowers.

Edith is especially critical of the use of aircraft to distribute insecticides over large territories because it does not discriminate between targeted and nontargeted insect species. She criticizes the use of light traps, which also results in mortality of large numbers of nontargeted species. Edith gives examples of the reports by beekeepers of serious declines in numbers of wild bees and of entomologists working in museums of declines of butterfly and moth species occurring in relation to extensive spraying programs. Unfortunately, at that time there was little specific information available to evaluate the rates of decline of pollinators, or the potential reduction in crop yield, or even

of the amount of pesticide residues remaining in the environment after spraying.

Edith concludes her talk with a vision of the year 2000, when it has become necessary to set aside protected areas for the benefit of insects.

Nurserymen have had to remove from their catalogs the names of plants pollinated by bees and hawk moths and were relying on a few hand pollinated plants to keep the species of plants from becoming extinct until a protected area for the rearing of bee and hawk moth pollinators could be established. The ornitho-entomological societies of America were establishing bird and insect preserves that provided food for young song birds. The President of the United States had issued a proclamation establishing Insect Gardens throughout the country to serve as reserves for pollinating insects. No caterpillars were to be killed in these gardens. Special measures were being introduced to aid apiarists in keeping their colonies in good health and marginal land would be devoted to weed-crops to supply nectar and pollen to bees when it was not available from commercial crops. Measures were being undertaken to ensure survival of populations of sphinx moths and a bulletin titled *Never Kill Sphinx Caterpillars* had been issued. Schools were initiating programs on insects necessary to human welfare and agricultural college students might take courses emphasizing how to save necessary insects while controlling pests.²⁷

Many in the audience would have known Edith, but a picture remains as to how Edith must have appeared to those who did not know her as she delivered her talk:

If she were spied at some social gathering or seen mounting a platform to give a talk on aphids, birds, or insects, she would make no deep imprint by either dominating or what is usually called fascinating personality. But as you warm to her theme and discover the wealth of her interests and the scope and thoroughness of her scientific knowledge, admiration grows fast and a shy loveliness of speech and manners is happily discerned.²⁸

It was a compelling, passionate speech. Edith used all her skills to keep the listeners' attention. It was also courageous as many of the listeners' would have been economic entomologists dedicated to the control or eradication of insects by chemical insecticides.

It is remarkable that Edith expressed this concern *before* the discovery of synthetic organic insecticides such as DDT, which was first discovered to have insecticidal properties in 1939 and released

for public use in 1945. Her 1936 talk also preceded the publication of Rachael Carson's *Silent Spring* (1962)—which expresses a similar outrage and is credited with having launching the modern environmental movement—by more than twenty-five years. Edith's speech argues that widespread use of chemical pesticides was having a serious effect on insects other than those intended and that both the scientific community and the general public should be concerned because the results could be profound.

The speech was widely covered by the press. The *Detroit News* featured it on the front page of the Sunday, April 25, 1937, feature section. The title of the piece was "If Science Wipes Out Insects, She Warns, Gardeners Must Raise Bugs," and the subtitle, "Vegetables and Fruit Will Die Off, Meat Prices Soar, Even Birds Vanish, Says Entomologist Who Points Out That Most Pests Are Not Only Harmless, but Needed to Pollinate Blossoms." The page was amply illustrated with cartoon drawings and photographs—some in color, which was unusual for the time.²⁹ Adaptations of Edith's talk appeared in many publications across the country.

Edith appreciated the

gracious and cordial reception given this address by my fellow entomologists and by other guests who were present. As for the entomologists, I feel encouraged by their stimulating support. As an example of the verdicts of the non-entomologists I'll quote from a letter received a few days ago from Dr. Donnell Young, Head of the Department of Zoology at The George Washington University, a non-entomologist, wrote 'I came in for your talk to the entomologists at the dinner, and I want to tell you how much I enjoyed it. The point of view which you presented is one I have wondered about and have felt was being neglected and I was so glad to have you put it forward in such a fine way. I heard several who are not entomologists but who heard you speak, say that your talk was one of the high points of the meetings. Neil Stevens was most emphatic in that respect, for example' [Neil E. Stevens was senior pathologist, U.S. Bureau Plant Industry].³⁰

When approached about the possibility of publishing the speech in the *Annals of the Entomological Society of America*, Edith replied that the speech was prepared as a message to be spoken and would need to be differently organized for print. Edith reported to Max Fitch that

There were subsequently so many requests from entomologists and professors giving graduate courses in zoology—including 'biological

control,' that Director Griffiee had this talk mimeographed to such distribution. There were also requests from periodicals for the use of this and I finally revised it a bit (to change it from a spoken address to an article) and sent it to the *Bulletin of the Brooklyn Entomological Society*. The Editor, Dr. J. R. de la Torre-Bueno wrote me that it will appear in the February (1938) issue.³¹

The speech and its published version are among the work for which Edith is most remembered by the entomological community and the general public.

Edith and University of Maine Students

Edith continued to enjoy the company of undergraduate and graduate students, and some of them would remain her friends after they left the university. Ralph S. Palmer (1914–2003), the distinguished ornithologist, knew Edith during his undergraduate days at the University of Maine (1933–1937), and she called upon him to review the bird illustrations by Carroll Lane Fenton for a book she was finishing. Palmer, always the perfectionist, drew attention to what he regarded as a small error. This was brought to Fenton's attention and changed. When Palmer married, Edith held a formal reception for the couple at Braeside.³²

Edith's last graduate student, Jean Burnham (later Jean Adams) graduated in the spring of 1936. She shared this memory of Edith:

I remember my graduation day so well. She took me to lunch in Bangor; in the midst of general conversation she paused and said, 'Jean, on your graduation day, I have a thought to leave with you.' I awaited a profound statement—'Never in the years ahead be afraid to say 'I don't know,' but try not to have to say it twice about the same thing.' At the time I was rather let down, soon, however, I began to realize how very basic this wise counsel was, and as years have gone on, how often she has saved me from pretentiousness!

Edith and Adams, who went on to work as an entomologist with the Canada Department of Agriculture, would remain friends for the rest of Edith's life. Their relationship contributed to the strong ties between the entomological communities of Maine and New Brunswick, especially among aphid-virus-potato researchers. Adams would later recall that "although Dr. Patch was small in stature she was a strong determined woman." Adams admired Edith for her leadership and philosophy of research and life.³³

Retirement

On October 15, 1936, Edith wrote to Station Director Griffiee asking if her retirement could be scheduled for July 1937 instead of 1941 when she would turn sixty-five. She added that this would only be feasible if the retirement payments were not too much reduced from what she would receive if she waited. Edith did not explain why she requested early retirement, but offered to give an explanation at Director Griffiee's convenience. She added, "I am sure, too, that you will understand why I omit 'sentiment' from this letter—because it is better to meet a crisis with a smile than a sigh."³⁴

On January 29, 1937, Griffiee wrote to University of Maine President H. Arthur Hauck that Edith wished to retire and was concerned about her financial situation in retirement. He stated that the request was prompted by ill health, which seemed to improve after taking a break from work. He noted that Edith had supported four people for twenty years (herself, her sister Alice, who lived with her, her brother Fred who had been in ill health for a number of years, and Fred's wife Lottie). Edith said that if her retirement stipend was \$1,000 to \$1,200 per year she could continue this support. Edith retired on July 1, 1937, after thirty-four years of service to the experiment station. Her retirement stipend was \$1,000 per year.³⁵

University of Maine publications noted Edith's retirement after thirty-four years of service at the university. The *Maine Alumnus* reported that the experiment station would lose one of its ablest scientists:

While her brilliant work has won for her, personally, a position of leadership, it has added also to the prestige of the University.

Because of the fact that but a limited number of undergraduates have had any contact with her, Dr. Patch is perhaps not so well known among our alumni. Had she been on the teaching faculty, she would have won a place of affection in the hearts of those who might have been in her classes. Her congenial, co-operative attitude, as well as her mastery of entomology and allied subjects, would have been an inspiration which would have caused them to work with enthusiasm and real interest. Few have risen to accomplish prominence both as a scientist and author. And with it all, she is extremely modest.³⁶

The Maine Campus also praised her accomplishments and noted her extensive membership in professional and fraternal associations: Fellow of the American Association for the Advancement of

Science and of the Entomological Society of America; member of the American Association of Economic Entomologists, American Society of Naturalists, National Council of Supervisors of Elementary Science, American Nature Study Society (of which she was currently president) and of the honorary fraternities Phi Beta Kappa, Phi Kappa Phi, Phi Sigma, Pi Gamma Mu, and Sigma Xi.³⁷

Colleagues at the station hosted a retirement dinner for Edith on April 30. Hauck, Griffiee, and Ava Chadbourne gave speeches. Edith was presented with a gold watch and made an entertaining speech of appreciation, saying that she saw two persons in the audience who were responsible for her being there. One was Louise Robinson Rhodes, who in 1903 edited Edith's application for a position in Maine, encouraging her to be less timid. The other was James Stacey Stevens who had tried to convince Director Woods that a woman did not belong in a university department, which made Woods, wanting to prove Steven wrong, offer the position to Edith³⁸. Mrs. Lula Upham, pianist, Mrs. Gordon Noyes, violin, and Miss Gladys Merrill, cello, provided musical entertainment.

In a letter to Clarence Kennedy, at Ohio State University, Edith outlined her plans for retirement. She would continue to live in Orono and would focus on her avocation of nature writing. She looked forward to spending more time out-of-doors than had been previously possible.³⁹

On June 30, 1937, Edith and Alice left on a visit to Montana and other points west, expecting to return in the fall. They traveled in Edith's car, quite a courageous expedition for two elderly ladies. They planned to spend time with their brother Fred in western Montana "in a valley surrounded by mountains and national forests." On their way home, in October, they visited Minnesota for two weeks. Edith was named entomologist *emeritus* and awarded a doctor of science degree by the University of Maine in October, 1937.⁴⁰

CHAPTER 6

Retirement Years

THE EARLY YEARS OF HER retirement from the University of Maine were busy ones for Edith. She published more books and pieces in periodicals; she traveled; and she completed her *Food-Plant Catalogue of the Aphids of the World* and organized her personal affairs.

In 1937 and 1938, Edith served as president of the American Natural History Society. Women had played a leadership role in this organization since its inception, and Edith had been preceded as president by Anna Botsford Comstock of Cornell University in 1913 and by Bertha Cady, naturalist for the Girl Scouts, in 1927.¹ In her January 19, 1938 address to the society's annual meeting in Richmond, Virginia, Edith chose to look back on her own career and the risks she had taken in attempting to combine natural history writing with her entomological career:

There was a time when presenting science to the public in understandable language was frowned upon by many scientists as unscientific. This attitude was brought to my attention in 1912 when I confided to one of the outstanding entomologists of this country that I was preparing a book about insects for children. The prominent entomologist protested with the kindest intentions. "You are running a great risk. You are likely to lose prestige among your colleagues if you do anything of that sort. Better to write technical bulletins, only." "Well," I said after thinking that over, "I shall take as much care with the facts I present to children as I do with my technical bulletins. If my colleagues disapprove, I shall be exceedingly sorry; but I'll run the risk." So I took this professional risk and also the financial risk of publishing said book at my own expense under the name of the Pine Cone Publishing Company, in 1913. Since my scientific colleagues were generous enough to write friendly reviews and since the whole edition sold out easily, I have never regretted this experimental venture in popular science.²

Edith continued her involvement with local natural history organizations. On August 23, 1939, the Bangor Nature Study Group meeting began with a picnic at Piney Knoll in Orono, followed by a treasure hunt for the children. The children competed in bringing in specimens from twenty assigned trees, flowers, weeds, and ferns. The day ended with refreshments at Braeside. In early March 1944, Edith addressed the

Bangor Bird Club on birds in literature. Edith was a valued member of these groups, spoke frequently at their meetings, and hosted many field trips at Braeside.³

Books for Children

Forest Neighbors, the third volume of the Neighbors series, was published in September 1938 and was dedicated to

Ernest Thompson Seton

Whose books on woodcraft have helped many young
Naturalists, and whose volumes on Lives of Game
Animals contain very much of interest to those
Who wish to know more about the
Four-footed neighbors of the
North Woods⁴

Ernest Thompson Seton (1860–1946) was a contemporary of Edith's. He was an internationally recognized wildlife author and artist, founder of Woodcraft Indians, and one of the founding pioneers of the Boy Scouts of America. His five-volume series, *Lives of Game Animals*, (1925–1928), remains a source of biological information on game animals. It is likely that Edith consulted these books when depicting the larger animals in her own books. Edith and Seton both followed the custom of the time in attempting to humanize their subjects (for Edith, even the insects) and to depict their relationships in terms of a human family of parents and children. Seton frequently referred to “marriage customs” among his game animals and describes the male jaguar “as a permanent member of the family, a loyal husband and father, helping with his noble powers to feed, protect, and train his offspring.”⁵

Forest Neighbors focuses on the North Woods and includes descriptions of trees and other plants, mammals, and birds commonly found there. All the stories are illustrated with drawings by Fenton, with a few photographs of trees. The stories are interesting and informative, and the illustrations are excellent. There is formal acknowledgment that some of the stories and illustrations first appeared on the children's page of the *Christian Science Monitor*. Edith gave a copy of *Forest Neighbors* to Mary and Frank Simpson, children of colleague Geddes Simpson, for Christmas 1938.⁶

The last book in the *Neighbor* series, *Prairie Neighbors*, was published in March 1940. Edith wrote to her friend Carmen Richards

that “my latest book, *Prairie Neighbors*, includes some of the plants, birds, and mammals with which I was most familiar during my Minnesota days.” Material provided by the publisher describes the contents:

Prairie is a French word meaning a level, treeless land. Early French settlers found our Central plains that kind of country so they were called prairie region.

It is to this prairie we go to find these “prairie neighbors,”—a burbling bob o’link who sings merry melodies, a cottontail rabbit who hops over the meadow brush with tail high, a gopher with pockets in both cheeks who digs tunnels underground,—muskrats, skunks, prairie chickens, moles, moths, and many, many birds whose music makes the prairie gay and lots of bright flowers that make it colorful. Whether you wander along a creek or visit an oak opening or stay in the wide-stretching fields where the waving grass ripples in the wind, you’ll find the prairie interesting and exciting to visit.



*Illustration by Carol Lane Fenton from
Prairie Neighbors.*

There are also stories about a number of insects—hawk moths, May beetles, walking sticks, grasshoppers, monarch butterflies and milkweed beetles. It is the last book that Edith published.⁷

Correspondence with Max Fitch

In the spring of 1937, Edith received a letter from Max Fitch saying that he was sorry that he would miss the occasion of her retirement. Fitch reported that he was working at the New York City Library and living at the New York City’s YMCA. His work at the library was going well, and he was finding the theater, ballet, and other entertainment available in New York exciting.⁸ On March 8, Edith replied that she was delighted he was enjoying his work at the library and the cultural

life of New York. She cautioned, in a motherly fashion, to be sure to get enough sunshine and outdoor walks. She enclosed a ticket to the Museum of Natural History to see the insect exhibits and suggested that before he went to the museum he look up and read articles in *Natural History* magazine by the curator of insects, Frank E. Lutz, author of the *Field Book of Insects*. She mentioned that C. H. Curran was also at the museum and was author of *North American Diptera*. Edith sent Fitch best wishes for success and happiness and hoped that she and Alice would hear from him from time to time.

It must have occurred to Edith that, with his library experience, Fitch would be an excellent person to assist with her projects to compile a list of her publications and to assemble collections of reprints of her scientific papers to be bound and placed with individuals or in libraries.⁹ Apparently Fitch agreed to assist with these projects and a series of letters (January 28, 1938, to November 21, 1943) traces the projects to their completion and gives news of Edith's life at Braeside during this period.

On April 8, 1938, Edith wrote to Fitch that she had finished the manuscript for *Forest Neighbors* and had mailed it to the publishers, along with Fenton's illustrations. The following Monday, she planned to return to the station and "keep going mornings until I have finished that long lasting catalogue." The project to assemble a list of her publications was underway and she added that "tomorrow I'll express a package of *Christian Science Monitors* with Patch Fenton articles." Fitch was now living at the International House in New York City. On May 3, Edith was still spending her days working on that everlasting catalogue.¹⁰

In July 1941, Edith reported to Fitch that the list of her publications, "Publications by Edith M. Patch," had been completed, mimeographed, and was being distributed.¹¹ Works are listed under seven headings: Entomological Publications (Technical and Economic) (79), Books (17), Popular Science and Nature Articles (40), Nature Stories and Articles for Children (170), Chapters and Adaptations Contributed to School Readers (16), Poems (5), Obituaries (3). Missing from the list, however, are Edith's first two books, *Dame Bug and her Babies* (1913) and *How Laddie Tells the Time O' Year* (1914), both published by Pine Cone Publishing Company. Many of the individual entries of children's periodicals are missing page numbers and additional information about the publishers that would be helpful in locating

these pieces. In spite of these limitations, it is the most complete list of Edith's publications that we have.¹²

On June 11, 1942, Edith informed Fitch that the first two bound volumes of the technical entomological papers were in her hands. She was pleased with the "splendid job you and the binder did with my entomological papers! I am very glad that these are now assembled (the two first volumes.)" She wrote that "I had a set bound, for the University of Maine and one for myself—One also for Dr. Lathrop and Dr. Hawkins. I haven't had any of the third volume bound yet. Perhaps I'll give Librarian Ibbotson his choice of the set already in the library and your excellent set. Perhaps I'd better find out if the Cornell University Entomological Library cares to 'cherish' the other set."¹³ Edith's own set of Volume I (1904–1910) and Volume II (1911–1920) is among her papers.

There are suggestions in Edith's letters to Fitch that she hoped he might become an entomologist. "Asa Fitch was a famous entomologist. Perhaps Max Fitch will follow in his footsteps." There was also a possibility that Fitch would go to the Department of Entomology at University of New Hampshire, possibly as a librarian. Nothing came of this. The June 11, 1942, letter was addressed care of Fitch's father in New Sharon, Maine, so Fitch must have left his position as librarian in New York. He must have confided to Edith that he was having difficulty making a commitment to serving in the military during World War II. Edith replied that she was "sending you a four leaf clover to express my wishes for your good luck in getting a classification that is in accord with your conscience. There will surely be much need for more hospital help." Her next two letters (July 8 and November 18, 1943) were addressed to Fitch care of the New Hampshire State Hospital in Concord, where Fitch must have worked after being granted conscientious objector status by the military.

In her letters to Fitch, Edith spoke of taking the bus with Alice to Bangor where they would have dinner. Edith said that they were taking a good many meals out as it saved on the housework for Alice. Edith had always been solicitous about Alice's household responsibilities, and a friend, Frances Murray, recalled that Edith always tried to have the most recent household appliances available to make Alice's house-keeping as easy as possible. On July 8, 1943, Edith told Fitch that she was pleased to hear of his work at the hospital and that he was "pretty contented" with it. In a November 21, 1943, letter to Fitch, Edith indicated she had accepted fifty articles to rewrite, revise, criticize, or

approve for the *Encyclopaedia Britannica Junior*. In 1934 Edith had written “The Bee” for an earlier edition of this *Encyclopedia*. Edith also reported that she then had the pleasant family of John Norman Harris, his wife, and two-year-old son as tenants in the north side of the house.¹⁴ These are the last of the letters from Edith to Fitch.¹⁵ Fitch went on to study medicine, eventually working as a pathologist at the veteran’s hospital in Omaha, Nebraska. He died in 1982.¹⁶

Travel

In the summer of 1938, Edith attended the International Congress of Entomology in Berlin, Germany. While overseas, she participated in a tour of Europe organized by J. Chester Bradley, a friend from her student days at Cornell. Edith commended Bradley for organizing and conducting “so extensive and varied a trip at so little expense.” Edith left Montreal by the “Duchess of Athol” on June 20. The formal entomological meetings in Berlin lasted about a week, with 1,100 entomologists from 40 countries participating. The “long-tour” party, lead by Bradley, numbered 16 (four of whom were entomologists including Edith, Bradley, and Johannsen). They visited Northern Ireland, Eire, Wales, England, Norway, Sweden, Denmark, Germany, Austria of the Deutsches Reich, Poland, Czechoslovakia, Hungary, Switzerland, and France. They called at entomological laboratories along the way, saw plays and operas, and visited museums, cathedrals, and historical sites before leaving France to return to Montreal on September 22. If Edith was aware of the tensions in Europe that would lead to the horrors of World War II within a year, she did not mention it. Edith reported on the meeting in the *Journal of Economic Entomology*, her last article to be published in a national entomological journal.¹⁷

After her return from Europe, Edith embarked on further travel. In December 1938, Edith and her sister Alice planned an extensive trip in the eastern U.S. Their plan was to leave Orono for Washington, D.C., on December 22. They would remain in Washington until December 26, then on to Richmond, Virginia, until December 31, returning to Washington for about a week. They then planned to go to New York for a week or ten days, where they hoped to see Max Fitch. While in Washington, Edith probably participated in a broadcast from Nature Study House.¹⁸

Edith and Alice spent much of the winter of 1940–1941 in Winter Park, Florida, traveling there and back in Edith’s 1936 Ford. Edith reported that she and Alice enjoyed themselves, traveling about and

visiting with old friends and relatives who were spending the winter there. She saw Mrs. Ralph Patch, wife of her cousin, and her daughter Alma and told them about a letter she had received from her brother Fred about the location of the graves of Patch family members in Worcester.¹⁹ In Winter Park she also saw old friends Henry T. Ferland, former head of entomology at the University of Massachusetts, and Herbert Osborn of Ohio State University.²⁰

Edith and Alice's friend Henry Briggs worked at the university as director of visual education during the early 1940s. Briggs later recalled: "Every year we three—Edith, Alice and I would take off on our 'lilac tour.' They loved lilacs as I did. I had a Model A Ford roadster, and putting the top down we would take a picnic lunch to spend the day exploring. They too loved 'side roads' and were eager to see what lay around the next bend." In addition to the lilac tour, the three would sometimes drive to the restaurant in the Penobscot Exchange Hotel in Bangor for Lobster à la Newburg.²¹

The Food-Plant Catalogue

The *Food-Plant Catalogue of the Aphids of the World* was finally finished and printed in 1938 and distributed in 1939. It is 431 pages long. In it, Edith acknowledges the assistance of Alice Averill, who for thirty years had kept up-to-date lists of the food plants recorded in all accessible aphid papers. The format is slightly different from that of the earlier *Food Catalogue* as shown by the entry on the cat-tail family of plants (Family Typhaceae) in the earlier publication (see page 42).

TYPHACEAE

CAT-TAIL FAMILY

Aphis avenae Fabricius. Davis, 1914c, p. 6

Typha latifolia.

Aphis gossypii Glover. Claassen, 1921a, p. 501.

Thypha latifolia.

Aphis maidis Fitch. Wildermuth, 1932a, p. 7.

Typha latifolia.

Aphis viburnicola Börner. Börner, 1921a.

Typha latifolia.

Hyalopterus arundinis Fabricius. Swain, 1919a, p. 176

Typha

Macrosiphum granarium Kirby. Swain, 1919a, p. 176.

Typha

Myzus persicae Sulzer. Wilson, 1918a, p. 126.

Typha.

Rhopalosiphum enigmae Hottes and Frison. Gillette, 1932b, p. 483, Hottes, 1931b, p. 237.

Typha latifolia.

Rhopalosiphum nymphaeae Linneaus. Essig, 1912b, p. 797; Patch, 1915c, p. 164; Theobald, 1927a, p. 64.

Typha latifolia, *T. major*.

Toxoptera typhae Laing. Laing, 1923a, p. 241; Theobald, 1927a, p. 324.

Typha latifolia.²²

This publication is Edith's most lasting contribution to the study of aphids. It remains an important record of aphids and their host plants. The publication of the *Catalogue* resulted in a flood of correspondence to the station; those who had received a copy responded with thanks and praise, and those who had not, requested one.

Edith sent a copy to William Woods, son of the former station director. Woods wrote to thank her and to reminisce about his years working with her in Maine, both as a student and as a summer staff member in the early 1900s. He had become an Episcopal priest, was living in St. Andrews Rectory, Kent, Connecticut, and teaching sciences at Kent School. Edith replied that she had recently visited a pond on the blueberry barrens that would be familiar to Woods:

You remember a special Holiday Pond, with Damsel Flies and Yelping Frogs in the midst of the Blueberry Barrens? Where you took a picture of me on top of a boulder split by a growing evergreen? Well, Alice and I went there a few weeks ago and took Mr. and Mrs. Wilfred Bronson with us. Wilfred Swancourt Bronson got 'quite a Thrill' in seeing that Holiday Pond. The Yelping Frogs yelped for us. The Damsel Flies were there. The boulder with its evergreen was still there.²³

The pond was a model for Edith's book, *Holiday Pond*. Bronson had made the drawings for *Holiday Pond* and the jackets and frontispieces

for *Holiday Meadow* and *Holiday Hill*. He was a well-known author and illustrator, and Edith must have admired his work as she gave a copy of his book *The Chisel-Tooth Tribe*, to Mary Elizabeth and Frank Thomas Simpson, children of Geddes Simpson, for Christmas, 1939.

William Procter of Bar Harbor also requested a copy of the *Catalogue*. Procter was well known for his work on the *Biological Survey of Mount Desert Island*, an ambitious effort to record the flora and fauna of the Maine island, home to Acadia National Park. Insects, including the aphids and their relatives, were part of this effort. The information on the aphids included in Procter's publication suggests that Edith contributed to this effort by identifying the aphids.²⁴

Alice Averill, Edith's laboratory assistant since 1908, died on November 28, 1941. Averill had assisted Edith with most of her aphid work and played an important role in the preparation of *Food-Plant Catalogue of the Aphids of the World*. Averill had a major role in the preparation of a supplement to that publication, *Index to Genera and Species of Food Plants*, published in 1945. This supplement greatly enhanced the usefulness of the *Catalogue*. Old friend Osborn wrote, recalling that he had always admired Averill's beautiful handwriting and the precision with which she maintained records in Edith's laboratory. Osborn feared that the skill of excellent handwriting was becoming obsolete.²⁵

Women in Entomology

In 1939, at the request of the Institute of Women's Professional Relations, Edith undertook an evaluation of entomology as a profession for women. The Institute of Women's Professional Relations, based in New London, Connecticut, with research headquarters at Connecticut College, provided services and publications to organizations seeking to increase employment opportunities for women. The information provided by Edith was to have been part of a new edition of *Occupations for College Women* for distribution to high schools and colleges. Edith's approach was to survey women who were members of the Entomological Society of America (44 or 5 percent of the total membership) and the American Association of Economic Entomologists (eight additional names). In a mailed survey she asked these women to respond to the following questions:

1. What positions have you held that involved work in some phase of entomology?

2. In what institution, or institutions, have you studied subjects that prepared you for such work?
3. Are you a college graduate—if so, what are your degrees and where obtained?
4. May I have a list of your publications?

Edith based her report on the 35 responses she received. All of the respondents would have known of Edith from her past presidency of the Entomological Society of America, and many spoke of their admiration for her work and her accomplishments. These responses, some quite long, are fascinating. Some women had found work that was completely satisfying, and others had found nothing after years of searching. Entomologists usually obtained their training at colleges and universities, and some of the women held Ph.D. degrees from prestigious universities noted for their programs in entomology. Others did not have a college degree. The women also varied in their passion for insects and their persistence and ingenuity in finding or creating positions.

Edith's analysis of the responses to her survey is recorded in "The Entomologist."²⁶ The women who were currently employed or had previously held positions as entomologists worked mainly in government and teaching. A few worked in libraries, museums, or as illustrators. Some were freelance writers of nontechnical books and articles for newspapers and periodicals for children and the general public. The women who worked for the government were involved with projects of the USDA, Bureau of Entomology, the Division of Identification and Classification of Insects, the Bureau of Plant Industry, and the Federal Horticultural Board. Edith also included in this category women who worked in state agricultural experiment stations, since they were wholly or partially funded from federal sources. Of the women who taught at colleges and universities, some of the women taught entomology courses, whereas others had little opportunity to use their entomological training as they were committed to teach other biology courses. Entomological museums such as those at the University of Kansas and Cornell University, and the Academy of Natural Sciences, Philadelphia, provided employment to a number of women.

Three of the women showed great resourcefulness in developing ways to support themselves when conventional employment was not available. One woman, who had taken university courses in entomology but had not obtained a degree, earned money in the 1920s by

amassing large collections of insects from specific areas. She had sold some 22,000 insects to the University of Minnesota for their insect collection. She was director of a museum of natural history with special emphasis on insects, including exhibits of living insects. She also served as councilor to the Boy Scouts of America on various subjects including insects. In the 1930s, two women, one an entomologist and the other a plant pathologist, joined forces to open a consulting business called The Plant Doctor, possibly the first organization to make a business of selling services directly to home gardeners. Both held Ph.D. degrees from Cornell University and were experienced in their fields.

Many of the women discuss the question of discrimination against women in the awarding of positions. Although there is evidence that this was happening, the lack of a similar survey of men makes discrimination difficult to quantify. Also, the survey was conducted in 1938, following years of economic depression, when jobs were hard to find for nearly everyone. The survey respondents frequently mention positions that had been terminated during the 1930s, especially in government services. Indeed, Edith was well aware of this situation and wrote of it to Harrison E. Howe:

at the present time, it should be understood that there are more entomologists than positions for same. That was not the case in 1903 or indeed until the last few years.

This year I have been flooded with communications announcing the elimination of this, that, and the other project: 'Unless the Senate Committee inserts an item for corn borer research work, approximately 40 entomologists will be thrown out of employment by June 30, 1934. It appears that severe reductions are to be made in appropriations for other projects of the Bureau of Entomology which will greatly increase the number of unemployed, trained entomologists.' That for a sample of lump announcements. Then all sorts of individual 'any job, permanent or temporary queries.'²⁷

Women who planned to marry, or had married, faced additional limitations due to laws or restrictions preventing two members of the same family working in a state, an institution, or a department. One woman recalls: "I received a graduate assistantship at the University of Minnesota, then was married to a man who was at the time an Instructor at Minnesota, and found, to my surprise, that I was disqualified for the assistantship." A former Canadian graduate student of Edith's who was

then working with aphids and the potato crop for the Canadian civil service, reports that she was required to ask permission from Ottawa to marry and was given notice that there would be no further advancement for her after her marriage.

Respondents also address the problem of credit for contributions to publications:

Publications at Utah State were made under the Experiment Station entomologist's name, since it was the policy of the institution to issue reports only under the authorship of full-time staff members. Subsequent work [at Minnesota] has been in conjunction with my husband under whose name reports are published.

As evidence of publication is an important component of an entomologist's credentials, lack of recognition for research efforts in publications was a serious matter.

In the report, Edith lists institutions where preparation for entomological work could be obtained. She also includes comments from survey respondents on the potential opportunities for women in entomology, both negative and positive. According to a research instructor in a recognized institution:

In my opinion the opportunities for women in entomology are few. I am wondering if most women aren't wasting time to work for advanced degrees in the biological sciences. Lately I have been advising girls not to enter this field. We have a number of women holding Ph.D. degrees who have been without jobs for some time, and others who have had to go into other work.

Another writes: "Unless one has an independent income or loves the subject enough to starve for it, one should not enter it." But she adds: "Personally, I wouldn't give up entomology for anything on earth." A third woman reports that if she was asked for advice she would say "if you enjoy working with insects, by all means go on with entomology, but face the possibility that you may have to be satisfied with it as an avocation." Another woman responded: "Personally, I feel that as soon as we quit thinking of ourselves as women in the field and begin thinking of ourselves as individuals, this imaginary barrier will drop."

Edith ends her report with "after being employed for more than thirty interesting and pleasant years as a research entomologist, I shall never discourage any capable young woman, with a real desire for the work, from preparing for it."

“The Entomologist” appears to have been Edith’s final report to the Institute of Women’s Professional Relations, but I have been unable to find a published version. Correspondence with Mrs. Jouett Shouse, chairman of the board of the institute, suggests that the report was never published, much to Edith’s annoyance.²⁸

Environmental Concerns

Edith continued her campaign to inform the public of the dangers of the widespread use of chemical insecticides. On May 4, 1939, she addressed the Garden Club Federation of Maine at a banquet at the University of Maine’s Merrill Hall, on the subject of “Our Insect Friends.” The emphasis of this speech is on insect conservation and echoes “Without Benefit of Insects” from 1936. Edith stresses the importance of insects as pollinators of important food crops for humans and livestock, and the birds and flowers that give us pleasure, focusing on hawk moths rather than bees.²⁹

Edith sent a copy of the talk to Frank H. Lathrop, who succeeded Edith as head of the Entomology Department. It was accompanied by the following letter:

May 3, 1939

Dear Dr. Lathrop:

I do not think there is any thing in this “talk” of mine to which you can object; but I am placing a copy with you in case you ever have any comment concerning it.

Sincerely,

Edith M. Patch

This letter suggests that there may have been tension between Edith’s stand against widespread use of insecticides and the department’s extensive research on use of insecticides for insect control.³⁰

In the summer of 1945, Edith expressed her concern with the news of the increasing use of new insecticide DDT, regarded by many as a new miracle insect-control agent. The insecticidal properties of DDT were discovered in 1939 and marked the beginning of the era of synthetic organic insecticides. DDT rapidly became the standard remedy for the control of typhus and malaria in both military and civilian use. DDT had a combination of what were regarded as useful properties:



*DDT trials at the Maine Agricultural Experiment Station's
Aroostook Farm in 1945.*

a broad spectrum of activities, long persistence, low acute toxicity for mammals, and low cost. In other words, it killed a wide variety of organisms, stayed around a long time, was not thought dangerous to humans and other mammals, and was cheap to manufacture. Though these characteristics were originally thought desirable, they would ultimately lead to its condemnation and banning. In 1943, the Department of Entomology at the University of Maine began experimental trials with DDT.

In 1945, Edith wrote to the Fisher Scientific Company calling attention to the possibility that there might be detrimental effects of DDT and enclosed a copy of "Without Benefit of Insects." Howard Draving, advertising manager of the company, responded to her letter. At the same time, Edith wrote to F. N. Annand, chief of the Bureau of Entomology and Plant Pathology at the USDA, pointing out that much of the publicity concerning DDT was not only unwise but not factual. The material had encouraged people to believe that it was a miracle control for insects and few people seemed to appreciate that it had its limitations and its dangers. In his response to Edith, Annand stated that he believed after the war that DDT would be used extensively. This was indeed the case. Edith provided a copy of this correspondence to Lathrop.³¹

Edith continued to be consulted on professional matters in retirement, but usually referred requests for information, loan of aphid specimens, or identification of aphids to Lathrop. In February 1941,

however, she responded to a letter from Robert F. Griggs of the National Research Council in Washington, who had asked her to comment on a letter of application for a position. In favor of his being granted the position, the applicant stressed his strengths in statistics. As mentioned before, the results of Edith's research were mainly descriptive. She expressed her lack of enthusiasm for statistics, which was common in many of her generation, in this letter to Dr. Griggs:

Statistical techniques applied to problems of entomological populations are subject to variances and covariances in value—depending not only on the complicated influences involved in the problems themselves but also in the breadth of knowledge and stability of the mathematician-scientist who conducts them. I have known such fallacious and ridiculous conclusions in the field of biology (including entomology) based on statistical techniques that I hesitate in my reply to the question you sent me.³²

World War II at Braeside

The entry of the U.S. into World War II touched even Edith and Alice. On July 8, 1943, in a letter to Fitch, Edith spoke of the many young men from the area who had been “called” for military duty. She was deeply concerned for their welfare, and she and Alice did what they could for the war effort. They bought war bonds and responded to appeals to restrict the use of cars to save on gasoline and tires. They kept in touch with the men they knew serving with the military. Edith gave some of them her “lucky stones” (grey stones with a white encircling band). One Orono resident, Charles Smith, kept his as a treasured keepsake after the war. Edith and Alice's old friend Henry Briggs was a corporal in camp in Florida in December of 1942 and later saw service in New Guinea, where Edith sent him letters and verses.

A sad reminder of one of Edith's former graduate students living in the Philippines is recorded in an undated clipping of a letter to the editor of the *Bangor Daily News* from a resident of Orono who had seen military action in the Philippines:

We went into Los Banos Luzon and the College of Agriculture that was there to get out some prisoners who were kept there during the war. I came upon a Filipino who was in rags. He talked perfect English and I asked him how come. He said he'd graduated from the University of Wisconsin and had taken his doctorate at the University of Maine under Dr. Edith Patch in Plant Pathology.

I was thunderstruck. I told him I was from Orono. We were both shaken. His name was Dr. Jerodo Ocferria. He asked me to get in touch with Dr. Patch when I got back to Orono, and to ask her if she could send him something to help him get started again.

I contacted Dr. Patch and she was flabbergasted. She asked me to come see her. I was only a mile away but was always too busy (I thought). She wrote to me and called me but I never went. Then one day I saw her obit in the NEWS.³³

It is not known if Edith was ever able to contact this person and I have not been able to document that he was a student at University of Maine. Perhaps he did not complete his studies or his name is spelled incorrectly.

Spiritual Concerns

Edith devoted much time and thought throughout her retirement to her embrace of Pantheism as her spiritual belief and delivered several talks on the subject in the Orono-Bangor area. Pantheism is subject to a wide range of philosophical and theological definitions, but simply put, it is a doctrine or belief that identifies God with the universe and regards the universe as a manifestation of God. In a talk titled "Pantheism Today," prepared for delivery to a meeting of the University of Maine Chapter of the A.A.U.W. on April 10, 1940, Edith traced this doctrine from the ancient Greeks up to the time of her presentation, giving ample quotations from published writings. She concentrated on a naturalistic Pantheism doctrine, whose adherents regarded the wonders of nature with reverence and felt obliged to defend the natural environment against those who would destroy it. She included in her address a quotation from writings by her old friend W. S. Blatchley. Blatchley had been state geologist of Indiana and was well known for his taxonomic works on Coleoptera, Heteroptera, Orthoptera, and especially Diptera. He had written on Pantheism in 1939, although without using the term:

They say because I am now a believer in evolution, that I am an atheist. But in this they are mistaken. I believe in a God, not the puny personal God whom most people revere, but in what I call the 'God of Nature.' You ask: what is the God of Nature? In answer I would say: Go out in early spring and look into the innocent faces of the first hepaticas or snow trilliums, peeping through a crust of snow; trace the flight of brilliant butterflies across a meadow; listen to the vernal

song of a mocking-bird or wood thrush; watch the bursting buds on the bare limbs of bush or tree as they expand into the green verdure of spring; gaze upon the order and the beauty of the planets and the stars in the heavens above you; do a hundred similar things with a reverent mien and you will feel the presence of the God of Nature, for the Universe is God and God is the Universe.³⁴

Patch sent a copy of her address to Blatchley, then living in Dunedin, Florida. He replied on March 30, and April 16, 1940, discussing their shared belief, complimenting her on her manuscript and saying that he was honored that she had included an extract from his work in her address.³⁵

The text of this speech seems to reflect Patch's own sentiments, but she does not state that they are her own religious beliefs. Jean Adams, her former graduate student, believed that Edith adhered to a Pantheist doctrine.³⁶ Patch again spoke on Pantheism on April 8, 1942, to the Student Forum at the Church of Universal Fellowship in Orono. In a letter to Osborn, Edith related that in February she addressed the Honor Society of Bangor School Teachers on "The Creed of a Naturalist," which was really the creed of Pantheists. (I have not been able to find copies of this talk.)³⁷

Edith appears to have been ill at ease with her embrace of Pantheism while formally associated with the Church of Universal Fellowship and to have discussed this with a fellow church member. She received reassurance in a letter from Milton M. McCorrill, minister of the church from 1947–1957:

Mr. Grannett told me of your conversation with him regarding church membership and he gave me to read your paper on Pantheism. A great deal of latitude is given to members relating to their specific beliefs. The first principle of our church is the Fatherhood of God. That is a symbolic term meaning that all of us are a product of the forces of the universe and that those forces are friendly toward man. As a Pantheist you would surely assert both of these ideas. The second principle is that of Jesus as the supreme revelation of God's will and way. This complete at-home-ness in the world of nature and his interpretation of nature as an expression of God would be surely a part of your thinking. The other two principles are truth and love.

If you are not fit to be a member of our church, frankly I would not know any of us who would qualify. From my stand point, you would most surely be a full-fledged member of our church.³⁸

The Last Years at Braeside

Edith continued collecting and distributing documents related to the Patch family history. On September 17, 1945, she sent a copy of her older brother Fred's account of the family's early travel to Nebraska to her cousin Waldo Patch in Worcester for his birthday on September 19.³⁹

On March 16, 1946, Edith's old friend Herbert Osborn wrote from Florida thanking her for her letter on his ninetieth birthday. In it he reminisced that "some time ago I had a nice note from Miss Averill in connection with her publication and it recalled again the many delightful associations connected with my summers in Maine. I count them among the most cherished of memories. I have often had occasion to admire your policy of securing specialists for work on the Maine insect fauna."⁴⁰

On April 3, 1946, Edith drew up her will. She named her sister Alice her sole heir and Dr. Boswell F. Bates as her executor. In the event that Alice predeceased her, Edith named a number of beneficiaries with Dr. Bates receiving the residue of her estate.⁴¹

Edith's sister and companion Alice died on March 16, 1948, of congestive heart failure after three weeks in the osteopathic hospital in Bangor. Dr. Bates was her physician. She was buried in Hope Cemetery, Worcester, Massachusetts.⁴² Alice had always supported Edith. Her work managing the household at Braeside freed Edith from domestic responsibilities. The staff at the station extended condolence, which Edith acknowledged on April 14.⁴³

In 1949, Edith sold part of her land between College Avenue and the Stillwater River to Richard Hill, and in 1952, she sold the remainder of this waterfront property, including her screened summer house, to William B. Stallworthy.

The loss of her sister Alice, her lifetime supporter, must have been difficult for 72-year-old Edith. There are many stories of Edith's loneliness and mental deterioration following Alice's death. Jennie Boynton wrote that

when she grew older and was left alone by the death of her sister, she became senile and pitiful....she had pneumonia and was treated at the Osteopathic Hospital in Bangor, by an Orono physician who impressed upon her that he had "saved her life." Thus he became her "Lord and Master." She took up the habit of riding the busses often, to and fro from Orono to Bangor, having her meals at restaurants. As it became difficult for her to get on the bus, she would take a stool out to the side of the road. I sat with her on the bus many times, as I

worked evenings in Bangor. When we went past the Doctor's house in Orono, she would hang on to the seat in front of her and say, "That's where the doctor lived who SAVED my life." Then as we passed the osteopathic Hospital, which was on State Street in Bangor, she would again stand up and say, "That's the hospital where Dr. ——— saved my life."

While riding on the bus, she started giving out candy bars. She would say to whoever sat with her (and in those days the busses were filled), "Do you take candy?" and pass out a bar. Then, as she left the bus she always passed the driver a bar of candy. Sometimes she would be already to step off the bus and would remember, so she would back up, dig in her bag, and finally come up with a candy bar for the driver. Sad, indeed, that such a brilliant person should end up like a little child—but, that is the way the ball bounces.⁴⁴

Frances Murray also had many memories of Edith's mental confusion and loneliness from this period. She recalled a taxi driver called Tommy who used to drive Edith around. When he brought her to the Murrays, Tommy would come in and ask her if he should tell Edith that Frances was not in. Then he would bring Edith in, and Edith would say that she had just come for a rest. Frances's husband, Joseph Murray, head of the Department of Zoology, would take Edith home when he came for lunch.⁴⁵

In 1950, Edith received a visit from Stephen S. Walczak of Colorado Springs, Colorado. Stephen was a schoolboy whom Edith had befriended. He had valued and remembered their time together: "My family and I were neighbors of Ms. Patch for many years in Orono. Hers was the second farmhouse down the road from ours....I knew her fairly well during the years I was growing up (1929–1941). After school I would visit her on the farm, often helping with chores and miscellaneous projects. I think she was quite fond of me as a boy during grammar school and through high school. Our friendship continued during and after the war. She wrote to me while I was overseas....I last saw her in person in 1950 during a visit to Maine. We had a lovely dinner, where I introduced her to my bride."⁴⁶

After Alice died, Lottie Patch, Edith's sister-in-law, and a series of students lived with her. Some of these arrangements were successful and others, including that with Lottie, were not. Richard K. Stuart recalled that he and his family had lived on the north side of Braeside from 1950 to 1952. When they moved in they were horrified to discover



Edith Patch and friends in Orono in the early 1950s. Left to right: Marg Jane Dirks, Elsa Klein (standing), Edith Patch, Addie Deering, Edna Otto, and Brownie Schumpf. Courtesy of Fred and Alma Otto.

that all sewage from the house was dumped directly into the little stream at the north end of the lawn. Edith paid for the materials for a septic tank, and Stuart and a good friend across the road (Richard C. Hill) built a septic tank. The Stuarts recalled that Lottie left in the fall of 1951 when a student couple came to stay with Edith. By this time Edith was frail and forgetful.⁴⁷ In 1952, the University of Maine granted Edith an increase of \$94.33 in her monthly retirement stipend.⁴⁸

Friends of Edith of this period included Ruth Hinkley McLaughlin, who used to take Edith to Tri Delta meetings where she might be alert or sleep; Edna Otto, who took her to the Lakewood Theater in Skowhegan for matinees; Brownie Schrumph, who organized picnics for the group; Marg Jane Dirks, Elsa Klein and Addie Deering.

On February 19, 1954, the Probate Court in Bangor adjudged that Edith was unfit by means of infirmities of age and physical disability to manage her estate. Boswell P. Bates was appointed conservator. Edith died in an Orono nursing home on September 28, 1954. Funeral services were at the Church of Universal Fellowship, with Milton M. McGorrell officiating. Friends, neighbors and former colleagues at the station were her bearers: Henry Briggs, John Hawkins, Geddes Simpson, Charles Dirks, George F. Dow, and Frank H. Lathrop. She was buried in Hope

Cemetery in Worcester, the resting place of generations of the Patch family. After her death, the Bangor Nature Club planted a tree in her honor by the water tower at the Bangor Bird Sanctuary on Thomas Hill.⁴⁹

The value of Edith's estate was assessed at \$34,044.97: \$12,000.00 in real estate, \$4,960.21 in goods and chattels, and \$17,084 in investments. Provisions of her will provided bequests to relatives, friends, former colleagues, and the Bangor Bird Conservation Club. The residue of her estate went to Dr. Bates.

Each person is said to have a ruling passion and Edith M. Patch spoke of hers as

The desire to serve old mother earth and to protect natural beauty; so to live, that there may not be fewer pond-lilies and less arbutus in the world because she passed along the path; so to write that bumblebees may not be begrudged their nectar and the eagles may not be shot for sport or egrets slain for fashion.⁵⁰

EPILOGUE

SINCE EDITH'S RETIREMENT IN 1937, inevitable changes have occurred in how entomologists work and the tools they use. The Department of Entomology that Edith founded at the University of Maine no longer exists, and entomologists now work in the university's School of Biology and Ecology in association with other scientists in related disciplines.

Edith's most important work was with aphids, their taxonomy and biology, and especially the identification of the plants on which they fed. She would have found the changes in the definition of species to include DNA profiles astonishing. Unfortunately, the reduced interest in traditional insect taxonomy and shortages of space and funds have led to reduction of the value placed on traditional museum collections. The insect collections that Edith organized—the aphid collection mounted on slides and the general pinned collection—are no longer at the University of Maine. Both of these collections, and their associated log books with detailed, handwritten notes, dated back to the early 1900s. The aphid collection was transferred on permanent loan to the Canadian National Collection of Insects, Arachnids and Nematodes in Ottawa. It was agreed that it would be kept intact and referred to as The Patch Collection.¹ In 2012, the general collection of pinned insects was transferred to the Maine State Museum in Augusta.

In spite of these changes, Edith's accomplishments continue to be honored. Edith's inclusion in books such as Marcia Myers Bonta's *Women in the Field: American Pioneering Women Naturalists* (1991) and *American Women Afield: Writings by Pioneering Women Naturalists* (1995) has made her known to those interested in the history of women naturalists.² Activities and reports of the Entomological Society of America continue to bring her contributions to the attention of the current entomological community. The society's "1996 Founders' Memorial and Lecture Honoring Edith M. Patch" was delivered by James Slater who said that it was an honor to speak of Edith. He praised her accomplishments as a successful woman in a profession, which, when she was working, was almost devoid of women professionals. To accomplish this, she overcame odds that most males and many females of later generations can scarcely conceive. He praised Edith's enormous versatility. She was not only an entomologist and distinguished aphid taxonomist, but a true naturalist and educator:

she was a true educator at all levels ranging from graduate students to popular texts, to writing children's books. Even as a girl of seven in Minnesota, she was a lover of all natural things, and she remained a naturalist until the day she died. The naturalist tradition is a long one. It always has included a love of, and appreciation for, the beauty of nature.³

Manya B. Stoetzel, a research entomologist specializing in aphids in the Systematic Entomology Laboratory, USDA-ARS, Beltsville, Maryland, acknowledged Edith's work as an aphid taxonomist:

The one aphid genus, *Microparsus*, described by Patch (1909) remains valid today. Of the 35 species of Aphididae that Patch described, 10 remain valid species in their original combinations, 9 remain valid species in different genera, and 16 have been declared synonyms. Of the 3 species of Adelgidae that Patch described, 2 remain valid species in different genera, and 1 has been declared a synonym. Two genera (*Patchia* Baker 1920 and *Patchiella* Tullgren 1925), 5 species (*Eriosoma patchiae* [Borer & Blunck 1916], *Essigella patchae* Hottes 1957, *Amphorophora patchiae* Essig 1941 [synonym of *Illinoia goldamaryae* (Knowlton 1938)], *Pineus patchae* Börner 1957, *Thecabius patchii* Gillette 1914), and one subspecies (*Chaitophorus populicola* subsp. *patchae* Hille Ris Lambers 1960) have been named in Patch's honor.⁴

Edith's major publication, *Food-Plant Catalogue of the Aphids of the World, Including the Phylloxeridae*, published in 1938, remains the only extensive, published record of aphids and their host plants and is considered by many as her most lasting contribution to the study of Aphidoidea.

Edith's most important contribution to the struggle to maintain environmental integrity is her 1936 public speech "Without Benefit of Insects." The speech was widely discussed and reported in the press. Printed copies were distributed; it was later revised and published.⁵ Edith was one of the first professional entomologists to articulate the need for insect conservation and the consequences of the loss of insect pollinators due to the widespread use of chemical insecticides. The Entomological Society of America was initially an organization that focused on managing insect pests, with emphasis in basic fields such as systematics and toxicology. With so much effort focused on controlling pest insects, little time was devoted to managing beneficial insects or species that were rare or declining in numbers. It was not until December 2007 that a group of scientists convened a symposium

to address a range of issues surrounding insect conservation.⁶ The heart of these papers reflected a call to action on the part of the society that harkened back more than seventy years to Edith's "Without Benefit of Insects." Edith had ended her paper saying: "The fraternity of hive beekeepers will doubtless continue to fight for the life of their pollinators. As for other helpful insects, will defenders of equal zeal rally to their support to the end that mankind may never be without benefit of insects?"

It has taken a long time, but Edith would be pleased that the Entomological Society of America has launched a network for insect conservation. She would be delighted that organizations such as the Xerces Society for Invertebrate Conservation are advocating for science-based conservation of insects. The Xerces Society has continued to honor Edith. In the Spring 2013 issue of its publication *Wings*, Mace Vaughan, pollinator conservation program director, named Aldo Leopold and Edith M. Patch as his two environmental heroes.⁷

Edith is recognized as a scientist who did not isolate herself and communicate only with fellow scientists. She devoted time and effort to developing the skills that allowed her to communicate with the general public through writing and public speaking. Her articles in gardening and natural history magazines and her public addresses on environmental matters are masterpieces of how this may be accomplished. She extended this skill to writing for children, capturing and nurturing their interests in animals of all sorts. She succeeded in this work because she remained interested in and enjoyed the company of people of all ages.

Friends of Dr. Edith Marion Patch

Braeside, Edith Patch's home, was acquired by the University of Maine in the 1950s and served as a student residence before standing vacant for several years. Significant structural deterioration in the house led to the suggestion that it be burned as a training exercise for local firefighters, but protests from the community resulted in the abandoning of this plan. In 1999, the Friends of Dr. Edith Marion Patch was formed and, with funding from donations and grants, began rehabilitating the house and offering educational programs to the public on topics related to Edith's work and interests. In 2001, the house was placed on the U.S. Department of the Interior's National Register of Historic Places. In addition to contributing funds, community members scoured their libraries and attics and contributed letters, books,

and other items associated with Edith Patch for the planned museum room in the rehabilitated Braeside. In 2013, the University of Maine made a significant contribution to the ongoing program to transform Braeside into a center for education and natural history.

For more information on the Friends of Dr. Edith Marion Patch and the future of Braeside, please contact

Friends of Dr. Edith Marion Patch
c/o University of Maine Foundation
Buchanan Alumni House
Two Alumni Place
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Or

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APPENDIX: PUBLICATIONS OF EDITH M. PATCH*

Entomological Publications

1904. "Brown-tail Moth and Other Orchard Moths." MAES Bulletin 108 (November).
1904. "The Apple Maggot, *Rhagoletis pomonella*." (by Edith M. Patch and W. M. Munson). MAES Bulletin 109 (December).
1904. "Insect Notes for 1904." MAES Bulletin 109 (December).
1905. "The Cottony Grass Scale, *Eriopeltis festucae* Fonsc." MAES Bulletin 121 (December).
1905. "Strawberry Crown Girdler, *Otiorrhynchus ovatus* Linn." MAES Bulletin 123, (December).
1905. "Insects of the Year (1905)." MAES Bulletin 123 (December).
1906. "Insect Notes for 1906." MAES Bulletin 134 (December).
"The Brown-tail Moth."
"Aroostook Potato Insects."
"Alder Blight and Attendant Insects."
"The Larch Case Bearer."
"Brief Notes upon the Other Chief Insects of the Year."
1907. "The Potato Plant Louse, *Nectarophora solanifolii* Ashm." MAES Bulletin 147 (November).
1907. "Insect Notes for 1907." MAES Bulletin 148 (November).
"Orchard Insects."
"Grasshoppers."
"Beetles."
"A Forest Attack by One of 'The Prominents.'"
"Aroostook Potato Insects."
"Brief Notes upon the Other Chief Insects of the Year."
1908. "*Crocigrapha normani* Grote." *Entomological News* 19 (July).
1908. "*Pemphigus tessellata*: Alternate Host, Migrants and True Sexes." *Entomological News* 19 (December).
1908. "The Saddled Prominent, *Heterocampa guttivitta* Walker." MAES Bulletin 161, (November).
1908. "Insect Notes for 1908." MAES Bulletin 162 (December).
"A New Spruce Tortrix, *Argyroploce abietana* Fernald."
"Ash Clusters and Gall Mites, *Eriophyes fraxiniphila* Hodgkiss and *Eriophyes fraxini* (Karp.) Nal."
1909. "Homologies of the Wing Veins of the Aphididae, *Psyllidae*, *Aleurodidae* and *Coccidae*." *Annals of the Entomological Society of America* 2.
1909. "*Pemphigus venafuscus* n. sp." *Entomological News* 20 (July).

* Compiled by Edith M. Patch in 1941. Many of the entries are incomplete.

1909. "The Desmodium Aphid, *Microparsus variabilis* n. sp." *Entomological News* 20 (October).
1909. "Downy Psyllid of Alder, *Psylla floccosa* new species." *The Canadian Entomologist* 41(9).
1909. "The Pine-Leaf and the Green-Winged Chermes." MAES Bulletin 171 (November).
1909. "Chermes of Maine Conifers." MAES Bulletin 173 (December).
1909. "Chermes of Maine Spruces." *Psyche* 16 (December).
1910. "Gall Aphids of the Elm." MAES Bulletin 181 (May).
1910. "Four Rare Aphid Genera from Maine." MAES Bulletin 182 (June).
1911. "Psyllidae. Aphididae." MAES Bulletin 187: 10–23.
1911. "*Macrosiphum destructor* and *Macrosiphum solanifolii*." MAES Bulletin 190 (June).
1911. "Insect Notes for 1911." (by O. A. Johannsen and Edith M. Patch) MAES Bulletin 195 (December).
1911. "*Pemphigus tessellata* (*acerifolii*) on Alder and Maple." MAES Bulletin 195 (December).
1912. "Notes on Psyllidae: Livia." *Psyche* 19(1).
1912. "Aphid Pests of Maine." MAES Bulletin 202 (July).
1912. "Food Plant Catalogue of the Aphidae of the World. Part I." MAES Bulletin 202 (July).
1912. "Notes on Psyllidae." MAES Bulletin 202 (July).
1912. "Elm Leaf Curl and Woolly Aphid of the Apple." *Science*, N.S. 36(914).
1912. "Elm Leaf Curl and Woolly Apple Aphid." MAES Bulletin 203 (July).
1912. "Aphidae." MAES Bulletin 207: 448–450.
1912. "Woolly Aphid Migration from Elm to Mountain Ash (*Schizoneura lanigera* (*americana*))." *Journal of Economic Entomology* 5(5).
1913. "A Note on Two Elm Leaf Aphids." *Journal of Economic Entomology* 6(3).
1913. "A Study in Antennal Variation." *Annals of the Entomological Society of America* 6.
1913. "Aphid Pests of Maine. Part II. Willow Family." MAES Bulletin 213 (June).
1913. "Food Plant Catalogue of the Aphidae of the World. Part II." MAES Bulletin 213 (June).
1913. "Woolly Aphid of the Apple (*Schizoneura lanigera*)." MAES Bulletin 217 (October).
1913. "Woolly Aphids of Elm." MAES Bulletin 220 (November).
1913. "Food Plant Catalogue of the Aphidae of the World. Part III." MAES Bulletin 220 (November).
1914. "Currant and Gooseberry Aphids in Maine." MAES Bulletin 225 (February).

1914. "Food Plant Catalogue of the Aphidae of the World. Part iv." MAES Bulletin 225 (February).
1914. "Maine Aphids of the Rose Family." MAES Bulletin 233 (November).
1915. "The Pond-Lily Aphid as Plum Pest." *Science*, N.S. 42(1074).
1915. "Two Clover Aphids." *Journal of Agricultural Research* 3(5).
1915. "Woolly Aphid of the Elm and Juneberry, (*Schizoneura americana* in part, of authors). MAES Bulletin 241 (August).
1915. "Pink and Green Aphid of Potato, *Macrosiphum solanifolii* Ashm." MAES Bulletin 242 (October).
1916. "A Psyllid Gall on *Juncus*, *Livia maculipennis* Fitch." *Psyche* 23(1).
1916. "Concerning Problems in Aphid Ecology." *Journal of Economic Entomology* 9(1).
1916. "Elm Leaf Rosette and Woolly Aphid of the Apple (*Schizoneura lanigera* (*americana* in part))." MAES Bulletin 256 (November).
1917. "Eastern Aphids, New or Little Known. Part I." *Journal of Economic Entomology* 10(4).
1917. "An Infestation of Potatoes by a Midge." *Journal of Economic Entomology* 10(5).
1917. "The Aphid of Choke Cherry and Grain, *Aphis pseudoavenae* sp. n." MAES Bulletin 267 (November).
1918. "Eastern Aphids: A Few Species of *Prociphilus*." MAES Bulletin 270 (April).
1918. "Food Plant Catalogue of the Aphidae of the World. Part v." MAES Bulletin 270 (April).
1919. "Three Pink and Green Aphids of the Rose." MAES Bulletin 282 (December).
1919. "Several New Species." MAES Bulletin 282: 209–215.
1919. "Food Plant Catalogue of the Aphidae of the World. Part vi." MAES Bulletin 282 (December).
1920. "The Life Cycle of Aphids and Coccids." *Annals of the Entomological Society of America* 13(2).
1921. "A Meadow Caterpillar." MAES Bulletin 302 (December).
1921. "Rose Bushes in Relation to Potato Culture." MAES Bulletin 303 (December).
1922. "The Blueberry Maggot in Washington County." (by Edith M. Patch and William Colcord Woods) MAES Bulletin 308.
1922. "Aroostook Potato Insects." *Journal of Economic Entomology* 15: 372.
1923. "Homoptera of the Pribilof Islands, Alaska." In *North American Fauna*, No. 46 (Bureau of Biological Survey, USDA): 143–144.
1923. "Psyllidae of Connecticut." Connecticut Geological and Natural History Survey, Bulletin 34, Part IV: 243–250.
1923. "Aphididae of Connecticut." Connecticut Geological and Natural History Survey, Bulletin 34, Part IV: 250–335.
1923. "The Summer Food Plants of the Green Apple Aphid." MAES Bulletin 313.

1924. "The Buckthorn Aphid." MAES Bulletin 317.
1924. "Aphids with Branched Cornicles." *Entomological News* 35: 331.
1925. "Potato Aphids." MAES Bulletin 323.
1925. "The Primary Food Plant of the Melon Aphid." *Science* 62: 510.
1927. "The Melon Aphid." MAES Bulletin 326.
1927. "Two Currant Aphids." MAES Bulletin 336.
1927. "The Pea Aphid in Maine." MAES Bulletin 337.
1928. "The Foxglove Aphid." MAES Bulletin 346.
1929. "The Apple Aphid and the Citrus Aphid: *Aphis pomi* Degeer and *A. spiraeicola* Patch." *Journal of Economic Entomology* 22: 698, 699.
1938. "Without Benefit of Insects." *Bulletin of the Brooklyn Entomological Society* 33(1): 1-9.
1938. "Food-plant Catalogue of the Aphids of the World." MAES Bulletin 393 (December).

Books[†]

Little Gateways to Science (Published by Atlantic Monthly Press and handled by Little, Brown and Co.)

1920. *Hexapod Stories*

1921. *Bird Stories*

1926. *First Lessons in Nature Study* (Macmillan)

Holiday Series (Macmillan)

1929. *Holiday Pond*

1930. *Holiday Meadow*

1931. *Holiday Hill*

1935. *Holiday Shore* (with Carroll Lane Fenton)

Nature and Science Readers (with Harrison E. Howe) (Macmillan)

1932. *Hunting*, Book I

1932. *Outdoor Visits*, Book II

1933. *Surprises*, Book III

1933. *Through Four Seasons*, Book IV

1934. *Science at Home*, Book V

1934. *The Work of Scientists*, Book VI

Neighbor Series (with Carroll Lane Fenton) (Macmillan)

1936. *Mountain Neighbors*

1937. *Desert Neighbors*

1938. *Forest Neighbors*

1940. *Prairie Neighbors*

[†] Missing from the list are *Dame Bug and Her Babies* (1913) and *How Laddie Tells the Time O' Year* (1914), both published by Pine Cone Publishing Company.

Miscellaneous—Including Popular Science and Nature Articles

1900. "The Selfish Man's Apology." *The Minnesota Magazine* 7:126–130.
1900. "A Birthday Tryst." (pseudonym Marian Whipple) *The Minnesota Magazine* 7: 221–226, 244–250.
1917. "Fighting Australian Aphids with Maine Flies." *The Scientific Monthly* (May): 478.
1917. "Aphids on Your Plum Trees." *Garden Magazine* (December).
1918. "The Traitor Aphid." *Garden Magazine* (April).
1918. "Sign Language of the Caterpillar." *Country Life* (January).
1918. "A Maine Fly and the Australian Apple Crop." *Country Life* (April).
1918. "The Quiet Grasshopper." *Country Life*.
1918. "Spruce Cones with Queer Seeds." *Country Life*.
1918. "While We Prune the Orchard." *Garden Magazine* (November).
1919. "A Poor Thing but Mine Own." *Orange Judd*.
1919. "Corbie." *Country Life* (May).
1919. "Pink and Green Potato Aphids." *The Potato Magazine* (June).
1920. "Fall Plowing, Fewer Cats and More Birds." *Garden Magazine* (October).
1920. "The Migratory Aphid and the Landscape Gardener." *Garden Magazine* (November).
1920. "A Naturalist on Opal." *The Atlantic Monthly Magazine* (July): 142.
1921. "Birds and Vegetables versus Cats and Caterpillars." *Garden Magazine* (October).
1921. "A Winter Caterpillar." *The Maine Naturalist* (April).
1921. "Seven Little Ninnies." *Farm Journal*.
1921. "On Writing a Nature Book." *The Editor* (November 26).
1922. "Nature for Children." *Press Bulletin for Kindergarten Association*.
1922. "Marooned in a Potato Field." *Scientific Monthly* (August).
1923. "Social Life Among the Insects, by W. M. Wheeler." Book review for the *Atlantic Monthly Bookshelf* (November).
1924. "The Buckthorn Aphid." *The Maine Naturalist* (August).
1924. "Mullein, a Naturalized American Plant." *Nature Magazine* (February).
1924. "Multiple Personality (Buckthorn Aphid)." *Science Service* (August).
1925. "Discrediting the Buckthorn." *Garden Magazine* (September).
1926. "The Hospitable Orpine." *Garden Magazine*.
1926. "The Adventures of Ctenucha." *Natural History* 26: 200–205.
1927. "Up Stream with The Alewives." *Nature Magazine* 9: 363–366.
1927. "Two Currant Aphids." *Garden and Home Builder*.
- "An English Common." *High School Service*.

1928. "Bread or Barberries." United States Department of Agriculture, Misc. Pub. No. 7.
1929. "The Mystery, a Nighthawk Furnishes Thrills with His Tricks." *Nature Magazine* 13: 56.
1929. "The Blithe Bird." *Christian Science Monitor*.
1931. "Nature Study Naturally Considered." *Progressive Education*. (October)
1932. "Insects." *National Encyclopedia*, Vol. 5 (P. F. Collier & Son): 462-467.
1933. "Seven Lives of the Elm Aphid." *Nature Magazine* 21: 115-119.
1934. "The Bee." *Britannica Junior* (Encyclopaedia Britannica, Inc.).
1936. "Maineward Ho!" *Portland Sunday Telegram*. Section D (December 27).
1939. "Tour to the Entomological Congress." *Journal of Economic Entomology* 31: 775-776.

Nature Stories and Articles for Children

Contributions to Periodicals

1915. "A Maple Dryad." *The Churchman* (August 7).
1916. "Caravans of Sweet Fern Lane." *The Churchman* (July 8).
1917. "Log Cabins." *The Churchman* (January 6).
1915. "How Buttercup Beetle Played Possum." *Little Folks Magazine* (May).
1917. "Big Lessons from Little Builders." *Little Folks Magazine* (Announced May).
- i. "Tenting in a Cherry Bush." (July)
 - ii. "Roseleaf Apartment Houses." (August)
 - iii. "Cowsheds of Alderbrook Farm." (November)
 - iv. "A Silken Chamber." (December)
1918. v. "The House of Paper." (January)
1917. "The Red White and Blue Club." *Storytellers' Magazine*. (Serial)
- Part i. (September)
 - Part ii. (October)
 - Part iii. (November)
1917. "Surly Sam and the Picnic Hornet." *Youth's Companion* (October 4).
1918. "The Little Moonlight Girl." *Little Folks Magazine*. (Serial)
- Part I. (July)
 - Part II. (August)
 - Part III. (September)
 - Part IV. (October)
 - Part V. (November)
 - Part VI. (December)
1919. "In Nature's Path." *Uncle Sam's Boy*. (Series)
- i. "Dobsons." (March)
 - ii. "Dragonflies." (April)

- iii. "Bumblebees." (May)
- iv. "The Monarch." (June)
- v. "Grasshoppers." (July)
- vi. "Cercopids." (August)
- 1919. "S.P.C.B." *The Blue Bird Magazine* (May).
- 1919. "Keti Abbott." *The Ladies Home Journal* (December).
- 1920. "Chick D.D." *Progressive Teacher* (December).
- 1920. "Phil, The Champion Bubble Blower." *The Farm Journal*.
- 1921. "Uncle Sam." *Popular Educator* (February).
- 1921. "Seven Little Ninnies." *Farm Journal*.
- 1923. "A Flower Cradle." *John Martin's Book* (August).
- 1926. "Taming a Chickadee." *Junior Red Cross News* (November).
- 1926. "The Adventures of Ctenucha." *Natural History* 26: 200–205.
- 1927. "Strange Doings of Two Damsel Flies." *Junior Red Cross News*.
- 1928. "An English Common." *High School Service* (Red Cross).
- 1928. "Lotor, the Washer." *Junior Red Cross News*.
- 1931. "The Caterpillar Scarf." *John Martin's Book* (June).
- 1931. "Cotton Fibers." *John Martin's Book* (July).
- 1931. "Button Button." *John Martin's Book* (August).
- 1931. "Blue Dye." *John Martin's Book* (September).
- 1931. "Starch." *John Martin's Book* (October).
- 1931. "Handkerchiefs." *John Martin's Book* (November).
- 1932. "The Adventures of Spots." *Picture Story Paper*. (Serial)
 - i. "Spots and the Blackbirds." (May 1)
 - ii. "Spots and the Robin." (May 8)
 - iii. "Spots and the Bullfrog." (May 15)
 - iv. "Spots and the Dragon Fly." (May 22)
 - v. "Spots and Mrs. Spotted Turtle." (May 29)
 - vi. "Spots and Mrs. Bufo." (June 5)
- 1934. "The Story of Clothing." *Picture Story Paper*. (Serial)
 - i. "Fine Linen." (April 15)
 - ii. "Royal Purple." (April 22)
 - iii. "Cloth of Camel's Hair." (April 29)
 - iv. "Coats of Skin." (May 6)
 - v. "Leather." (May 13)
 - vi. "Wool of Goats and Sheep." (May 20)
 - vii. "Cotton and Silk." (May 27)
 - viii. "Pearls." (June 3)
- 1935. Out of the Zoo. *Picture Story Paper*. (Series)
 - i. "Bruin." (August 4)
 - ii. "Hantsin, The Elephant." (August 11)
 - iii. "Zaraf" (August 18)
 - iv. "Tomobo The Elephant." (August 25)
 - v. "The Roo Family." (September 8)
 - vi. "Big Cats." (September 15)
 - vii. "Pan and Panzee." (September 22)
 - viii. "Qua-Ha." (September 29)

1935. "Hermits and Other Crabs." *Junior Red Cross News*.
1935. "Osprey." *Junior Red Cross News*.
1935. "Bronto, The Thunder Lizard." *Junior Red Cross News*.
1936. "Lumpy and the Tracks in Sandstone." *Story Parade* (February). Also in *Story Parade* book, (The John C. Winston Co.), 141-147.
1936. "Whistler, The Marmot." *Junior Weekly* (August 8).
1936. "Squeaks, The Haymaker." *Junior Weekly* (August 15).
1936. "Mukwa and Her Cubs." *Junior Weekly* (August 22).
1936. "Billy of the Peaks." *Junior Weekly* (August 29).
1936. "Cornu, The Horny One." *Christian Science Monitor* (October 12).
1936. "Samia's Winter Nap." *Christian Science Monitor* (November 9).
1936. "Mus Quash's Igloo." *Christian Science Monitor* (December 14).
1937. "The Herd in the Moose Yard." *Christian Science Monitor* (January 11).
1937. "How Cheesay Spent the Night." *Christian Science Monitor* (February 8).
1937. "Mother Mah-Kay and Her Cubs." *Christian Science Monitor* (March 8).
1937. "Tha Has a Pleasant Day." *Christian Science Monitor* (April 12).
1937. "Two Birds Who Laughed and Played." *Christian Science Monitor* (May 10).
1937. "Veery is a Merry Songster." *Christian Science Monitor* (June 14).
1937. "The Grosbeak Among the Pines." *Christian Science Monitor* (July 12).
1937. "The Ruffs and Their Family." *Christian Science Monitor* (August 9).
1937. "Two Busy Beavers Build a Home." *Christian Science Monitor*. (September 13)
1937. "Wing-Finger, The Flying Reptile." *Christian Science Monitor*. (October 11)
1937. "Mammut Takes His First Bath." *Christian Science Monitor*. (November 8)
1937. "Diplo and Stego." *Christian Science Monitor* (December 13)
1937. "Little Long Leap." *Story Parade* (April)
1937. "Bannertail." *Story Parade Red Book* (The John C. Winston Co.): 52-58.
1937. "An American Rabbit." *Junior Weekly* (May 8).
1937. "A European Rabbit." *Junior Weekly* (May 15).
1938. "White-Tail Deer and His Family." *Christian Science Monitor* (January 10).
1938. "Snowshoes for Work and Play." *Christian Science Monitor* (February 14).
1938. "Sha-Kan and the Chipmunks." *Christian Science Monitor* (March 14).
1938. "Two Forest Birds." *Christian Science Monitor* (April 11).

Without Benefit of Insects

1938. "Travelers and Stay-At-Homes." *Christian Science Monitor* (May 9).
1938. "Brown-Wing of the Woodland." *Christian Science Monitor* (June 13).
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NOTES

Abbreviations

- EMP—Edith Marion Patch
MAES—Maine Agricultural Experiment Station
KEG—K. Elizabeth Gibbs
FDEMP—Friends of Dr. Edith Marion Patch

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Without Benefit of Insects

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