DERMAPTERA AND ORTHOPTERA IN THE KANSAS STATE COLLEGE COLLECTION. MORGAN HEBARD

In 1931 when publishing on "The Orthoptera of Kansas" (1) we were informed that collections had been assembled by the Kansas State College, but too late to include them in that study. Their material has now been submitted to us and the following records of interest are here published. Considerable series of other species, publication of data on which would have added nothing to the scientific value of this paper, have been determined and returned to the Kansas State College. These collections were made largely in Riley County.

Most noteworthy is the fact that in that County are areas of Great Plains environment and several species have been secured which we had supposed were limited to western Kansas. In a large number of cases slight increases in the known distribution westward of

eastern species are also noted.

Two species, Boopedon auriventris McNeill and Melanoplus punctulatus (Scudder) are added to the Kansas list. Both of these were mentioned by us in 1931, one as possibly, the other as probably occurring in the State. A typical male of the race Melanoplus scudderi scudderi is also here recorded for the first time, as are examples of the adventive species Euborellia annulipes and Periplaneta americana.

We are deeply indebted to Professors R. C. Smith and R. H. Painter for placing the present collections in our hands and for giving us information of value in

preparing the present report.

DERMAPTERA LABIDURIDAE

Euborellia annulipes (Lucas)

Topeka, Shawnee County, VIII, 11, 1927, (R. C. Smith), 9 juv. Newton, Harvey County, VIII, 25, (R. H. Painter), 1 juv.

This species is probably an introduction in Kansas,

from which state it was not previously known.

LABIIDAE

Labia minor (Linnaeus)

Manhattan, Riley County, VII, 10, 1 male. Riley County, VII, 27 to IX, 21, 4 males, 2 females. Franklin County, 1925, (H. K. Gloyd), 1 female.

Generally established in the United States, this

⁽¹⁾ Proc. Acad. Nat. Sci, Phila., LXXXIII, pp. 119 to 227.

species was originally introduced from Europe.

ORTHOPTERA BLATTIDAE **PSEUDOMOPINAE**

Blattella germanica (Linnaeus)

Riley County, IX, 14, 1931, (Smith and Brown), 2 Manhattan, IV, 3, 1931, (M. W. George), 1 females. male

Ischnoptera deropeltiformis Brunner

Manhattan, V, 6, 1925, (Zimmerman), 1 male, (Hebard Cln.); V, 13, 1910, (H. M. Smith), 1 male.

This is a northwestern limit for the species and a slight extension westward of its previously known range.

Parcoblatta bolliana (Saussure and Zehntner)

Pawnee County, VI, 15, 1931, (G. Fox), 1 male. Osborne, VI, 1930, (H. Nonamaker), 1 male.

Parcoblatta fulvescens (Saussure and Zehntner)

Riley County, (Popenoe), 1 male (medium size); VIII, 11, (F. Marlatt), 1 male (large for the species). This is a slight extension westward of the known range of fulvescens and also a northwestern limit.

Parcoblatta pensylvanica (DeGeer)
Jefferson County, IX, 1931, (J. H. Amun), 1 male. Riley County, V, 31, 1 male; VI, 20, (Kimball), 1 male. Manhattan, VII, 6, 1930, (E. Kingsley), 1 male.

BLATTINAE

Periplaneta americana (Linnaeus)

Manhattan, III, 20, 1929, (R. C. Smith) to XI, 22,

1926, 2 males, 1 female.

This is the first record for Kansas of this species, there probably introduced. It is a domiciliary pest. Blatta orientalis Linnaeus

Manhattan, I, 15, 1932, (H. W. Gilbert), 1 large juv. male. Riley County, X, 17, 1931, (Neill), 1 male.

MANTIDAE AMELINAE

Litaneutria minor Scudder

Reno County, IX, 22, (R. H. Painter), 1 male, (macropterous, dark).

Oligonicella scudderi (Saussure)

Onaga, Pottawatomie County, IX, 25, (Crevecoeur), 1 male.

MANTINAE

Stagmomantis carolina (Johansson)

Manhattan, X, 14, 1929, (L. M. Dean), 1 male.

This is a slight extension northward of the known range of this species.

PHASMIDAE HETERONEMIINAE

Diapheromera persimilis Caudell

Pottawatomie County, VII, 19, 1931, (W. Wahl), 1 female (green). Manhattan, IX, 22, 1930, (R. H. Painter), 1 male, 1 female (Hebard Cln.); X, 4, 1930, (W. V. Redding; on prairie), 1 male. Medora, Reno County, X, 4, 1931, (Gilbert and Painter; in sand dunes), 1 male, 1 female.

Pottawatomie County and Manhattan are slight ex-

tensions northward of the known range of this race.

ACRYDINAE

Acrydium arenosum angustum Hancock

Manhattan, VI, 16, 1929, (L. M. Dean; insectary), 1 female (abbreviate). Riley County, IV and V, 1931, (Popenoe; Nonamaker), 1 male (abbreviate), 3 females (two subabbreviate, one caudate).

Paratettix cucullatus (Burmeister)

Manhattan, VI, 16, 1929, (L. M. Dean; insectary), 1 mole, 2 females. Riley County, VI, 20 and 28, (Popenoe; Marlatt), 2 females.

ACRIDINAE

Pseudopomala brachyptera (Scudder)

Riley County, VI, 7, 1930, (D. A. Wilbur; in upland pasture burning plot), 1 female.

Mermiria neomexicana (Thomas)

Manhattan, VII, 29, 1921 to X, 17, 1930, (Wilbur; Smith), 12 male, 9 female. Riley County, VII, 22 to IX, 19, (Norton, Wahl etc.), 16 males, 18 females (nine females green, two females partly green, others brown).

This is evidently a common species in Riley County, but in eastern Kansas it is probably local in distribution.

Mermiria maculipennis macclungi Rehn

Riley County, VII, 19 to VIII, 28, (Dean; Popenoe; Marlatt; Wilbur), 11 females. Clark County, VII, 19, 2 females (atypical of this race).

Syrbula admirabilis Uhler

Manhattan, VIII, 15, 1931, (E. S. Fry; in alfalfa field), 1 male (Acad. Nat. Sci. Phila.). Riley County, IX, 10 to X, 10, (Neill; Avery), 2 males, 3 females.

Opeia obscura (Thomas)

Riley County, VIII, 23 to X, 14, (Dean; Popenoe; Avery; Hamon; Wilbur, native grasses on upland prairie), 1 male, 3 females (pair buff and brown, one female light and dark brown with green tegminal humeral band, one female same with green also on head.

pronotum and dorsum of tegmina).

This in an eastern limit, substantiating as well that from Wichita which we were unable to verify in 1931.

Amphitornus coloradus (Thomas)

Riley County, one VII, 22, 1897, (Marlatt; Dean), 1 male, 2 females.

This is an eastern limit of continuous distribution, though the species is known from the sand areas of Illinois.

Eritettix simplex Scudder

Riley County, II, 9, 1929, (C. W. Withey), 1 half grown juv. male; IV, 26 to VI, 7, (G. A. Dean), 10 males, 18 females (four males and five females lacking supplementary carinae on pronotum); VII, 16, 1930, (D. A. Wilbur; upland pasture burning plot), 2 males, 1 female (one male lacking supplementary carinae on pronotum).

This species here undoubtedly winters in the immature stages, not in the egg as do the species which appear adult later in the season. The present series is typical, showing no approach toward tricarinatus.

Phlibostroma quadrimaculatum Thomas

Riley County, VIII, 6, (J. B. Norton; hilltops 3 to 4 miles west of Manhattan), 1 adult (abdomen missing).

This is an extension eastward of the known distribution of this Great Plains species. It is probably very local east of central Kansas, but is very generally distributed on the western plains.

Dichromorpha viridis (Scudder)

Riley County, X, 30, 1931, (T. B. Avery), 1 female (brown); VIII, 23 to IX, 27, 1930, (D. A. Wilbur; upland pasture burning plots), 4 males, 12 females (three males green dorsum, four females green, others brown).

Ageneotettix deorum (Scudder)
Riley County, IX, 1931, (A. Howard), 1 female

(very large and robust).

Psoloessa texana Scudder Manhattan, IV, 17, 1932, (R. H. Painter), 2 females, 1 large juv. female.

This locality is considerably east of the eastern limits of general distribution of this species; the previously easternmost known point of local distribution in Kansas was Medora. A northern Great Plains race of the species is represented, which will shortly be described by Rehn.

Boopedon auriventris McNeill

Riley Co., VI, 17 to VIII, 23, (Dean; Popenoe; Norton), 7 males, 9 females. Manhattan, VII, 23 to VIII,

23, 1933, (D. A. Wilbur), 16 males, 8 females.

This species was described from northwestern Arkansas and certain differences to distinguish B. savannarum Bruner, described from West Point, Nebraska, have been noted by us. Additional material from Dallas, Texas, shows that series to be indistinguishable from that from Nebraska and Kansas. The color differences are insufficient to warrant nominal recognition and the longer limbs of the Nebraska, Kansas and Texas specimens can certainly not justify recognizing savannarum as more than a geographic race and we believe will be found to be subject to sufficient variation to warrant repudiation of even racial rank. We therefore consider savannarum a synonym of auriventris and record the present series under that name.

Though known from very few localities, the species undoubtedly occurs over a wide area in eastern Nebraska, Kansas and Oklahoma, northeastern Texas, southwestern Iowa, western Missouri and northwestern

Arkansas.

Aulocara elliotti (Thomas)

Riley County, VIII, 11 and 20, (F. Marlatt), 2 females.

This is a considerable extension eastward of the known range of elliotti, probably generally distributed only over the plains of western Kansas.

OEDIPODINAE

Arphia xanthoptera (Burmeister)

Linn County, VIII, 1931, (Miller), 2 males (wing disk orange). Iola, Allen County, VIII, 14, 1931, (D. Braun), 1 male (pronotal disk white, wing disk apricot yellow), (Hebard Cln.). Manhattan, IX, 26, 1931, (H. W. Gilbert), 1 male (wing disk orange). Riley County, VIII, 24 to X, 4, 1931, (Avery; Neill; Fox; Popenoe), 3 males, 1 female (wing disk bittersweet orange in two males, orange in one male, apricot yellow in female).

Manhattan is a northwestern limital point for this species which is common in Riley County and which probably occurs throughout eastern Kansas.

Chortophaga viridifasciata (DeGeer)

Oketo, Marshall County, XI, 8, 1928, (C. W. Withey; in wheat), 2 medium small juv. female (brown). Manhattan, IV, 17 to VI, 9, 1931, (Smith; Walker; Lamerson), 2 males, 2 females (one female green, others

VOL. VII.

brown). Riley County, IV, 28 to VII, 31, (Dean; Popenoe; Brown; Myers), 3 males, 8 females (one male, two females green, others brown).

Encoptolophus sordidus (Burmeister)

Oketo, Marshall County, XI, 8, 1928, (C. W. Withey; in wheat, 1 male. Manhattan, IX, 26, 1931, (H. W. Gilbert), 1 female.

Hippiscus rugosus (Scudder)

Riley County, IX, 17 to 30, 1931, (Hamon; Brown; Neill), 1 male, 3 females (wing disk pink in one female, orange in one male, yellow in two females).

Pardalophora apiculata (Harris)

Pottawatomie County, (W. Wahl), 1 female, (Acad. Nat. Sci. Phila.). Ashland, Riley County, IV, 26, 1928, (C. W. Withey; in wheat), 2 males. Manhattan, IV, 12 to V, 9, 1930, (Painter; Smith; Hanna), 1 male, 2 females.

Pardalophora haldemanii (Scudder)

Pawnee County, VII, 20, 1931, (G. Fox), 1 male (wing disk rich pink).

Dissosteira longipennis (Thomas)

Riley County, IX, 10, (F. Marlatt), 1 male.

This specimen was, we believe, a migrant. The limits of constant distribution of the species are probably west of Riley County.

Spharagemon bolli Scudder

Riley County, VII, 24, (G. A. Dean), 1 male, (Hebard Cln.).

This record constitutes a moderate extension westward of the known range of **bolli**.

CYRTACANTHACRINAE

Schistocerca americana americana (Drury)

Riley County, V, 26 to IX, 12, (Dean; Neall; Fox), 3 males, 6 females. A pair was taken in coitu on May 26, 1913.

This is a new western limital point, though in southern Kansas the insect has been reported from as far west as Reno County.

Hesperotettix viridis pratensis Scudder

Riley County, VII, 16 to X, 3, 1930, (D. A. Wilbur; upland in fertilizer plots, few in pasture burning plots and in height of grass clipping plots), 10 males, 12 females.

Like Trimerotropis pallidipennis salina McNeill, this insect has been shown by Montana material to there almost certainly intergrade with the typical race, but in the states which include the eastern borders of the Great Plains no trace of intergradation has ever been found, even though in parts of these states in each case both races are present.

Melanoplus scudderi scudderi Uhler

Riley County, VIII. 20, 1 male. See comments under scudderi latus.

Melanoplus scudderi latus Morse

Riley County, VIII, 11 to IX, 23, (Dean; Popenoe),

7 maies, 16 females.

Though four males are typical of this race in form of the cerci, three show some divergence toward scudderi scudderi, and one recorded above is typical of that race in this feature. All, however, have the general appearance of scudderi latus and in Riley County, though evidently in the zone of intergradation, that race apparently dominates.

Melanoplus differentialis (Thomas)

Pottawatomie County, VII, (W. Wahl), 1 female (melanistic). Manhattan, VIII, 13, 1931, (E. C. Smith; in alfalfa), 1 male, 1 female. Riley County, (Popenoe), 1 female (melanistic); X, 14, 1931, (T. B. Avery), 1 fe-

Melanoplus punctulatus punctulatus (Scudder)

Onaga. Pottawatomie County. VII. 26.

(Crevecoeur), 1 male.

This is the first Kansas record and a western limital point in the distribution of this insect.

Melanoplus fasciatus (F. Walker)

Riley County, VII, 24, (G. A. Dean), 1 male, 1 female.

In Kansas this is a western limit for the species which, however, is again carried southward to this latitude in the Rocky Mountains.

Melanoplus foedus fluviatilis Bruner

Riley County, VIII, 12, (G. A. Dean), 1 female.

Phoetaliotes nebrascensis (Thomas)

Riley County, VIII, 1 to XI, 6, (Dean; Avery; Popenoe; Marlatt; Wilbur, in fertilizer plot), 6 males, 14 females (two females macropterous). Manhattan, IX, 13, 1932, (R. H. Painter), 1 male.

Though generally distributed only in western Kansas, we now believe that Bruner's record from Topeka, which we considered accidental in 1931, is based on a specimen, like those here recorded, coming from a local area of favorable environment. The species is known from the sand areas of Illinois and extreme western Indiana.

TETTIGONIIDAE PHANEROPTERINAE

Arethaea gracilipes constricta Brunner

Onaga, Pottawatomie County, VII, 15, 1930 and VIII, 9, 1924, 2 males, 1 female. Riley County, VII, 26 to X, 26, (Marlatt; Wilbur, upland in fertilizer plot and in pasture burning plot), 2 males, 1 female.

Onaga constitutes a short eastward extension of

the known range of this insect.

Amblycorypha oblongifolia (DeGeer)

Riley County, 1 male.

Amblycorypha parvipennis brachyptera Ball

This is the insect which Rehn and the author have heretofore recorded as Amblycorypha iselyi Caudell. Dr. E. D. Ball has recently brought to our attention the fact that he inadvertently described this insect from Ames and northwestern Iowa in 1897(2). Caudell's iselyi, described in 1904(3), is therefore a synonym. Further study of our series shows that parvipennis (Stal), described in 1876, is a valid species and not a race of rotundifolia (Scudder) as was incorrectly stated by Rehn and Hebard in their revision of the genus in 1914(4) and that brachyptera is a northern race of parvipennis.

Onaga, Pottawatomie County, (Crevecoeur), 1 female. Franklin County, VI, 29, 1922, (H. K. Gloyd), 1 male. Onaga is a western extension of the known range of this race which, however, to the south is known as

far west as Sedgwick County.

Microcentrum rhombifolium (Saussure)

Pottawatomie County, VIII, (W. Wahl), 1 female.

Manhattan, IX, 6, 1929, (L. M. Dean), 2 females.

This is a short extension of the known range of the species westward.

PSEUDOPHYLLINAE

Pterophylla camellifolia (Fabricius)

Independence, Montgomery County, VII, 1 male, (Hebard Cln.).

This is a western limital point for camellifolia.

COPIPHORINAE

Neoconocephalus retusus (Scudder)

Manhattan, V, 24, 1904, 1 female.

This is a short extension west for the species, but constitutes a northwestern limit as well.

⁽²⁾ Proc. Iowa Acad. Sci., IV, p. 237.

⁽³⁾ Jour. New York Ent. Soc., XIII, p. 50.

⁽⁴⁾ Trans. Amer. Ent. Soc., XL, pp. 339 and 340.

Neoconocephalus nebrascensis (Bruner) Franklin County, VIII, 17, 1922, (H. K. Gloyd), 1

female (green), (Hebard Cln.).

This record constitutes another western limital point in the species distribution.

Neoconocephalus ensiger (Harris)
Riley County, VII, 7 to 26, 1930, (D. A. Wilbur; 2 on lowland prairie in native grasses, 4 in upland pasture burning plot and fertilizer plot), 4 males, 2 females (one female light brown, others green).

This is another point on the known western limits of

the species.

CONOCEPHALINAE

Orchelimum sylvaticum McNeill

In recent studies on the Orthoptera of Illinois we have found O. calcaratum Rehn and Hebard to be a

synonym of sylvaticum.

The species was recorded as calcaratum by us in 1931 from Kansas. west to Smith. Osborn and Grant Counties.

Orchelimum nigrines Scudder

Manhattan, IX, 24, 1928, (L. M. Dean), 2 males, 1 female. Riley County, VIII, 29, 1930, (D. A. Wilbur; from pasture grasses in rich bottom), 1 female.

This is a western limital record. Conocephalus brevipennis (Scudder)

Riley County, IX, 6, (E. E. Faville), 1 male.

This is a short extension westward of the known distribution of this species.

Conocephalus nemoralis (Scudder)

Manhattan, X, 15, 1926, (R. H. Painter), 2 females. The distribution of nemoralis is hereby similarly extended briefly westward.

Conocephalus nigropleurum (Bruner)

Riley County, IX, 1896, (J. B. Norton; beaten from

Polygonum), 1 male.

This is a southwestern limit and a short extension of the previously known range of the insect.

Concephalus saltans (Scudder)

Manhattan, IX, 26, 1931, (H. W. Gilbert), 1 male, 1 female (brachypterous, sides green).

DECTICINAE

Pediodectes haldemanii (Girard)

Manhattan, VII, 26, 1929, (R. H. Painter), 2 females, (Hebard Cln.). Riley County, VII, 27 to VIII, 24, (Popenoe; Norton), 4 males, 1 female.

Manhattan is an eastern limit, the species already

having been taken slightly more to the east in central and southern Kansas.

RHAPHIDOPHORINAE

Ceuthophilus divergens Scudder

Riley County, VII, 13, (J. B. Norton), 1 male, (Hebard Cln.). This is a short extension westward of the known range of the species.

Ceuthophilus pallidus Thomas

Oketo, Marshall County, VII, 19, 1928, (C. W. Withey; under shocks in wheat field), 1 juv. male. Manhattan, VII, 26, 1929, (R. H. Painter), 1 male, 1 large juv. female.

Daihinia brevipes Haldeman

Medora, Reno County, V, 29 and VII, 4, (McColloch and Smith; in sand dunes), 1 male, 1 female, (Hebard Cln.). Stafford County, IV, 30, (R. H. Painter; in salt marsh), 1 large juv. female.

GRYLLIDAEGRYLLINAE

Miogryllus verticalis (Serville)

Riley County, III, 21,(Kimball; under rocks), 1 male; V, 15, (K. V. Engle), 1 juv. female; VII, 21, (J. B. Norton; under stones on Bluemont hill), 1 female.

This is a short extension westward of the known

range of the species.

NEMOBIINAE

Nemobius carolinus carolinus Scudder

St. George, Pottawatomie County, VIII, 27, 1 female (brachypterous). Riley County, VIII, 27 and 28, (J. B. Norton), 2 males (brachypterous). Manhattan, X, 8, 1932, (R. H. Painter), 1 male (brachypterous).

Manhattan constitutes another slight extension

westward of this race's known range.

Nemobius bruneri Hebard

Wathena, Doniphan County, VII, 1, 1926, (L. M. Gates), 1 female (macropterous), (Hebard Cln.). Riley County, VIII, 27 to IX, 10, (J. B. Norton), 2 males, 3 females (brachypterous).

This is also a slight extension westward of the known range of bruneri. Specimens before us from Springfield, South Dakota, show also a new north-

western limit for the species.

OÈCANTHINAE

Oecanthus angustipennis Fitch

Manhattan, VIII, 11, 1931, (R. C. Smith), 1 male. Riley County, X, (Popenoe), 2 females. Franklin County, IX, 17, 1925, (H. K. Gloyd), 1 male, (Hebard Cln.).

Manhattan is a slight extension westward of the known range of angustipennis.

Oecanthus niveus (DeGeer)

Pottawatomie County, (W. Wahl), 1 male.

This record extends slightly westward of the known area of continuous distribution of niveus in Kansas. The species, though occurring in the West, is probably absent from the Great Plains.

Occanillas sigricornis quadripunctatus Beutenmuller

Riley County, VIII, 16 to IX, 3, (Norton), 1 male, 1 female (Fulton's Classes 3 and 5). Medora, Reno County, X, 3, 1931, (H. W. Gilbert), 1 female (Fulton's Class 1 (antennae immaculate)).

Oecanthus nigricornis argentinus Saussure

Riley County, VI, 20 to IX, 25, (Norton; Popenoe; Smith; Faville: a large number on Grindelia), 12 males, 27 females (Three are Fulton's Class 7, all others strongly Class 8).

Oecanthus latipennis Rilev

Onaga, Pottawatomie County, (Crevecoeur), one male, (Tchard Cln.).

Neoxabea bipunctata (DeGeer)

Onaga, Pottawatomie County, VII, 8, 1929,

(Crevecoeur), 1 male, (Hebard Cln.).
This is a western limital point but the species has also been recorded from Morris County, slightly west of south.

TRIGONIDIINAE

Anaxipha exigua (Say)

Topeka, Shawnee County, VIII, 24, (Popenoe), 2

females. This record constitutes a very slight extension westward of the known range of the species.

GRYLLOŤALPINAE

Gryllotalpa hexadactyla Perty

Easton, Leavenworth County, VIII, 6, (T. C. Craig), 1 female (brachypterous). Manhattan, VIII, 11, 1928, (R. H. Painter), 1 female (macropterous). Riley county, IX, (M. Dunlap), 1 male (brachypterous), (Hebard Cln.). Franklin County, VIII, 4, 1922, (H. K. Gloyd), 1 female (macropterous), (Hebard Cln.). Madison, Greenwood County, VIII, 14, 1928, (R. H. Painter), 1 female (macropterous).

Gryllotalpa major Saussure

Riley County, IV, 17, 1931, 1 female; V, 5, (G. A. Dean), 1 male, (Hebard Cln.). Stockton, Rooks County, VI, 1, 1921, (H. V. Toeffer), 1 female, (Hebard Cln.). Stockton extends the known distribution of this species in Kansas a considerable distance westward.

TRIDACTYLINAE

Tridactylus minutus Scudder

Onaga, Pottawatomie County, V, 21, 1926, (Creve-coeur), 1 male, 3 females. Manhattan, V, 12, 1920, R. H. Painter), 3 males, 1 female.

EDWIN A. POPENOE

Edwin A. Popenoe was born in Centerville, Ohio, July 1, 1853. He moved with his parents to Illinois in 1860, where he remained nine years and then came with his parents to Topeka, Kansas. He entered Washburn

College and graduated in 1876.

In July, 1879, Professor Popenoe was elected to the chair of Botany, Horticulture and Entomology at the Kansas State Agricultural College, and gave the courses in these subjects. From 1883-1894 the department was known as the Department of Horticulture and Entomology, and Professor Popenoe gave the courses in Entomology and Horticulture. In 1887, at which time the Kansas Agricultural Experiment Station was established, Professor Popenoe also became the Horticulturist and Entomologist of the Kansas Agricultural Experiment Station. In 1894, due to the rapid growth and expansion of the college work, it was necessary to add new departments, and Professor Popenoe became head of the Department of Entomology and Zoology, which position he occupied until July, 1897. In July, 1897, he resigned, but two years later he was again appointed Professor of Horticulture and Entomology. In the reorganization work at the college in 1901, Professor Popenoe again became head of the Department of Entomology and Zoology, which position he filled until July 1, 1907, when he resigned to live on his farm three miles south of Topeka. Professor Popenoe died at his farm home, November 17, 1913.

Professor Popenoe was a man of broad education, high culture and engaging personality. As an investigator he was accurate, thorough, and had the true scientific spirit. As a teacher of Entomology, Horticulture and Zoology, he interested many students who have reached not only the highest positions in their respective fields, but also have contributed much to the agricultural and biological sciences. His memory is cherished by all who had the good fortune to secure his friendship.

GEO. A. DEAN.