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OF

# ALPHEUS SPRING PACKARD

1839-1905

BY

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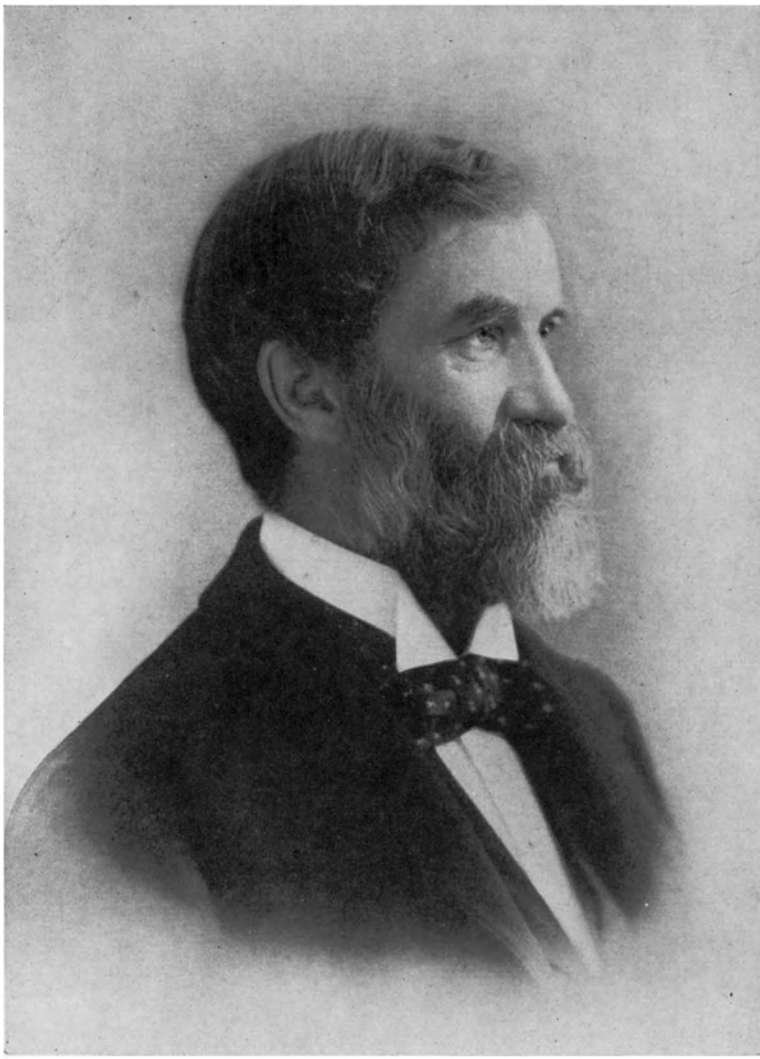

A. S. Packard

# ALPHEUS SPRING PACKARD *

1839-1905

BY T. D. A. COCKERELL.

Alpheus Spring Packard, Jr., zoologist and teacher, Professor of Zoology and Geology in Brown University, was born at Brunswick, Maine, February 19, 1839, and died at Providence, Rhode Island, February 14, 1905. His father, Alpheus Spring Packard, D. D., was Professor of Greek and Latin at Bowdoin College; his mother was Frances Elizabeth Appleton, daughter of the Rev. Jesse Appleton, president of Bowdoin College. Both the Packards and the Appletons are of English ancestry, but have been in New England since the seventeenth century. Samuel Appleton, born in England in 1624, came to Ipswich, New England, in 1635. Four generations, residing in the same region, come between him and Professor Packard's mother; and the several marriages bring into the stream of inheritance the families Oliver, Baker, Sawyer, Hubbard and Means. The Packards trace their ancestry to Samuel Packard, who came from Windham, England and died in 1684. His son, Zaccheus, married Sarah Howard, who was brought up in the family of Miles Standish. Their son, Solomon, married Susanna Kingman, and their son, Jacob, born in 1720, married Dorothy

*It has been possible to prepare this memoir only because Mrs Packard, with the greatest kindness, transmitted the materials concerning her husband which she had collected and preserved in four large volumes. She also answered all my questions, and secured information from others. I have thus been able to examine Packard's diaries, and numerous letters and other documents; making a brief summary and abstract of materials which, if fully utilized, would suffice for a book. I am also indebted for information and other assistance to Dr. Charles W. Packard, Mrs. Frances Packard McClellan, Mr. A. A. Packard, Dr. L. O. Howard, Dr. Wm. H. Dall, Rev. C. C. Carpenter, Prof. James Schouler, Dr. Nathan Banks, Dr. Glover M. Allen, Mr. Charles W. Johnson, and the editorial offices of the "Independent" and "Youth's Companion."

Perkins in 1742. They had a son, Hezekiah, born 1761, who, in 1794, married Mary Spring. These were the parents of Professor Packard's father, Alpheus Spring Packard, 1798-1884.

The Packard family has produced in America a remarkable number of accomplished persons. The National Cyclopedia of American Biography cites eleven, nine of whom are known to be descendants of Samuel Packard, of Windham. A moderate search through recent biographical works and bibliographies reveals the names of twenty other Packards, who have published books or articles, or are otherwise noteworthy. Presumably nearly all (at least) of these belong to the same old New England stock, as there is no Packard family of any note remaining in England. No Packard is mentioned in English biographical dictionaries or in a recent volume of the English "Who's Who." The talents and opportunities of the Packards have led them in many directions. We find representatives of law, education, medicine, architecture, poetry and other fields of activity, but their main vocation has been the ministry until comparatively recent years. Professor Packard, when questioned in 1901 regarding the source of his scientific interests, replied: "I may say that the love of flowers, animals and natural scenery was inborn in me. My ancestry on both sides were ministers, and we never had a naturalist in the family, but my father was extremely fond of and appreciative of natural scenery, and was interested in history and archæology. As a child I was very fond of flowers, as were my parents, and as early as I can remember had a flower-garden of my own. When about 14-15 I began to collect minerals, and then shells. My zeal for collecting and forming a museum led an older brother, who also had such tastes, to give me his cabinet, containing curiosities, shells and minerals. I was also an omnivorous reader, devoured all the books on natural science in the library of Bowdoin College, where I was kindly allowed to browse long before entering college. When about 16-17 I collected insects in considerable numbers. I was also aided by a maiden lady in Brunswick, Maine, who told me about shells, and aided me in naming my native plants. I formed a herbarium before entering college. From Miss Ann

back on, when a boy, I first heard of Lamarck, and of his classification of shells, and of the Lamarckian genera of shells. With, then, an inborn taste for natural history, an aversion to business, and a fondness for books, my deep interest in animal life was sustained and I was impelled to devote my life to biological study. All through college I corresponded with Professor Baird, assistant secretary of the Smithsonian Institution, also with conchologists and entomologists, and this was a constant stimulus to the natural zeal and interest, or passion, for biology which has influenced my life. Also, I was a born collector, though I have now no large collections."*

Packard never knew his mother, who died a few months after he was born; but in other respects his early environment was extremely favorable. His father was a man of noble character and lovable personality, always ready to give wise counsel and encourage the intellectual and moral development of his children. Alpha, as the child was called, was not left without a woman's care; his aunt, Miss Sarah S. Packard, took charge of the household and the little baby was the object of her most devoted care. In 1845 his father married a second time. There were three brothers and a sister older than Alpha; and the old grandfather, Hezekiah Packard, lived until 1849. The family life was extended, as it were, into that of the college, and every circumstance tended to give young Packard permanent and genuine interests, developing as he grew. He suffered from a congenital defect of the palate, which somewhat affected his speech, though he was able to sing, and in later life was very successful as a lecturer. Partly as a result of this, he shrank from general society, though much attached to his friends and readily attracted to those who had common feelings and interests. He kept a diary during the greater part of his life, and from this record it has been possible to follow the development of his activities without difficulty.

The earliest journal found is dated January 1, 1854, and contains this entry: "I had for my New Year's present 50 cents; with it and some other money bought Layard's *Nineveh*." He was not quite 15 years of age.

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* *Popular Science Monthly*, April, 1903, p. 519.

On March 14, 1854, a manuscript periodical was begun, under the editorship of John N. Wilder, A. S. Packard, Jr., and S. P. N. Smyth. The contributions are not signed, so it is impossible to say which were written by Packard. The journal was called "The Star of the East," and immediately under the title appeared the motto "Excelsior!". Apparently thirteen numbers were issued. In the first editorial we read: "The object of our paper is to teach us to write and compose better, so that if we should ever be called upon to edit a larger paper, we should be better fitted for that office. Our paper will be devoted to literature, amusements and the news of the day, and we shall ever be zealous for the cause of the poor slave. . . . In most every number there will be a little poetry, original or taken from other authors."

In dealing with public affairs, "The Star of the East" took a very strong stand against slavery, and supported the English, French and Turks in the Crimean War. The following is interesting reading at the present day:

"The Turkish war is an event of great importance. The Russians have a great many nations subject to them. So has Austria, if Austria joins Russia, all these nations will rise and throw off the chains of bondage. Thousands will be pouring in from all sides. England and France are sending troops to attack Russia and help the Turk, and there will be a general war in Europe. It has different effects on the missionaries also. The missionaries in Turkey pray for the success of the Turk. The Koords, a lawless set of people in Asia Minor, are committing great ravages during the absence of the Turkish soldiers . . . "

There is an original poem lamenting the fate of Hungary, subject to the domination of Austria. A patriotic poem closes with the words:

> Hurrah now all! for Washington.
> And then for our good land
> And let each one for liberty
> New pledge his heart and hand.

Enough has been given to show the temper of these fifteen-year-old lads; their serious outlook on life and determination to make something of themselves. At this period, young Pack-

ard also made a cabinet and began to develop a collection of natural history objects and other miscellanea. "Father gave me a leaf from the Ilex over the tomb of Virgil, a leaf from a tree planted by Cowper at his summer house at Olney, a leaf from a Yew tree over his grave. . . . They will be fine to put into my cabinet." The Ilex is of course not the holly, but the Quercus Ilex, or evergreen oak. Before long the principal part of the collection seems to have consisted of shells, and the diary contains innumerable references to conchology. Presents were received from numerous friends, and are all faithfully recorded. Books on shells were borrowed whenever possible, and gradually the specimens were named. On March 17, 1855, Packard was asked what department of Natural History he liked best, and answered without hesitation: Conchology.

The following extracts from the diary show the range and character of Packard's interests as a boy:

"Nov. 14, 1854. Went over to the library, and got out Bayard Taylor's *Eldorado*. Goldsmith's *Animated Nature,* it has something about Conchology in it. I read *Lalla Rookh* yesterday, it is a most charming and beautiful book, and gives some ideas of eastern customs and life which I never knew before. There are some most beautiful passages in it. *Eldorado* is fully equal to his *Journey in Africa.*

"Nov. 16. Finished *Eldorado,* it is very interesting. I have read Goldsmith's *Animated Nature,* parts of it. About Conchology and other parts I like very much. Went to library and got out 4th vol. Encyclopedia Americana; an interesting article on Conchology in it.

"Nov. 18. Oh dear me, I have got to go to school. I want to have another week to read and do some work, I don't want to study yet.

Jan. 1, 1855. His parents gave him Principles of Zoology, by Agassiz and Gould. "A valuable book and just the thing I wanted. I cannot but think how kind my parents are to me, and how much I owe to them."

"Jan. 6, 1855. Went to the library and got an article on Mollusca, with a life of Cuvier in it, and one volume of Ree's Cyclopedia . . . containing an interesting article on Con-

chology. I think that I am very fortunate about getting books on that subject, which is so interesting to me, but the rest of the family except Osgood laugh at me about it.

"Jan. 12. I wrote this evening my composition on the life of Cuvier. A very good subject.

"Jan. 20, 1855. Got the key to the Peucinian Library . . . got out one vol. *Naturalist's Library*, containing the life of Lamarck, and one vol. of Journal of Science.

"Jan. 24, 1855. I have skated down to school every day now. We went down to Humphrey's mills in 15 minutes, 4½ miles."

"Feb. 5, 1855. I have read a good deal today in my *Naturalists' Library*. Oh, that I could wander around the earth to collect specimens of Natural History! It seems to me that if I could know all about botany, mineralogy, geology and conchology, and knew how to stuff animals and birds, and to preserve insects and keep shells, that nothing could be more pleasant, provided that I had the *finances*.

"Feb. 6. I am reading now Howitt's *Homes of the Poets*, it came from the Peucinian Library. Oh, what a treasure is that Library for me! I am thankful that I have such opportunities to read. I don't know what I should find to do without books.

"Feb. 7, 1855. I wish that I had a fondness for poetry. Almost every long piece of poetry I read, I labor through. I mean to read some this vacation.

"Feb. 13, 1855. I am reading now with great interest Hugh Miller's Autobiography, or *My School and School Masters*.

"Feb. 14, I have finished Hugh Miller's Autobiography. I think he thinks considerable of himself, but still I think a good deal of him. I mean to read his works.

"Feb. 15, I finished *Foot Prints of the Creator*. The last part is much more interesting than the first, and I like the book very well. I began on his *Old Red Sandstone*. A very interesting book.

"March 17, Went over to the Peucinian Library and got out the 5th vol. of the *Naturalist's Library*, on the Pachyderms, with a life of Sir Hans Sloane, it is *extremely* interesting to me, he was the founder of the British Museum, he spent his

whole life in making the most valuable private collection I guess that any individual ever possessed.

"Jan. 24, 1857. I must now gain a thorough knowledge of Comparative Anatomy. I intend next summer to do a good deal of dissecting, and shall devote myself much more to collecting insects, etc., and dredging, etc., last summer I only collected about two hundred insects, when I ought to have collected three times the number, and I must give more attention to rearing caterpillars. I intend next summer to have a fresh and salt water aquarium. This is the only way to study the habits and economy of animals. I must also use my microscope more, etc. I did not do near as much last summer as I ought to. In fact I have only got my ideas of these things this winter. May none of my enthusiasm for these affairs be cooled down by this cold weather."

Thus the lad at the time of his admission as a freshman to Bowdoin College in the fall term of 1857 was already mature minded, with keen intellectual interests of many kinds. His course in life was already determined: he could never cease to be the naturalist he had already become, nor could he, on the other hand, become a narrow-minded specialist. The college, Agassiz, and the rest, all still before him, did not create his tastes or aptitudes; they merely afforded the means for their additional development.

The diary of September 4, 1857, has this entry: "I am getting on very well in college: have no trouble as yet in recitations, much to my joy, for I had dreaded it very much." At the same time Packard began a "course of geological reading" on his own account: "I shall read the elements, etc., of the science, then the particular surveys of different States, etc., hoping thereby to gain as good a knowledge of Geology as I can without a teacher. . . . My interest was greatly excited by seeing the specimens of fossils, etc., in Boston." The diary enumerates the various geological works read in rapid succession, but there was also time for Gibbons' "Decline and Fall," which he found very interesting.

It was characteristic of Packard that his geological reading soon spurred him to action, and he writes: "I intend to make a thorough survey of every part of this town, make a plan of

the coast, and of the shore of the river on both sides." At the same time, he is working on Entomology, and obtaining the *Entomologist's Annual* and *Weekly Intelligencer* from England. He notes that he is so busy that he sees comparatively little of his fellow students. On December 23 he decides that he will pay particular attention to the Lepidoptera.

Professor Paul A. Chadbourne, of Williams College, gave lectures on Natural History at Bowdoin, and Packard soon became greatly attached to him, gaining much from his friendship and influence. This led to an invitation to join in the Williams College expedition to Labrador, under the leadership of Professor Chadbourne, in the summer of 1860. It was a wonderful opportunity for the young naturalist, who made the most of it in every way, and returned with a large collection of specimens and voluminous notes. The story of the trip is told in detail in "The Labrador Coast," published in 1891.

On January 2, 1858, the diary has: "Yesterday I wrote a letter to a Mr. Scudder of Williamstown, to commence corresponding with him in regard to Entomology." Again on January 26—"I am now corresponding with a young man studying with Professor Chadbourne, who is very much interested in Entomology. We shall exchange specimens with each other. He is a Boston man; his name is Scudder. In Boston he has free range of all the libraries and collections." Thus began the friendship between Packard and Scudder, both destined to be famous entomologists. From that time on they were closely associated in the work and interests of their lives. By March 18 we read in the diary: "My entomological correspondence with Scudder is a source of great pleasure and profit to me."

In March, 1858, Packard was becoming deeply interested in religion, and was led to express himself on the subject at a college prayer meeting. His father, a sincere and ardent Christian, had evidently left him to develop in his own way, and was "greatly moved" by this spontaneous expression of a feeling in which he so deeply sympathized. Throughout his life Packard retained a strong undercurrent of religious feeling, which influenced all he did, though his interpretation of the ancient dogmas necessarily became more liberal.

On May 5, 1858, we read "Went to the meeting of the Boston Society of Natural History. Heard Professor Agassiz's remarks on his explorations in Florida. All exceedingly interesting to me." In July of the same year he writes: "I received a letter the other day from no less a person than Baron Osten-Sacken, requesting me to correspond and exchange in regard to Entomology. He is specially an accomplished Dipterologist, *i. e.*, studies flies, and he wants me to send him all the flies I find around here. My name was given him by Professor Baird. You see how much that institution [The Smithsonian Institution] has helped me along, and probably hundreds of others like me."

On September 25: "I am now getting ready my *Coleoptera* to send to Doctor Leconte to name for me. I have 64 species the names of which I know, and 340 species unknown. A little over 400 species of *Coleoptera* indigenous to Brunswick."

November 8. "I sent off today my moths to Doctor Clemens. Some 6 or 700 specimens, and I guess some 450 species. I hope there will be some new ones among them." (*Semioscopis packardella,* Clemens, was described in 1863.)

November 16. "I have been preparing my Diptera to send to Osten-Sacken. I have taken within two seasons 475; all of these except some 20 or 30 I have taken this season. I think I have done pretty well in that respect."

While Entomology now became the dominant interest rather than Conchology, all branches of Natural Science were cultivated, including Botany. In 1859 we find:

February 16. "Been at work on my grasses. Got puzzled about 4 or 5 of them. . . . It's a difficult study."

February 19. "Been at work on my carices; hope to be more successful than in the grasses, as all the U. S. species seem to be there. Mine are of the more common species." He was using Professor Chadbourne's herbarium for comparisons.

May 4. "Been overhauling a bushel of fishes' guts; *pleasant* and profitable work!" He frequently examined the stomachs of fishes for molluscs which they had swallowed; many rare shells may be found in this way.

June 10. "Our new Natural History Society formed; am elected secretary."

August 27. "Been trying to identify my Polyzoa. Can only make out the genus. I've formed the idea of making for my private use a manual of Marine Zoology like Gosse's, adapted to New England." The writings of Gosse, the English zoologist, were highly valued by him, and greatly stimulated his interest in Marine Zoology.

September 1. "Commenced today on my *New England Marine Zoology*. I shall make it as complete as possible, making ink sketches of each genus. It will be good practice, especially drawing the animals."

November 12. "Been studying up on my Geometridæ this P. M. It is pleasant work. I begin to see now what is to be done in the way of studying up this family. I must attend to the pterology especially, and the anatomy of the organs of the head." In after years he monographed the Geometridæ of the United States.

In 1860, after returning from Labrador, "Sent an article on Labrador to the *Tribune*. Hope they will publish it." In the same year he wrote papers on Economic Entomology for the *Maine Farmer*, and thus began the series of entomological writings, which continued for forty-five years. During the first half of 1861 much dredging was done in the vicinity of Brunswick.

After graduating, in 1861, Packard conducted members of his class on a summer voyage to the Bay of Fundy. He also worked for the Maine Geological Survey, and discovered a deposit of fossils which determined the age of the rocks in the Fish River Region.

On October 8, 1861, Packard went to Cambridge to study in the Lawrence Scientific School under Agassiz. He took the rooms which had been occupied by his friend Morse. He writes to his father: "I went into the museum and saw the Professor, who put me to work on a moth, and I have been several hours looking at the wings and their make. There is Shurtleff by me studying Entomology, and Scudder will be in soon. Everything looks very pleasant there."

On October 31 he writes: "I feel well established here now.

though not much advanced in study at the Museum. Professor Agassiz has agreed to remit, or not to ask, the tuition, 100 dollars for the year, upon my telling him how I was situated, and on the condition that I should do extra work, taking care of insects, etc., which would only be a part of my study as an entomologist. He said he would not set me to work doing anything he would not do himself. . . . I am going to have a long talk with Professor A. about staying here some years, if he will pay me enough to pay my expenses; in hopes of being one of the entomological curators of the Museum. Some of the students here he gives $300 per year, to keep them here, and I might 'tend medical lectures and get a degree meanwhile."

This plan, in its essential features, was actually carried out. Packard studied human anatomy and medicine for portions of the following three years, and received his M. D. in 1864 from the Maine Medical School at Bowdoin College. Those were the days when doctors were easily made, and some of the leading subjects of study in the modern medical schools had not even been heard of.

On January 11, 1862, he writes to his father:

"I have been informed indirectly that the Professor is desirous of having me as an assistant in the Entomological Department of the Museum. He has several times spoken to me of my industry, and was much pleased with my arrangement of the wasps. Yesterday I spoke to him about some interesting affinities of a moth to another insect far removed in structure, and he was so much pleased with my discovery that he told me to make a communication to the Boston Society about it, and show Entomologists in the country how they studied insects in the Museum."

A few years later Packard published a revision of the wasps referred to, describing many new species.

February 9, 1862. "Dr. Harris's insects, finely illustrated, has come out. Professor A. gave me a copy, as he did all the other Entomological students."

April 27. "I work from 9 in the morning to 6 at night in the Museum, taking an hour out for dinner; so that I do not

feel like studying or anything else in the evening, so I copy Harris's correspondence."

A letter of October 5, 1863, tells of the arrangement finally made with Agassiz:

"Professor A. comes up from Nahant occasionally. When he saw me, he asked me if I could go to work and unpack, label and arrange the insects. I told him I could, but that the only thing in the way was the money question. He said he would give me $400 a year, and part of my time to work for my private study, an arrangement very agreeable. . . . I shall have just enough to live upon, which was all I dared to ask for the first year."

It now seemed that Packard might settle down to a scientific life, with every prospect of becoming one of the permanent curators of the Museum of Comparative Zoology. Unfortunately, however, matters took a new turn, and difficulties arose between Agassiz and those working under him. Trouble had been slowly brewing for a long time, owing to differences of opinion concerning the duties and obligations of the men in the Museum. The whole matter has been discussed many times and from different angles, and we are obliged to conclude that the fault was not all on one side. Marcou has given a lengthy and apparently just account in his *Life, Letters and Work of Louis Agassiz* (vol. 2, pp. 99-101). For the junior assistants, matters came to a head when a sheet was published containing "Regulations for the Museum of Comparative Zoology." This document was obviously designed to prevent assistants from working for themselves during office hours, and in general, to bring the men definitely under the control of the curator, *i. e.*, Agassiz. Its provisions do not now appear particularly unreasonable; in fact they closely resemble those in force at the British Museum. On the other hand, the young men were paid very little for their services (it was the best Agassiz could do), and were beginning to feel their mature powers, and to think of their place in the world. To Agassiz, the Museum was the first thing, to them it was rather a means toward an end. So Verrill, Putnam, Morse, Packard and Hyatt left Cambridge and sought other employment. They continued their work under other auspices, where they could

be more independent. In the case of Packard, at least, there was never any personal quarrel with Agassiz, and as the years passed the respect and affection of the younger man for the older increased and deepened. Agassiz remained a kind friend, and it was through his nomination that Packard was elected a member of the National Academy of Sciences in 1872.

In the summer of 1864 the artist William Bradford, of New York, organized an expedition to Labrador, for the purpose of painting icebergs and arctic scenery. Packard was invited to join the party, and was delighted to return in this manner to the coast which had so fascinated him in 1860. This time they went as far north as Hopedale, but were not able to reach Cape Chidley, the northernmost point on the coast. The expedition was successful in every way, and the scientific results were important.

On returning from the north, Packard received a commission as assistant surgeon of the First Maine Veteran Volunteers, under Col. Hyde. He accordingly left for the front, going first to Washington. During this period he wrote no journal, but numerous letters have been preserved. In Washington he found time to confer with the naturalists of that city; Baird, Gill, Stimpson and Ulke. Three days later we find him at Martinsburg, Va., and a little later he was in camp near Strausburg. A letter of February 1, 1865, "Camp near Petersburg," expresses hopes of peace: "600 Johnnies are weekly coming into our lines, and they are deserting home in much greater numbers. It really seems as if something of moment was going to happen. . . . Wouldn't it be delightful if the war should close up soon, and leave me a good chance to collect insects down here in the spring!" However, a letter of March 26th tells of hard fighting: "Our regiment lost more than any other in the division, as they went nearer the rebel breastworks than any other, and the fire, mostly of grape and canister, told fearfully. I do hope early this summer a stop will be put to this severe fighting. It made me heartsick to see the poor fellows. . . . The result of the whole day's fighting was rather brilliant; 5,000 prisoners captured." Peace came and the regiment was mustered out in July. This ended Packard's medical and army life, and he returned to the study of ento-

nology. During the same year his *Synopsis of the Bombycidae of the United States* was published by the Entomological Society of Philadelphia. In it were described numerous new genera and species.

From this time on Packard's scientific activities were more numerous than it is possible to describe in a brief memoir. For a year he was acting librarian and custodian of the Boston Society of Natural History. He was appointed in 1867 one of the curators of the Peabody Academy of Science at Salem, Mass.; and for about two years (1877-8) was the director of its museum, where he founded a summer school of Biology. For a year he lectured on economic entomology at the Maine State Agricultural College, and for several years at the Massachusetts Agricultural College at Amherst. He was lecturer on entomology and afterwards on comparative anatomy at Bowdoin College. In the winter of 1869-70 he visited Key West and the Tortugas for the purpose of studying southern marine life, stopping at Beaufort, N. C., on his way home. The following winter he studied the embryology of marine animals for some weeks at Charleston, S. C. During all this time he continued his original researches, publishing important papers on entomological, zoological and geological subjects. His name became widely known in Europe as well as America, and his place in the annals of science was assured.

In October, 1867, occurred the most fortunate event of his life; he was married to Elizabeth Derby Walcott, daughter of Samuel Baker and Martha (Pickman) Walcott, of Salem. A contemporary letter from his father gives thanks for his singular happiness and good fortune in all his circumstances and relations. In the course of time a son (Alpheus Appleton Packard) and three daughters (Martha, Elizabeth and Frances) were born. Elizabeth Derby Packard died in 1885; the others are still living.

In March, 1867, Packard, with his colleagues of the Peabody Academy, E. S. Morse, A. Hyatt, and F. W. Putnam, founded the *American Naturalist*. The introductory words in the first number state the purpose and character of the magazine:

"In laying before our readers this first number of a popular scientific monthly, we commence a publication in which we

shall endeavor to meet the wants of all lovers of nature. The rapidly increasing interest in the study of the various departments of Natural History invites the establishment of a journal which shall popularize the best results of scientific study, and thus serve as a medium between the teacher and the student, or, more properly, between the older and the younger student of nature. . . . . The value of the magazine will depend more on its power to awaken the absorbing interest invariably excited by the contemplation of nature, and of illustrating the wisdom and goodness of the Creator, than on any adornment of style, or cunning devices of the artist. We trust the magazine will be equally welcome to the farmer, gardener, and artisan. We shall endeavor to point out the practical benefits resulting from the study of nature. . . . In our monthly calendar of the periodic return of animals, farmers and gardeners will be warned of the attacks of insects injurious to crops."

The articles were written in a popular style, and were contributed by able writers, so that the journal bid fair to be all the editors hoped. It was an ambitious undertaking, and the Salem naturalists, in making it a success, earned the applause and gratitude of all who cared for the progress of scientific work and education. With volume 12 (1878) the *Naturalist* was transferred to Philadelphia, and was then edited by Packard and Edward D. Cope. Eventually Packard retired from the editorship, and with volume 21 (1887) E. D. Cope and J. S. Kingsley took charge. The *Naturalist* is still published, edited by Professor J. McKeen Cattell. Its function has become more specialized, and there is perhaps still room for a magazine conducted in the spirit of the editorial of 1867. The *Scientific Monthly,* which is widely read by the classes for whom the original *Naturalist* was intended, more nearly occupies its place than the *Naturalist* of today.

In 1869 Packard published his "Guide to the Study of Insects," a work of over 700 pages, with many illustrations. This book contained a summary of the whole science of entomology, as then understood, with numerous original observations. It at once found a public, and went through no less than eight editions, which appeared in 1869, 1870, 1872, 1874,

1876, 1878, 1880, and 1884. It was through the "Guide," more especially, that Packard's name became familiar to entomologists everywhere. The present writer remembers seeing it in England when he was a very young man and hearing it spoken of as a wonderful work. Agassiz praised it warmly, and took it with him to Nahant to study. He declared that copies ought to be placed in all the libraries of the State, at the public expense, and that it should be adopted in all the agricultural colleges as a textbook. Toward the end of his life, Packard contemplated the possibility of issuing a new and revised edition of the "Guide," but never found time to prepare it for the press. After his death, the question of preparing an edition was discussed, but it was considered impossible to bring the work up to date without making virtually a new book.

In the spring and summer of 1872 Packard made his first trip to Europe, going first to England and then to the Continent. On this journey he must have realized with a certain measure of surprise how far his fame as a naturalist had gone. He was everywhere received with kindness and treated as an honored scientific colleague. In England he met Owen, Woodward, Hooker, Westwood, McLachlan, Flower, Lubbock, Douglas, Stainton, Lowne, Michael Foster, Rolleston, Newman, Dallas and many other well-known naturalists. His diary was voluminous, giving many details. "In Gegenbaur's museum an old cabinet with specimens studied by Goethe, while he lived at Weimar, and used to come over here (Jena) and study. Gegenbaur's lecture room old and very small, about 25 average students, often fewer. . . . Saw the foundations of Dohrn's aquarium [at Naples]." In Switzerland he was delighted with the mountains and glaciers, and collected a good many insects. The journey even extended to Scandinavia. He returned by way of England, taking time to visit Wales before sailing from Liverpool. By an unfortunate mischance, he missed seeing Darwin. He had written, asking permission to call, and Darwin replied, inviting him to stay at Down for two or three days. Darwin's health was so poor, that he did not know when he could see him, but if he would come to the house, there would surely be short times when

they could talk together. Darwin's letter should have reached him shortly before he sailed, but it was forwarded to Paris by his bankers, and only delivered to him long after in America. His disappointment was keen, for he would gladly have given up his passage to have accepted the invitation.

In October, 1872, he went on a dredging trip in the *Bache*, and much of his time in the following year was taken up with dredging.

In the summer of 1873 Packard was one of the instructors in the Anderson School of Natural History, conducted by Agassiz on the Island of Penikese, off the coast of Massachusetts. On a later occasion, after describing the work of the school and its influence on American Zoology, he said: "The influence of the school was lasting and widespread, and that single season of six weeks was the leaven which leavened the whole lump. I for one wish to bear testimony to the rich and rare experience and advantage, the intimate intercourse with such a mind as Agassiz's, and the inspiration and stimulus and delightful memories of that delightful summer of 1873." As is well known, Agassiz never became converted to the theory of evolution, yet the men who were his students, the younger generation, were without exception evolutionists. Packard, in lecturing at Penikese, expressed his evolutionary views most fully, and Agassiz, who always attended his lectures, never made any objections. On one occasion Packard remarked to Agassiz that he feared his lectures, addressed to young students, must be tiresome to him, but Agassiz replied that he attended them for his own pleasure. Agassiz was extremely kind to the members of his staff and to his students, and finding that some of the latter were short of funds, aided them from his own pocket.

Agassiz died the following winter, and Packard's diary of December 18 has this entry: "Attended the funeral of Agassiz. Much crowded, very impressive, rode to the grave [which was] concealed with evergreens and flooded with flowers. A sad, sad day! Felt his loss as that of an old, dear friend. Felt much drawn to him at Penikese last summer. Learned to love, respect and revere him. He has died mourned by the people of the U. S., as no one else would be."

The next five years were crowded with important activities; perhaps more so than any other period of Packard's life. He continued his work at Salem, and the Penikese summer school having been abandoned, established a more modest "Summer School of Biology" at the Peabody Academy. It was designed primarily for the teachers of Essex County, but students came also from other states. Packard was the director, and the instructors included E. S. Morse and J. S. Kingsley.

A very different Kingsley, the distinguished English author, visited the Packards in 1874. The diary records: "The Rev. C. Kingsley spent the night, with Miss K., a most charming lady. On entering the house Mr. K. began to play with Alpha and Mattie, and insisted on sitting next to Mattie at tea and breakfast. After the lecture sat up an hour talking science. . . . A most genial, cheery old man, and a true naturalist; very enthusiastic, very courtly, and with fine manners."

In 1874 Packard was temporarily connected with the Kentucky Geological Survey, for the purpose of investigating the animal life of the Mammoth Cave and other caves. He was keenly interested in cave life and the evolutionary problems it presented. His collected observations were finally published in a memoir, "The Cave Fauna of North America," by the National Academy of Sciences, in 1888.

In 1875-76 Packard was associated with the U. S. Geological Survey of the Territories, under F. V. Hayden. During the two years previous he had published papers in the reports of the survey, dealing with the insects of Great Salt Lake, the Mallophaga, the Myriapods and the Moths of Colorado. The Hayden survey included biological as well as geological subjects, and in 1876 published Packard's great Monograph of the Geometrid Moths, a work of over 600 pages, with 13 plates. It is from this work especially that Packard's name has become permanently associated with the family Geometridæ. In the latest list of North American moths, 15 genera, 105 species and 21 varieties or sub-species of this group, described by Packard, are recognized as valid.

In 1877, under the influence of C. V. Riley, Congress established the U. S. Entomological Commission, for the purpose of

investigating the Rocky Mountain locust (*Melanoplus spretus*) and determining what could be done to check its ravages. The organization took place in March, with C. V. Riley, at St. Louis, Mo., as the chief, A. S. Packard the secretary, and Cyrus Thomas the disbursing agent. All three were eminent entomologists, and in the working out of the plans, each was assigned a certain territory to cover. Packard had western Wyoming, Utah, Idaho and the Pacific coast. He also visited Montana. In order to cover the assigned area, it was necessary to travel long distances by stage and otherwise, over much rough country, but it was a great opportunity to investigate the entomology of the west. The locust was finally vanquished through the cultivation of the regions where it was wont to breed and multiply, and today its migratory hordes are remembered only by the older settlers. The Commission, once established, broadened its activities, and dealt with many phases of economic entomology. Packard remained a member until 1882, and the fifth and last report of the Commission, published in 1890, was a bulky volume by him on the insects injurious to trees.

Packard was still a comparatively young man, not quite 40 years of age, when in 1878 he was elected Professor of Zoology and Geology at Brown University, Providence, R. I. A local paper, announcing the appointment, remarks that "The advent of Mr. Packard is not unlikely to form a turning point in the scientific history of this city and state." For the rest of his life Packard remained at Brown, finding ample opportunities for teaching and research. In 1893, Westwood having died, a desire was expressed that Packard should be appointed to the Hope Professorship of Entomology at Oxford, but the matter was not followed up, and Poulton received the appointment.

The 27 years at Brown University saw the maturest development of Packard's intellectual powers, and the widening of his already great influence on the younger generation. The salient events were comparatively few; occasional journeys abroad, the publication of books and memoirs, honors conferred by Universities and learned societies. In 1885 he made a journey to Mexico, accompanied by Professor Jenks. In 1886 he

went to Florida and Cuba, at Havana meeting Poey, the eminent naturalist of that city. In 1889 he visited Europe for the second time, accompanied by his family. He found Dr. Dohrn now well established in his zoological station at Naples, and at Heidelburg renewed his acquaintance with Osten Sacken. At Wurzburg he visited Semper. He attended a meeting of the International Zoological Congress, and was elected one of the honorary presidents. In England he visited Sir John Lubbock, E. B. Poulton and others. In 1898 he was vice-president of the section of zoology of the American Association for the Advancement of Science. His vice-presidential address was on "A half century of evolution, with special reference to the effect of geological changes on animal life." In 1898 he also published his *Textbook of Entomology,* dealing with the anatomy, physiology, embryology and metamorphoses of insects. It is an entirely different book from the *Guide to the Study of Insects,* being primarily a college text for the special student, instead of a guide for the general entomologist and lover of nature.

In December, 1898, Packard crossed the Atlantic for the third time, accompanied by his daughter Frances. They visited the Mediterranean countries first, Gibraltar, Spain, Morocco, Algeria, Malta, Egypt, Palestine, Rhodes, Smyrna, Ephesus, Constantinople, Greece and Italy. They were the first Americans into Spain after the Cuban war. From Italy they went on to France, where much time was spent in looking up facts regarding the life of Lamarck; data to be used in the book, "Lamarck, the Founder of Evolution, his Life and Work," published in 1901. They finally returned by way of England, reaching Boston on September 22, 1899.

The fourth and last trip to Europe was in the summer and fall of 1900. In 1903 Packard visited Nova Scotia—his last excursion out of the United States. After the spring of 1904 his health began to fail, and on February 14, 1905, he died.

Reviewing Professor Packard's scientific work as a whole, we find that it has to do, (*A*) with the philosophy of nature, and the larger evolutionary processes, (*B*) with classification, (*C*) with the description of new forms of animal life, (*D*) with the popularization of natural science, and (*E*) with the

economic applications of biological studies. In any one of these fields his work was sufficiently noteworthy to have given him a permanent position among American scientific men.

Packard was an ardent evolutionist, belonging to what was called the Neo-Lamarckian School, which he founded in connection with his friends Cope and Hyatt. To the support of their opinions these brilliant men brought a mass of observations; but today, in the light of modern experimental methods, the whole subject has taken on new aspects. It appears certain that we shall never return to Lamarckism, new or old; but the facts remain, still commanding attention and inviting investigation. The modern naturalist is at once more and less sure of his ground than the evolutionist of Packard's day. More sure, because supplied with a vast and growing mass of experimental data, which cannot be gainsaid. Less sure, because he is more aware of the complexity of natural processes and of the impossibility of finding a single formula to define the whole of evolution.

In his studies of the insects and crustacea, especially, Packard was a pioneer in classification. He perceived that the insect orders were more numerous than had been supposed, and tried to substitute a more natural arrangement than that in vogue. His work is now incorporated into the zoological system, and while many differences of opinion still exist, some at least of the Packardian group-names have come to stay.

Packard described as new over 50 genera and about 580 species of animals. Over 40 of the genera belong to the Lepidoptera; five are Crustacea. The species are distributed as follows: Aptera 41, Arachnida 34, Bryozoa 11, Crustacea 34, Diptera 7, Coccidæ 3, Mallophaga 14, Hymenoptera 101, Lepidoptera 308 (and 43 others now regarded as subspecies or varieties), Mollusca 4, Diplopoda 5, Pauropoda 1, Panorpidæ 1, Psocidæ 1, Orthoptera 3, Tunicata 2, Vermidea 5. Some of the Crustacea are fossil. Of the 580 species, at least 156 are now placed in the synonymy. Most of them are Lepidoptera, and a large proportion fall before names proposed by Walker and other authors whose descriptions were too poor for certain recognition. It is only because the types in Europe have been examined, that we are now in a position to interpret many of

the older descriptions. Packard's descriptions differed greatly in quality. His later descriptions of moths in particular, were extremely full, with careful attention to structural details. Whenever his main purpose was taxonomic, his work was good; but he not unfrequently introduced new species very briefly, when using them as illustrations of some principle, or citing them in a general discussion. At such times, also, he seems to have been less careful than usual to ascertain that the species were really new. Thus of the 13 Lepidoptera named as new in the *Guide,* the majority are synonyms. These, however, are relatively minor matters, and the important thing is that in his monographic works, such as those on the Geometridæ and the Bombycoid moths, he presented a real morphology of the insects, in place of the short and artificial descriptions generally current.

It is characteristic of Packard's work, that he would publish an important paper on some group, and rarely or never return to it. Thus, for example, his paper on the fossorial wasps established him at the time as the leading authority on the subject, and made his name familiar to all subsequent generations of Hymenopterists. Yet, although many new wasps must have passed through his hands in later years, he paid no further attention to them. Probably this manner of working was partly accidental, or due to circumstances which could not be controlled, but it was also to some extent deliberate. It was wasteful of time, in the sense that after mastering a subject and accumulating the literature, it would have been much easier to continue along the same lines than to take up something new. It also deprived the author of the opportunity which a continuous worker has, of correcting his own mistakes. On the other hand, it is inconceivable that Packard could ever have become a narrow specialist, and the variety of subjects he studied gave him a power and mastery over the field of biology which he could not have acquired in any other way. In this he was like Darwin, who intensively studied barnacles, but after his monograph appeared, abandoned them and turned to other things.

In his later years, indeed, Packard was more consecutive, as witness his continued attention to cave faunæ and the Bom-

bycoid moths. In the case of the Bombycoid moths, his last memoirs returned to the subject of his first taxonomic revision. The series of memoirs on the Bombycoid moths, published by the National Academy of Sciences, illustrate the trend of Packard's thought. Choosing a group with which he was familiar, and which had interested him since boyhood, he set out to describe it in such a manner as to illustrate biological principles in detail. He took the greatest pains to obtain, rear, and describe and figure the larvæ; not merely the mature larvæ, but all stages. As the work progressed, it expanded; and what began as a revision of the North American Bombycoids, developed into a consideration of those of the whole world. Could Packard have had another ten years of life and health, with sufficient opportunity to examine the European collections, the resulting treatment of the Bombycoids would have surpassed anything yet attempted. As it was, the last volume of the monograph, edited by another and finally published in 1914, necessarily remained incomplete as compared with what the author intended.

Although we have referred a number of times to the extent and variety of Packard's biological researches, there are some limitations which are rather surprising. In particular, his youthful enthusiasm for conchology bore almost no fruit in later years, at least of a direct kind. Mollusca are discussed, with original observations, in the papers on Labrador, but after that they are practically ignored. It may have been partly because Morse, Packard's colleague at Salem, was a specialist on mollusca and took charge of any that came to hand. Certainly Packard's pleasure and interest in the group must have continued; we find in the diary a record of the delight of finding the first nudibranch in the vicinity of Salem, and on his last European trip he collected snails. It is also somewhat surprising to find no original papers on botanical subjects. Packard studied plants as a young man, and throughout his life continued to take a keen interest in them. His journals contain frequent references to the flowers he saw. He certainly might have been a keen botanist had time and opportunity permitted.

Packard's contributions to popular science were numerous,

but he never cheapened his subject to make it appeal to those who had no real sympathy with his aims. His object was to help beginners and amateurs to become naturalists, or at least to learn enough to appreciate some of the natural phenomena all around them. In all this he was very successful, and Dr. J. B. Smith of New Jersey said that "as a teacher through books he has taught more students than any other American entomologist." The writings on economic entomology were not clearly separated from the popular or semipopular papers just referred to; the one thing naturally graded into the other. The Reports of the Entomological Commission contains articles by Packard which are not so much directly economic, as affording a basis on which the economic investigations of others may stand.

Packard's scientific work brought him honors of various kinds, such as his election as foreign member of the Entomological and Linnean Societies of London. Bowdoin College conferred the Ph. D. and LL. D. upon him. Two genera of Lepidoptera (Packardia and Eupackardia), a genus of Hymenoptera (Packardiella), and at least 39 species and three varieties in various groups have been named after him. These include 22 Lepidoptera, 5 Hymenoptera, 2 Mollusca, 2 Crustacea, 2 Arachnida, and one each of Orthoptera, Heteroptera, Homoptera, Coleoptera, Collembola, Odonata, Myriapoda, Diptera, and Algæ.

Packard took great interest in his college teaching, and grudged no amount of trouble if he could assist those who were really interested in their work. In 1904 the class in anthropology presented him with a loving cup, the first that had ever been given at Brown. He was greatly surprised and pleased, saying when he came home, "I had no idea the students cared so much for me." At a memorial service held after his death, Mr. W. G. Meader spoke for the student body as follows: "We respected him, not only as an instructor, but because of his sterling character and genial disposition. He was fair-minded to a degree, never judging harshly. He was modest and retiring, yet he carried himself with a dignity that commanded our respect. He had a keen sense of wit that often lightened the class room. . . ."

From numerous letters and other documents it has been possible to compile a brief description of Professor Packard's personality, and the essential agreement of many independent witnesses gives us confidence in its accuracy. As a boy he was affectionate and playful, and already had a passion for collecting insects. As a young man, when visiting Labrador, he charmed every one there by his sincerity, kindly ways and enormous enthusiasm. Of all his personal characters, perhaps two stand out most strongly; his kindliness and courtesy, and his zeal for his work. He was strongly attached to home and family; social and sympathetic; yet not eager for "society" or social distinction. His defective palate somewhat interfered with his utterance, and probably tended at an early age to make him retiring and sensitive. Nevertheless, he spoke well, and had a good singing voice and a true ear. He was very fond of music, delighting in concerts and the theater. His temperament was emotional and artistic; two of his brothers were clever in drawing, and he might have developed in artistic lines had he not given his life to science. He delighted in good landscapes, and owned some himself. When traveling, he never failed to see the picture galleries. His artistic feeling was also manifested in his extreme delight in natural scenery, and his keen observation of beauty or picturesqueness of costume. His fad, when travelling, was buying oriental rugs and photographs of scenery and architecture. He even loved lace and bric-a-brac, and had a very keen eye for furniture and women's dress. Although he found the reading of poetry rather a burden when a boy, he assimilated the best of what he read, and liked to quote passages of Shakespeare. He also remembered his history well, and was eager to visit any spot of historic interest. When in Palestine, he listened to the stories of the guides, with faith that made the scriptural narrative live, and seemed to bring him into the presence of holy things. In his dealings with others, he was entirely honorable, and never forgot to give credit for assistance of any kind to younger men, in a day when this was by no means invariably the custom. It was difficult for him to imagine that others could be dishonorable in any way, and his trustful disposition once involved him in serious trouble and financial loss. Dr.

L. O. Howard remarks that when visiting Washington he always "treated the younger men with a very perfect courtesy and consideration." Unlike some professional biologists, he had a special regard for amateurs. Thus he became greatly interested in some weavers in the mills at Valley Falls. One of them came to see him, explaining that a number of them, coming from Lancashire, had brought specimens of rocks and insects, and had arranged them in a little room where they met in the evenings. Packard gladly went to give them assistance and advice, added to their collection, and was always ready to answer questions and solve difficulties.

He had an excellent sense of humor, which enlivened his teaching. Although unassuming and of a quiet disposition, he had a tremendous spirit when roused to just anger. He was notably courageous; after the war General Hyde said of him that he was a dare devil and knew no fear. Although his ordinary life called for no physical courage, he seems to have enjoyed situations of danger, and of all his experiences he liked best to tell of his ride through Lee's army, immediately after the surrender. He also did not hesitate to travel in Spain immediately after our war with that country.

A little personal peculiarity, in which he resembled the English entomologist Westwood, was that of economizing paper. He would write his notes on any scraps of envelopes, wrapping paper, etc., which were available, and this sometimes made his writings difficult to edit when they were transmitted to Washington for publication. He was a very keen collector of insects, and whether in America or abroad, he always carried collecting bottles. His enthusiasm never waned, and he never became a purely indoor and laboratory naturalist.

His personal appearance is thus described by one who knew him intimately: His forehead was like Darwin's bust, rather low immediately above his eyebrows, then rising again high and broad. His head was broad above the ears. The play of expression in his gray eyes varied from a very sad and pathetic one to sparkling humor. He was tall, very slight, quick and nervous. He usually sprang up-stairs, three steps at a time. He had small and shapely hands and feet. He dressed immacu-

lately, and carried himself gracefully; he liked to dance about in playing with his children.

Regarding Packard's life as a whole, we see a man who was spurred forward by internal rather than external stimuli. He did not work primarily for such rewards as the world might give, and when these came he was usually surprised. Humble concerning his personal achievement, he had unbounded faith in the cause he served, and unlimited zeal in the service. He was a good and faithful soldier in the army of science, and as such was captain to many more than he ever knew. His influence remains, and will long continue a factor in the scientific life of America.

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