

ROBERT EVANS SNODGRASS, INSECT ANATOMIST AND MORPHOLOGIST

By ERNESTINE B. THURMAN¹

Adversity is seldom dull. The things we do in this world do not count for half so much as those that happen. I would not exchange the unexpected in my life for all that I've achieved through efforts of my own. The events we set in motion by pre-conceived design take us along conventional routes that we expect will lead on to success, while those that fate ordains create all the diversity and give all the excitement that make it worth while to live.

R. E. SNODGRASS, 1914 (unpublished diary).

The author of this biography accepts with pleasure the unexpected privilege and honor of being invited to participate in offering this well-deserved tribute to Dr. Robert Evans Snodgrass, on this rare occasion, his 84th birthday. There are many throughout the world who join in expressing best wishes and felicitations, and who share the author's sentiments of appreciation, admiration, and respect for so eminent an entomologist.

Dr. Snodgrass is one who, after more than half a century, still is rendering distinguished and inestimable service to mankind through his contributions to the science of arthropod morphology, anatomy, evolution, and metamorphosis. He is known and admired by many as a friend, a teacher, an author, a literary critic, and an artist, as well as a savant and an internationally renowned scientist. It is difficult to separate his sterling qualities of character and his innate talents for drawing and writing, so well known to his students and colleagues, from his scientific accomplishments which are the result of an insatiable quest for scientific truths and a remarkable ability to observe and interpret.

All these attributes are harmoniously composed into a dignified, erect, gracious, unassuming gentleman of remarkable health, agility, and strength who is possessed of a profound depth of philosophy, a sparkling sense of humor, and a vigorous zest for living. This is a

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composite which is the dream of countless men many years his junior, but realized by few. A thick shock of glistening white hair, a ruddy complexion, and alert blue eyes, which require the aid of glasses only for reading, denote unusual physical stamina. A phenomenal memory for facts and events, a wealth of basic knowledge at his ready command, thorough training in the use of the Classical and Romance languages, and an unlimited vocabulary in English and German, spiced with wit, which is ready but sometimes sharp, make conversations with him informative and memorable pleasures.

The author has spent many enjoyable hours listening to Dr. Snodgrass relate incidents of his early life, reading his unpublished diary and travelogs, browsing through his correspondence files and publications, laughing over original copies of his cartoons, and admiring his numerous precise drawings and oil paintings of insects and their life histories, which are accurate in minute detail as well as being noteworthy as works of art.



"COME, DEARIE, BE A GOOD BOY, NOW, AND
HOOK UP MY SHELL BEHIND FOR ME."

(From Life, Feb. 23, 1911.)

"My ancestry is as unknown to me as I am to my ancestors, but I believe I am a typical American, since, judging from the family names, I must be a mixture of English, Scotch, Welsh, and Irish, and I do not know who my grandfather was." (His sister belonged to the Daughters of the American

Revolution.) Thus, Dr. Snodgrass opened one conversation with the author, continuing with the information that his parents, James Cathcart Snodgrass and Annie Elizabeth Evans Snodgrass, came from Ohio and settled in St. Louis, Mo. There he was born on the 5th of July, 1875, so they told him. A sister and brother, born 3 and 8 years later, completed the family. He lived in St. Louis until about the age of 8 years.

His first ambition in life was to become either a railway engineer or a Pullman conductor, but he could never decide which personage looked more important. Before leaving St. Louis, however, an interest in zoology had been aroused through visits to the St. Louis Zoo. There the sea-lion in particular so impressed him that he became adept in imitating its manners and bark, much to the consternation later of one of his mother's friends. His mother, while entertaining a lady

guest one afternoon, stepped into the kitchen for a moment. Young Robbie (as he was known then), left alone with the lady, felt it his duty to entertain her. Throwing himself onto the floor directly in front of her, ventral side down, he proceeded to give his best impersonation of the sea-lion, raising himself on his front flippers, stretching up his neck, and barking while swinging his head from side to side. The lady unaccountably became pale and rigid, got up, went to the kitchen door, and in a tremulous voice said, "Mrs. Snodgrass, I think there is something the matter with your little boy." His mother relieved her with the information that he was only playing sea-lion, but the lady did not ask for an encore.

The first entomological observation which Dr. Snodgrass recalls is seeing that the legs of grasshoppers, cut off by his father's lawn mower, could still kick while lying on the pavement. This apparently mysterious fact made a strong impression on him, and he decided that sometime he would look into the matter.

In 1883 the Snodgrass family moved to the town of Wetmore in northeastern Kansas, where his father became a cashier in the bank, later rising to higher offices. Here Robbie's interest turned to machinery, and he finally made a steam engine that almost worked—the piston would go out but it would not go back. However, the turning point in his life came when he received an air gun and target as a birthday gift. Though shooting at a target soon became rather tame sport, the family principles absolutely forbade the shooting of birds. Then an inspiration saved the situation; he would learn to mount birds and thus preserve them for science. This argument prevailed to the extent that he was allowed to shoot two birds of each kind. So he obtained a small book, "Taxidermy Self-taught," and soon had a vacant bookcase full of birds sitting on perches, looking rather uncomfortable, but still giving a fair imitation of how they appeared in nature. Then he became known locally as a professional taxidermist. When pets in the neighborhood died, the owners brought them to him for mounting. Their appreciation, however, usually was expressed in such remarks as, "No, Dickey never did look like that," or "Polly didn't have shoe buttons for eyes." This discouraged him from following taxidermy as his life's work. Accordingly he decided to be just an ornithologist, and continued to shoot and mount birds for his own collection. His efforts were rewarding, as some of the specimens were borrowed once for exhibition at a local county fair. It must be understood, of course, that there were no Audubon Societies in those days, and that field-glass study of birds was yet a long way off. Only a bird in the hand could be identified. Later he acquired Coues's "Key

to North American Birds" (which he still has), and then prepared specimens as museum-type skins.

After 7 years in Kansas the family moved again, this time to southern California, where they finally settled on a 20-acre "ranch" in Ontario, planted to oranges, prunes, and grapes. In Ontario the 15-year-old Snodgrass (called Rob at this age) entered a Methodist preparatory school of high-school level, then known as Chaffey College. Here he studied Latin, Greek, French, German, physics, chemistry, and drawing, but no biology which might involve evolution. On the side, however, he read Darwin, Spencer, and Huxley, thereby becoming branded as a heretic. His interest in anatomy now was awakened and he spent Saturdays, and Sundays after church, dissecting birds, cats, frogs, crayfishes, and other animals. Notes and drawings from these endeavors provided entrance credit in zoology when he later went to Stanford University. But his openly avowed belief in evolution estranged him at home and caused him to be expelled from Sunday school, much to his satisfaction.

In 1895, at the age of 20, Rob Snodgrass entered Stanford University and majored in zoology. The whole atmosphere now was changed. He had excellent courses in general zoology, embryology, and comparative vertebrate anatomy. From Dr. David Starr Jordan, who was then president of Stanford University, he of course learned something about fishes. It seemed to him, however, that nearly everything must already be known about vertebrate animals, so as a side course he took entomology under Prof. V. L. Kellogg. Soon Professor Kellogg set him to work on the anatomy of the Mallophaga—biting-lice, a group in which the professor was specializing at the time. The prospect of doing original work that might even be published inspired Snodgrass to acquire a new outlook on life and provided the impetus for investigations from which came his first two publications (1 and 2),² "The Mouth Parts of the Mallophaga" (1896) and "The Anatomy of the Mallophaga" (1899). The long-cherished dream of being an ornithologist was given up.

While a student at Stanford University, Rob Snodgrass had two interesting and profitable trips. The first took him, as one of a party selected by Dr. Jordan, to the Pribilof Islands to study the habits of the fur seals. At that time a dispute involving other countries existed over the right to kill seals in the ocean. The second was a 10-month trip with Edmund Heller to the Galápagos Islands in a 100-ton sailing

² Numbers in parentheses refer to the Snodgrass bibliography that follows this paper.

schooner, the *Julia Whalen*, with Captain Noyes of San Francisco in command. They visited all the islands of the eastern Pacific from California to the Equator. The crew included the captain, the mate, three sailors, and the cook. Their principal objective was the skins of the southern fur seals. Life on a small schooner in those days was primitive and monotonous compared with that on a modern luxury yacht. The staple diet was salt beef and hardtack, except when at anchor. Then fish and even sea turtles were obtainable. Although ocean currents continued their movement, the wind did not always blow when wanted. As a result much time was lost in attempts to arrive at specific points, but the expedition eventually visited every



THE ORDER OF THE BATH

(From Judge, Nov. 28, 1914.)

island of the archipelago. Heller and Snodgrass collected everything from giant tortoises to bird lice, in addition to plants and samples of lava, but specialized on birds, insects, spiders, and fishes.

The Galápagos Islands, though on the Equator, are not a tropical paradise. They are of volcanic origin with much of their surface consisting of raw lava. Only one of the islands gets enough rainfall to permit cultivation. In his account, Dr. Snodgrass stated that walking over newly cooled lava beds makes one feel like a spider or an ant traversing a cinder path, and that getting to the top of a 3,000-foot crater is a strenuous day's exertion. Before the party left the islands, one volcano came to life and gave a brilliant exhibition. It is fortunate that accidents did not occur, as any kind of accident could have been serious without medical care. Though hungry ticks were abundant and

mosquitoes swarmed in the rainy season, on the islands that were without human inhabitants there were no diseases for the arthropods to transmit.

Zoologically the archipelago is noted for the differentiation of species on the different islands. Collections from the trip went to Stanford University and were distributed to specialists whose papers were published in the Proceedings of the Washington Academy of Sciences and other journals. Snodgrass individually or with Heller authored seven papers (3, 5, 6, 7, 12, 16, and 19). Edmund Heller became a noted collector of mammals and later accompanied Theodore Roosevelt on his African Expedition.

In 1901 Robert E. Snodgrass was graduated from Stanford University with an A.B. degree, and took a teaching job at the State College of Washington in Pullman under Prof. C. V. Piper, an enthusiastic entomologist and botanist at that time, later an agrostologist in the U. S. Department of Agriculture. During the summer vacations Snodgrass, with two companions, two horses, a wagon, and camping equipment, explored the central desert of the area, then as nature had left it, and traversed the Grand Coulee before it was "dammed by a dam."

After 2 years at Pullman, he returned to Stanford University as an instructor in entomology under Professor Kellogg. Here he made his first acquaintance with honey bees in an observation hive. This initial interest was sustained and led to his intensive studies of honey bees (23, 50, 76). During the period at Stanford (1903 to 1905) he added 11 publications (9 to 19) to his rapidly lengthening bibliography. However, it seems that the authorities were not too pleased with the young instructor, mainly on minor accounts. For one thing, Professor Kellogg was in Europe, and in his absence it was the duty of Snodgrass to feed some newly hatched silkworms in the laboratory. The larvae, of course, had hatched ahead of the season outdoors, and vainly he searched the campus for mulberry leaves. (This was before it was known that the larvae would eat lettuce.) At last he found a single tree with young leaves, climbed the tree, picked the leaves, and saved the lives of the experimental silkworms. The tree, however, refused to put out more leaves and inconsiderately died. It was in a row of shade trees in front of the men's dormitory, and thus rated in importance ahead of silkworms. After some other minor indiscretions of a similar nature, Snodgrass went to San Francisco, jobless, to brush up on his drawing.

In San Francisco he obtained a job in the art department of an advertising company and attended an art school at night. He did

some magazine covers, designs of clay-modeled animals, and was to be taken on the staff at the San Francisco Academy of Sciences. However, the morning after he had been accepted by the Academy, the earthquake of 1906 shook up things, and then the fire came. He was living at the time south of Market Street with Sidney Peixotto, brother of the artist Ernest Peixotto, and several young men associated with him in a boys' club. Directly across the street was a large playground. After the earthquake shock, which left the house still standing, they all moved into the playground with whatever they could salvage. (All Snodgrass's possessions were contained in one trunk.) Here, with a large crowd of other refugees, they lived in an improvised shelter while everything surrounding them was in flames. After several weeks of "camping out," Snodgrass packed his trunk and went home to Ontario for the summer.

In the fall of 1906 he cashed an insurance policy in order to go to Washington, D. C. Dr. L. O. Howard, then Chief of the Bureau of Entomology, U. S. Department of Agriculture, took him on the staff at a salary of \$60 a month, and later raised it to \$100. During the next 4 years in the Bureau he produced 5 more publications (20 to 24). Dr. E. F. Phillips, then Head of Apiculture, gave him the opportunity to do his first work on the anatomy of the honey bee.

By the summer of 1909 he had a bank account of about \$300 and decided to take a trip to England and Scotland. This being in the days before passports and accumulated leave, he was granted a 3-month furlough from the Bureau. He purchased a round-trip ticket and took passage from Baltimore on a so-called cattle steamer. The steers, of course, traveled in the steerage and did not mix with the upper-deck passengers, who, besides Snodgrass, included American tourists, a Cambridge professor, and some prospective Oxford students. After 10 days on the Atlantic Ocean, they landed at Liverpool, and the next day Snodgrass took a train to Chester, a quaint old town with its ancient Roman wall still intact. Here he spent a week or so and made sketches of antique houses, the remains of an ancient abbey, and some other scenery.

From Chester he went north to Glasgow, where he visited a former Stanford roommate, a native of Scotland who at the time was teaching botany at the University. The friend was living just as bachelors do in Dickens's stories, with his meals served in his room by the landlady. To honor Mr. Snodgrass, the landlady served a haggis, that famous Scotch dish, which is a sheep's stomach stuffed and seasoned with too many things to inquire about, all thoroughly boiled. It was quite an experience for the American. Mr. Snodgrass and his friend

visited the home of Burns at Dumfries, Melrose Abbey, and Abbotsford, the home of Scott. Then they went to Edinburgh, a city still reeking with history, and from there to Aberdeen and St. Andrews.

Finally Snodgrass headed south for London, stopping on the way at Durham, York, Warwick, Stratford, Cambridge, and Oxford. He spent at least a month in London, traversed every section of the city on foot from a boarding house on Tavistock Square, and was disappointed only in that he did not encounter a London fog. Dr. Snodgrass, in recalling this trip, describes it as one of the most enjoyable events of his bachelor days; never before nor since has he had so much good food at a price that he could afford.

At the end of 4 years with the Bureau of Entomology, Mr. Snodgrass hinted that he might be due a raise; but Dr. Howard sadly informed him that the Department could not provide money for work in anatomy and that the only chance he now had for a raise was to change to another type of work. Thereupon he promptly resigned, again packed his trunk, pocketed his cash savings, and went to New York City.

Since cockroaches and bed bugs, then the principal insects of New York City, did not hold any particular interest for him, Snodgrass now turned to the study of the human species. He attended night classes at the Art Students' League and learned to draw the human figure. The art-school discipline of freehand drawing under a competent instructor proved to be excellent for training the eye to see form and proportions, even in an insect, without recourse to instruments. As a source of income, he composed jokes and portrayed them in pen drawings, which now and then he sold to the comic magazines of the day, such as *Life* and *Judge*; also he did a few more serious illustrations. As a pastime, he made pencil sketches of New York's interesting street scenes, but the latter have changed considerably over the past years.

The life of an artist he found delightful—no hours to keep, get up when one pleases, stay up all night if one wishes to study night life, no responsibilities except room rent. If one sometimes became short of cash, there was always the free-lunch counter, from which, by paying 5 cents for a glass of beer, enough diversified food could be had to satisfy almost any degree of hunger. Dr. Snodgrass adds, "The free-lunch counter was a great institution of the old days, but it went out with prohibition. In lower Manhattan there actually was a restaurant that served meals for 10 cents." Sometimes, in order to eat or pay his room rent, Snodgrass had to take a job in the art department of an advertising company. Here he learned much about lettering and

the practical problems of line-cut reproduction which proved to be of value to him in his future work.

When World War I was declared, things became dull in New York for artists and writers. Mr. Snodgrass accepted an invitation from an artist friend from Indiana to go with him to his native State, where he thought, with Snodgrass's assistance in selling, he could better dispose of his pictures. As business manager of the venture, Snodgrass canvassed the small towns of Indiana for customers, and at least met many interesting people. Also he was able to observe the Hoosier in all his local color. So, while his friend frantically slapped color onto his canvases to supply orders, Snodgrass sketched the more picturesque Hoosiers, depicting their everyday life and manners. It would appear from his sketches that the males of the day were chiefly remarkable for growing whiskers, loafing in groups according to age and length of beards, chewing tobacco, and distance and accuracy in expectoration; the females for cooking, rearing large families, and acquiring physiques that looked like feather pillows tied in the middle.

The venture in selling paintings was interesting but financially not particularly successful. So one day Mr. Snodgrass casually

dropped into the office of the State entomologist in Indianapolis, and unexpectedly was invited to join the staff. Here again was demonstrated the value of events that happen by chance.

Again he found himself in entomology. Frank Wallace soon became head of the office. Harold Morrison and Harry Dietz were in the midst of preparing their book "The Coccidae or Scale Insects of Indiana," and wanted an artist for the illustrations. Through outdoor work and contact with the farmers and their problems, Snodgrass learned much about practical economic entomology. He also wrote "Some of the Important Insect Pests of Indiana" (25) and made oil-painting wall charts of farm and garden insects.



"Unnecessary advice." R. E. Snodgrass.

(From Indiana sketch book, 1916, unpublished.)

After two entomologically profitable years in Indianapolis, Mr. Snodgrass in 1917 decided to try his luck again in Washington, D. C., where he offered as an inducement his newly acquired chart-making abilities. This appealed to Dr. Howard, who once more hired him in the United States Department of Agriculture for an assignment which paid \$2,000 per year. Gradually, as the war work became less important, he again bootlegged anatomy into the Bureau and found it more in favor at that time. The entomologists seemed to want his productions, and the Smithsonian Institution accepted his papers for publication.

During these years with the U. S. Department of Agriculture, Snodgrass was assigned for several summers to work at Wallingford, Conn., where he learned much about the life histories of apple insects. Then he was transferred to a U.S.D.A. experiment station at Sligo, Md., and later to a station near Silver Spring, Md. Finally he was permanently quartered in the South Building of the U.S.D.A. in Washington, D. C.

On September 18, 1924, Mr. Snodgrass married Miss Ruth Mae Hansford, a talented musician, endowed with beauty, charm, and sparkling personality. The result, he says, is that he now has a wife, two daughters, five grandchildren, and real-estate taxes.

"The rest of my career is well known to the entomological public, and need not be detailed." In this brief statement, Dr. Snodgrass has summarized modestly his activities covering an additional 36 years of continuous research from which 54 publications (26 to 79) have been produced, and one more is in preparation.

Among the numerous recognitions of his achievements is his honorary degree of doctor of natural sciences conferred November 17, 1953, by the Eberhard-Karls-Universität at Tübingen through the interest of Prof. Hermann Weber "as Master of Anatomy and Morphology of Arthropods, in recognition of his services as original researcher, as author of fundamental books, and an example to a whole generation of morphologists." Other recognitions include his election as honorary president of the Entomological Society of Washington and honorary member of the Entomological Society of America, the New York Entomological Society, the Royal Entomological Society of London, Société Entomologique de Belgique, Société Entomologique de France, Société Entomologique d'Égypte, the Academy of Zoology of India, and the Sociedad Uruguaya de Entomología.

Throughout his career, Dr. Snodgrass has been more interested in the evolutionary changes and relationships of anatomical structures,



About this age (6 years) in St. Louis, Mo., Robbie Snodgrass made his first entomological observation, that the legs of a grasshopper cut off by his father's lawn mower could still kick while lying on the pavement.



Magazine cover, clay model of the bighorn sheep. R. E. Snodgrass, San Francisco, 1906.

and in describing and illustrating the morphological development of arthropod structures, than in describing new taxa of arthropods. In fact, it was by sheer accident that Dr. Snodgrass described a new species of scorpion fly, though he did not name it. He figured the structures of the male genitalia of what he thought was a well-known species of *Panorpa*. Specialists in the group assured him he had not figured a known species, but an undescribed one.

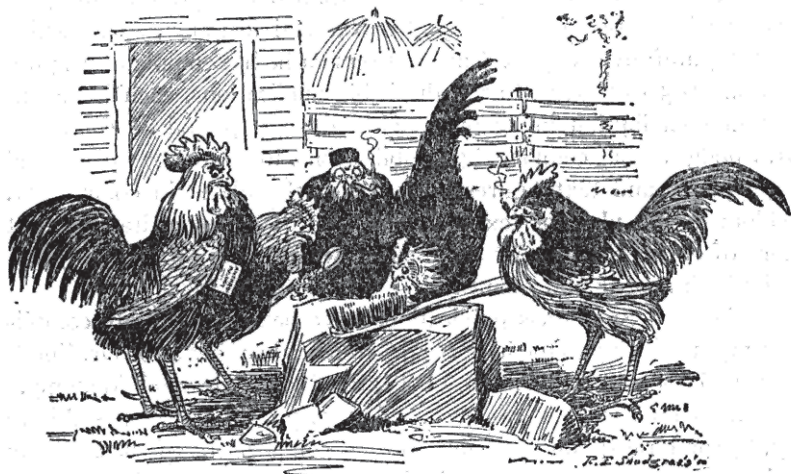
In 1945 Dr. Snodgrass reached the age of retirement. Having much unfinished work on hand, he continued his activities in space made available in the United States National Museum, space which he still gratefully occupies. Since retirement he has completed 15 publications (65 to 79), and as with all his publications, each is an important contribution in its own right. Over a period of 61 years, Dr. Snodgrass has completed 79 publications, totaling 5,972 pages and 2,154 plates and text figures, with 15 of the plates in color (44). Seldom does a plate or text figure consist of a single drawing, but more often of 10 to 15 or even 20 drawings. His bibliography exhibits both quality and quantity.

Reviews of Snodgrass publications have been exceedingly complimentary, testifying to the high regard which others have for Dr. Snodgrass and his research. About "A Textbook of Arthropod Anatomy," Dr. A. Glenn Richards (*Science*, vol. 117, p. 464, 1953) has this to say, "[Snodgrass] concerns himself with comparisons of the anatomy and terminology associated with the anatomy of the various classes of the animal phylum Arthropoda. He states the situation pungently in his preface: 'The arthropods are a group of related invertebrates; arthropodists, for the most part, are a group of unrelated vertebrates.' . . . The high caliber, the style of writing, the logical thinking, the personal verification of most of the details presented—even when they are credited to a previous author—and the many superbly drafted illustrations (very few of which are copied) are typical of the author's work."

Of the same book, Dr. V. G. Dethier's review (*Quarterly Review of Biology*, 1954, p. 179) includes these statements: "An outcome of a lifetime of study of insect structure and ancestry . . .," "a masterful piece of work, clearly presented, and attractively printed," and "a profusion of excellent illustrations which has come to be associated with all Snodgrass' works."

In his review of the "Anatomy of the Honey Bee," Dr. Roland Walker (*Science*, Oct. 19, 1956) uses such phrases as "precision and elegance of the pen work . . .," "constant evidence of Snodgrass' critical judgment . . .," and "the labels punctiliously revised to con-

form to changed concepts of homology." In a review of the same book, Dr. R. G. Schmieder (*Entomological News*, vol. 67, No. 9, pp. 250-251, 1956) quotes the beginning of chapter II, "An insect is a living machine; no other animal is provided with so many anatomical tools, gadgets, or mechanisms for doing such a variety of things as a winged insect." Dr. Schmieder describes Snodgrass as having "gone over carefully the mountains of recent literature with all its detailed



A MEETING OF THE SCIENTISTS TO DELIBERATE ON THE POSSIBLE USES OF AN INTERESTING DISCOVERY.

(From Chicago Record-Herald, 1913.)

data and has boiled down and refined all its profusion and confusion to the basic essential facts which he presents with amazing clarity and simplicity. . . . This is not a technical reference book; [it is] essentially a treatise on entomology, using one species as an example and including a discussion of the fundamentals . . . [it] can be read straight through with pleasure . . . a delight to follow the author through this complete examination of one insect. . . ."

One of the most delightfully illustrated works of Snodgrass is "Insects, Their Ways and Means of Living" (44). The colored plates, numbering 15, are reproductions of oil paintings, some of which today grace the wall of the Snodgrass office, and of water-color studies, some of which Dr. Snodgrass has given to entomologist friends. One edition is beautifully bound, with pages edged in gold, befitting the careful and detailed studies contained therein. This book exemplifies a rare talent, the ability of a specialist to present a technical subject com-

pletely accurate in detail in a style which can be read and appreciated by both specialists and laymen. Dr. Snodgrass's continued study of evolution, for which he was branded a heretic in 1894, is evident in his discussion of the Diptera. "Scientifically, the Diptera are most interesting insects, because they illustrate more abundantly than do the members of any other order the steps by which nature has achieved evolution in animal forms. An entomologist would say that the Diptera are highly specialized insects; and as evidence of this statement he would point out that the flies have developed the mechanical possibilities of the common insect mechanism to the highest general level of efficiency attained by any insect and that they have carried out many lines of special modification, giving a great variety of new uses for structures limited to one mode of action. But when we say that any animal has developed to this or that point of perfection, we do not mean just what we say, for the creature itself has been the passive subject of influence working upon it or within it. A fundamental study of biology in the future will consist of an attempt to discover the forces that bring about evolution in living things."

"Principles of Insect Morphology," published in 1935 (53), is considered by many to be the masterpiece of Snodgrass. It is described by Dr. Hans Sachtleben (*Deutsches Entomologisches Institute*, vol. 3, pp. 676-677, 1953) as the "greatest work." Dr. Clarence Hamilton Kennedy (*Science*, vol. 83, pp. 413-415, 1936) deemed this text to be "a volume of interest to zoologists as well as to entomologists." Dr. Kennedy acknowledged the abilities of the author and noted the careful writing of the book, that it is not just an expansion of lecture notes into chapters. "It is this remarkable ability to see things, then to draw them in a superb style that makes an outstanding anatomist . . . [the] ability to see the riches in the common and abundant, to organize and interpret the commonplace is one of the characteristics of a genius. . . ." And so for more than 20 years "Principles of Insect Morphology" has been and still is the leading text dealing with insect structure. Copies have been printed in numbers approaching 9,000 for the use of students and specialists throughout the world.

In explaining the difference between "anatomy" and "morphology," Dr. Snodgrass tells us that "anatomy is what you see with your eyes, morphology is what you *think* you see with your mind." The recorded facts of anatomy, he points out, do not change much with the years; but morphological concepts vary according to the mental vision of the morphologist. The zoologist, however, should continually revise his morphological outlook as new facts come to light. Through the years a few students of morphology have not agreed fully with the morpho-

logical concepts of Snodgrass, evidently owing to the understandably different mental interpretations by the individuals.

Dr. Snodgrass's contributions to science have not been confined to his printed pages. He has given and still is giving freely of his time and technical resources in guiding the efforts of others through personal direction or through correspondence. Students have traveled thousands of miles for the privilege of working under the guidance of Dr. Snodgrass. It is the customary thing to find references by Snodgrass listed in the bibliography of almost every publication dealing with arthropod morphology and anatomy, evolution and metamorphosis, and embryology. In these and publications treating other fields of entomology, illustrations marked "after Snodgrass," "following Snodgrass," "courtesy of Snodgrass," or "R. E. S." are numerous. Students in unrelated fields often request and receive assistance from Dr. Snodgrass. Currently a young journalist who was inspired by the delightful treatment of aphids in "Insects, Their Ways and Means of Living" (44) is writing an account of the life of an aphid, being privileged to use the prized illustrations signed "R. E. S."

As a lecturer, "Professor" Snodgrass is often in demand. He is a clear and concise speaker with the ability to present a complex subject in a simple and entertaining manner. Well known to his audiences is his talent for adroitly sketching illustrations on the blackboard. Dr. Snodgrass was a special lecturer in entomology at the University of Maryland from 1924 to 1947. Since then he has given lectures at the University of Minnesota, Cornell University, and the University of Virginia in addition to continuing as guest lecturer at the University of Maryland. He has the ability to increase the number of listeners with each lecture as a series progresses.

During the 1957 series at the University of Maryland, the lectures were attended by students and professors from other departments and colleges on the campus in addition to the Department of Entomology, from neighboring institutions, and from adjacent cities. The current students often found it difficult to keep up with the Snodgrass pace of lecturing and illustrating. Students of former years report that in their day Professor Snodgrass spoke and sketched even more rapidly than today; the sketches, then as now, did not require any retouching; and the only way they could equal the pace was to work in pairs, one copying and labeling the sketches while the other wrote the lecture notes. Professor Snodgrass admits that in those days perhaps he did occasionally sketch with a piece of chalk in each hand.

In keeping with his rapid, precise thinking and sketching, Dr. Snodgrass writes quickly, "just as the thoughts come to me." Then he



Calton Hill cemetery and prison, Edinburgh, Scotland. R. E. Snodgrass,
Nov. 1909.
(From collection of unpublished sketches.)

polishes his manuscripts with a few easy changes in one or two rewrites, not having to undergo the laborious task of rewriting numerous times as the majority of us do in our scientific literary endeavors. With a chuckle, Dr. Snodgrass mentioned one reason for his not re-writing manuscripts—Mrs. Snodgrass does not like to retype the papers.

Concurrently with his lecturing at the University of Maryland, he generously supervised thesis research for graduate students, each student receiving meticulous and inspiring guidance. The published investigations of these students have added much to the knowledge of insect anatomy and morphology. The accomplishments of these students, who are specialists today, testify to the abilities of their instructor.

Dr. Snodgrass has always been an avid reader who enjoys a wide variety of subjects and authors; and routinely reads for hours every night. His favorite of all books is that most humanized animal story, "The Wind in the Willows," by Kenneth Grahame (1908). It is in keeping with the simplicity of Dr. Snodgrass's innate interest in and fondness for animals—an intrinsic part of his personality which has been revealed in many ways.

When the author inquired of Dr. Snodgrass if he were a sports fan or a hobbyist, he answered in the negative. A few minutes later he brought to her desk two pages of notes, quickly written in the usual Snodgrass style, treating his lack of interest in hobbies and sports. Here they are just as he initially wrote them.

PERSONAL NOTES

"I never have had any hobbies, and have given little time to pure recreation. While I have played tennis a little, golf has always seemed too much of a gentleman's game. I used to like circuses because they had animals, but theaters to me are only something you have to take girls to before you get married. However, I do enjoy window shopping to see how many thousands of things there are that I don't need and don't want. In my youth I had plenty of involuntary exercise sawing the family stovewood and mowing the lawn. Later, on my own volition, I did a good deal of long-distance hiking, and some mountain climbing where mountains of reasonable height were easily available. But at school I was no good at all in athletics, except in running games. In fights I always got the worst of it, and thus became a popular victim. In baseball I was a complete failure; the ball either made a bee line for my face, or if it did hit my hands, it had a trick

of bouncing back before I could close my fingers on it. In the classroom I excelled principally in copying maps and in making those analytical diagrams of sentences by which we learned grammar in my early days at school (and in drawing pictures of the teacher).

“Life in general has been enjoyable, though it took me about a year to get used to it. At present my principal dislikes are barking dogs, radios, getting up in the morning, and nutmeg in apple pie. My only regrets are the things I didn’t do. If I have had any enemies they have gone where they deserve to be. Since my only physical disability is dental, I expect to live as long as I can eat—if the price of food doesn’t go too high. When I die I hope to be cremated because I still retain a dread of possible resurrection and the Judgment Day.

“This is just a brief sketch. It does not include all that I remember, or anything I have forgotten.—R. E. S., April 8, 1957.”