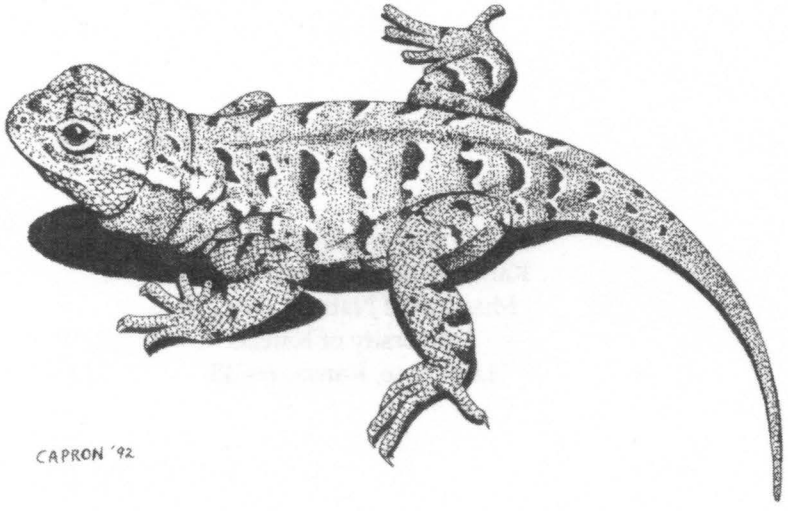
KANSAS HERPETOLOGICAL SOCIETY
SPECIAL PUBLICATION NUMBER 2

THE LIZARDS OF KANSAS

BY
EDWARD HARRISON TAYLOR



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Edward H. Taylor, graduation photograph, Garnett (Kansas) High School, 1908

Edward H. Taylor, University of Kansas, 1912-1913
(photographs courtesy Kraig Adler)

EDITOR'S PREFACE

On 4 November 1990, the Executive Council of the Kansas Herpetological Society (KHS) charged its editor with investigating the possibility of publishing Edward H. Taylor's masters thesis, *The Lizards of Kansas*. Subsequently, Philip S. Humphrey, director of the Museum of Natural History at the University of Kansas, granted KHS permission to publish this manuscript on behalf of the University and the Museum. To him we are most grateful.

To aid the reader in interpreting this manuscript, we have been fortunate in that Hobart M. Smith of the University of Colorado and Joseph T. Collins of the University of Kansas agreed to write interpretive forewords. I believe that the reader will find that both of these forewords are essential to the proper understanding of the importance of Taylor's paper. Again, to these authors we are most grateful.

The task of editing an old, unpublished manuscript by a deceased author presents numerous challenges to an editor. Such is the lesson that I have learned from editing Edward Taylor's masters thesis, *The Lizards of Kansas*. An editor's primary responsibility when presented with a paper for publication is to ensure that the material contained therein is comprehensible to the reader while maintaining the unique style, intent, and meaning of the author. Normally, the author is alive and available for queries from and response to the editor and problems are rather easily resolved. As Dr. Taylor died in 1978, such interaction was not possible. Consequently, I have had to make certain decisions as to the style and content of the following publication.

The first problem encountered was that of style and usage of certain words and phrasing. The manuscript was completed in 1916 and much has changed in the world of scientific literature standards since then. Terminology normal to that period is quite obviously dated now. However, to make modern changes to this manuscript would result in a radical restructuring of the manuscript. In addition, I have no connections to the spirit world and therefore am unable to determine from the author his exact intent or meaning of certain words and phrases. I have chosen the path of least resistance and transcribed the manuscript verbatim with only minor changes for obvious misspellings (indicated by the author) and where Dr. Taylor himself added editorial changes to the manuscript by hand. The reader will note a liberal use of the Latin term *sic* throughout the paper as a result. This term is used not to indicate that Edward Taylor was a poor speller in his youth (he was not) or that his terminology was illogical (it is not) but merely to show that the manuscript has not been edited for publication with the

cooperation of the author prior to the KHS Executive Council's decision to publish said manuscript. To ensure the integrity of both the author and the editor, I see no other course than to present the manuscript in this manner, although some may disagree with that logic. See Dr. Smith's foreword for additional material and comment on Taylor's style and content. The reader is referred to the actual manuscript located in the library of the Division of Herpetology at the Museum of Natural History at the University of Kansas if he or she wishes to determine the exact content of the paper.

The text makes reference to both photographs and figures, neither of which are included with the bound manuscript. Although these graphic materials are of obvious interest, subsequent search of the Edward H. Taylor archival material at the University of Kansas has not revealed their presence there. I would be most interested in hearing from any reader who might have information as to where these photographs and figures might reside so that they could be included in possible future editions of this paper.

Last, an appendix has been added. This appendix has the complete citations for virtually all works mentioned in the paper, as the old style of citation is barely comprehensible in certain instances. A few citations overlap Taylor's Bibliography and a few could not be determined due to incomplete or incomprehensible citation.

I take this opportunity to thank a number of individuals whose efforts have helped bring this project to fruition. Ann Bradley, Nancy Bradley, and Dan Bauer (Baco Corporation), all of Wichita, made significant financial contributions which substantially reduced the cost of this publication. Kraig Adler's comments, suggestions, and loan of photographic material improved the contents of the manuscript considerably. The splendid front cover illustration by Martin B. Capron, Oxford, Kansas added greatly to the presentation of the publication. Finally, the interpretive forewords by Hobart M. Smith and Joseph T. Collins are essential in revealing the critical importance of this manuscript in understanding many of the nuances of Edward Harrison Taylor's herpetological career. All these people have my deepest thanks.

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FOREWORD

EXPOSITION OF A LEARNING PROCESS

by
Hobart M. Smith

Abstract: Taylor's unpublished (until now) *Lizards of Kansas* is interpreted as having laid the foundation of that author's lifelong style of taxonomic research. Having no mentors in person, Taylor perforce was self-taught, and learned the only way he could, by copying the works of others, most notably Cope. Taylor emulated or unconsciously paralleled Cope in many ways, although he never admitted so to anyone, probably not even himself. But his here posthumously published *Lizards of Kansas* unmistakably foreshadows the direction his life and research would take, as well as the source of his inspiration.

Although I met Edward H. Taylor in 1930 or 1931, as an undergraduate student at Kansas State University (where I majored in entomology but had been influenced to switch to herpetology upon graduation), was associated with him off and on until his death in 1978, and knew him about as well as any of his students or colleagues ever did, he remained extensively enigmatic to me, who was cursed with a simple and transparent mind. That was exactly the way he wished to be seen. Any effort to probe into and understand his past, present, or future usually was deflected, often quite bluntly. He seemed to fear being understood, or allowing anyone to be very knowledgeable about his activities. His paranoia may have originated with and, at least, was exacerbated by his stints with the federal secret service in Siberia after World War I and during World War II in Asia.

Thus I never learned anything directly about the how or why of his early forays into the discipline of herpetology. Perusal of this manuscript on the *Lizards of Kansas*, at the kind behest of its editor, Eric M Rundquist, has therefore been a major revelation. It sheds important light upon the nurturing of the seeds of herpetological interest implanted in him as it is in many children who grow up with parental indulgence and where snakes and other reptiles are often encountered in the wild. In most children, those seeds do not sprout because subsequent events are not conducive to their germination or firm establishment. As Taylor himself (1975: 6) pointed out, his circumstances did permit his childhood interests to be developed. Chance dictated his choice of career, as indeed it does for most people.

Why Taylor chose to go to the University of Kansas rather than the university of his home state, Missouri, is uncertain, but probably hinged on the long-established fame, even then, of the university's museum and Biological Survey. Lawrence was also distinctly closer to Taylor's home town, Maysville, in northwestern Missouri, than to Columbia, home of the University of Missouri.

In pursuit of his chosen interest in herpetology, however, there was no one at the University of Kansas with the expertise to guide him. That he nevertheless pursued it is a tribute to his advisor at the time, Dr. Clarence E. McClung, "one of America's greatest geneticists" (Taylor 1975: 8), who allowed Taylor the flexibility he needed, encouraging his self-education. For that adaptability to that particular student's desires McClung deserves accolades he has never received; very likely Taylor would otherwise have become a paleontologist, through the influence of Dr. Ray Moore, "America's greatest paleopathologist" (Taylor 1975: 8), whom he accompanied in field work in western Kansas and who likely would have been his advisor had not McClung served in that role. Whether Moore would have been equally adaptable as McClung was, in counselling Taylor, or whether Taylor would have been diverted to another field, will never be known.

In that context it should be noted that Taylor was an exceptionally versatile person. He was sorely tempted to become an actor (what competition he would have given Lionel Barrymore, who had a similar body build, profile, and hypnotic ability!); his histrionic abilities captivated his audiences, even his students in comparative vertebrate anatomy, and saved his life several times in tropical field trips all over the world. His piercing black eyes added a dimension of hypnosis to his performances. He toyed with the idea of writing both prose and poetry, as a profession, and he did briefly become a mammalogist, publishing a monograph on the mammals of the Philippines (Taylor 1934, his doctoral dissertation), and an ichthyologist, writing a comparable monograph on the fishes of the Philippines. The latter was lost at sea in final manuscript form, hence was never published (nor does any copy survive, to haunt him as does *The Lizards of Kansas*). Thus Taylor's interests and talents could readily have led him in other directions had either McClung or Moore been less flexible in their counsel.

Left to his own devices, Taylor chose to stick with his juvenile fascination with snakes and their kin. He selected as his first research topic, for his master's degree dissertation, a review of the lizards of his state, Kansas, because, as stated in his dissertation (pg. 2), they were poorly known at that time.

It came as a complete surprise to me to discover that his master's

dissertation was completed while he was still an undergraduate, in the fall of 1911, or with no more than finishing touches to be added, before February, 1912, when he left for the Philippine Islands. He had entered the University of Kansas in September, 1908, and graduated in December, 1911, thus having spent only 3½ years getting his bachelor's degree. It was an amazing accomplishment, particularly since he worked his way through, with little support from home, and on top of that he wrote his master's dissertation, even before becoming a graduate student. Although he obviously was then and always remained an exceptionally hard worker, he was never a "workaholic", in the sense of perpetually keeping nose to grindstone. He worked very efficiently and with complete concentration when he did work, but he also lived a highly social life, needed little sleep and was blessed with seemingly unlimited stamina. He enjoyed life thoroughly, at both work and play.

With the master's dissertation written and approved by his advisor, McClung, Taylor completed requirements for the degree when he returned from the Philippines for a stay in Kansas of less than a year in 1916. By that time he had acquired much of the material that served ultimately as the basis of his monographs on the Philippine herpetofauna, and had published his first herpetological contribution (Taylor 1915).

Thus Taylor's master's dissertation was his first major research effort, and any attempt to analyze its significance in his subsequent career is beset with the same faults of subjectivity as it is to interpret abstract painting. The interpretations that follow are not to be taken as inviolable. They are simply mine; other analysts might emerge with quite different interpretations. The man we seek to analyze was a highly complex person and a consummate actor; façade and reality are not readily distinguished.

As I see it, the present lizard manuscript established trends characteristic of his entire career. For example, rather full synonymies-chresonymies were given for each taxon, a relatively detailed description of each, and there were profuse illustrations. These features were earmarks of this taxonomic works throughout life. Hyperdiscrimination, a lifelong attribute, is also evident in the abundance of taxa represented in the dissertation, with an excess of splitting represented particularly in the genus *Eumeces*. Taylor is often regarded as a classic example of a "splitter", but he was in every sense a perfectly legitimate discriminator; if he ever distinguished two or more nominal taxa where but one was previously recognized, the differences were there, not imagined. He did not split for the sake of splitting, as is pejoratively implied (or is even explicit) in use of the term, but because he was

convinced that the distinguishing features he observed were real and indicative of reproductive isolation. He abhorred the thought of failure to distinguish different species where they actually exist, and I do not recall that he was ever found guilty of including more than one species in the type series of any of hundreds of reptile and amphibian species he newly described, although such misidentification was not uncommon among colleagues of his era.

As Taylor compiled his lizard dissertation, he must have been puzzled by the multiplicity of the taxa of *Eumeces*; it is highly likely that his ultimate determination to monograph the genus (Taylor 1936) stemmed from uncertainties apparent to him at the very beginning of his professional career.

It is noteworthy that in spite of his intense discriminatory ability, Taylor rarely dealt with subspecies; he seemed to disdain them as scarcely worth attention. His Kansas lizards work seems to have set that precedent. Conventions of the time required acceptance of some subspecies, but he added none of his own.

One feature of the lizard dissertation exemplifies what might be regarded as juvenile, or immature, enthusiasm, which he exhibited relatively little at later times in his writing, although it was readily evident in speech: inclusion of anecdotal accounts of behavior and other aspects of natural history. Such matters came to concern him relatively little, because they could seldom be treated in as satisfyingly an objective manner as anatomical facts. A vast store of knowledge of natural history was lost because of his reluctance to give it the credence it deserved. But in the dissertation, he recounted a great deal of his observations on lizards both in the field and in captivity.

Full utilization of the literature was also a characteristic of the lizard work as well as his subsequent research. He must have made use of the Zoological Record, for he included in his Bibliography a reference to a short article (pg. 6) by F. Werner on *Phrynosoma orbiculare*, a strictly Mexican species, that he could only have picked up in the Zoological Record; it was not listed in his chresonymy for *P. cornutum*, where it belongs, for Wiedersheim (not Werner) dealt in that article with Texas animals, not *P. orbiculare*.

Seeking a model that Taylor might have used in writing his dissertation, I was rather shocked to discover that Cope (1900) not only served as his model but was the source for virtually all synonymic, chresonymic, and descriptive detail in the dissertation, without attribution. Cope (1900) was noted by Taylor as the source for the text figures (pg. 13) and nomenclature (pg. 12) but not for the details mentioned, although taken verbatim from Cope. Taylor never would have con-

doned such unacknowledged plagiarism in his subsequent years; I have never encountered anyone more intensively principled in integrity than he was. I am not sure that he regarded his use of extensive excerpts from Cope as dishonest, as Cope was the best source of information on structure, color, and distribution of lizards in Kansas. Nevertheless, I hypothesize that use of Cope's work so extensively, both unacknowledged and not, had three profound effects upon Taylor's future development.

Firstly, failure to pursue publication of the lizard dissertation may have been as much reluctance to let his plagiarism be known, as it would have been had it been published, as a magnanimous withdrawal in favor of Housholder's dissertation (pg. 11) on the lizards and turtles of the state. How much of Taylor's paranoia may have sourced from a need he may have felt to conceal this lapse of integrity is unknowable. As intense as his sense of total integrity was, a deep psychological reaction is possible.

Secondly, in copying Cope's style, he absorbed it. Teachers have long known that nothing is more effective in developing writing skills than tedious copying by hand of the compositions of the writers one would emulate. This exercise by Taylor, in copying from Cope, established habits of expression and organization that he retained throughout life. It was a learning process from which not only he but the whole herpetological discipline benefitted.

Thirdly, Cope appears to have been Taylor's model, consciously or unconsciously, in many ways, although I am not aware that Taylor admitted as much. Certainly their lives paralleled each other in many ways, beginning with the very style and structure of their scientific writing. Both described enormous numbers of new taxa; were physically imposing, energetic field men; were paranoid and contentious, feuding with their colleagues; were broadly talented, linguistically facile, highly cultured, with a taste for the theater, opera, acting; had excellent writing skills in both popular and scientific contexts; were highly social extroverts; and were irrepressibly infatuated with women (see Osborn, 1913, 1931, and Lanham, 1973, for impressions and facts about Cope).

In my view, publication of Taylor's master's dissertation does not diminish or tarnish his image, however violently he would undoubtedly object if he could. It shows that, however lavishly talented he was, like all of us he had his cross to bear, and he rose to its challenge in a way that should be an inspiration to us all. This publication thus serves its purpose in honoring its writer in a unique way. He can still be emulated, even with eyes open to some shortcomings shared with many others. No human idol is without them.

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FOREWORD

EXPLICATION OF TAYLOR'S LATIN NAME USAGE

by
Joseph T. Collins

Edward Harrison Taylor's unpublished master's thesis (*Lizards of Kansas*, University of Kansas, 1916) was the first comprehensive attempt to define the number and identity of these reptiles in the state. In order to facilitate use of this first published version of that thesis, I here present modern-day equivalents for the scientific names used by Taylor. This conversion will permit ease of comparison with the taxonomy in my *Amphibians and Reptiles in Kansas* (1982) and other field guides.

Taylor recognized 20 species and subspecies of lizards from Kansas. Eight of those lizards, comprising six species, have never been verified as occurring in Kansas. Although not a part of the state's lizard fauna, their scientific names are listed below along with the current scientific name and spelling, as follows:

TAYLOR'S NAME	CURRENT NAME
Cnemidophorus gularis gularis	*Cnemidophorus gularis gularis*
Cnemidophorus tesselatus	*Cnemidophorus tesselatus*
Eumeces epipleurotis	*Eumeces multivirgatus*
Eumeces leptogrammus	*Eumeces multivirgatus*
Eumeces multivirgatus	*Eumeces multivirgatus*
Holbrookia maculata lacerata	*Holbrookia lacerata*
Phrynosoma douglassi hernandesi	*Phrynosoma douglasii hernandesi*
Sceloporus undulatus undulatus	*Sceloporus undulatus undulatus*

The remaining twelve taxa represent eleven species, all of which have been verified from Kansas, and are presented below with the names in current usage in the state today, as follows:

TAYLOR'S NAME	CURRENT NAME
Cnemidophorus sexlineatus	*Cnemidophorus sexlineatus viridis*
Crotaphytus collaris	*Crotaphytus collaris collaris*
Eumeces guttulatus	*Eumeces obsoletus*
Eumeces obsoletus	*Eumeces obsoletus*

Eumeces pluvialis	*Eumeces anthracinus pluvialis*
Eumeces quinquelineatus	*Eumeces fasciatus*
Eumeces septentrionalis	*Eumeces septentrionalis*
Holbrookia maculata maculata	*Holbrookia maculata maculata*
Leiolopisma laterale	*Scincella lateralis*
Ophisaurus ventralis	*Ophisaurus attenuatus*
Phrynosoma cornutum	*Phrynosoma cornutum*
Sceloporus undulatus consobrinus	*Sceloporus undulatus garmani*

Taylor's list included eleven of the twelve native species of lizards known to inhabit Kansas, based on Collins (1982). Only the Broadhead Skink (*Eumeces laticeps*) was not included in his thesis.

Literature Cited

Collins, J. T. 1982. Amphibians and Reptiles in Kansas. 2nd Ed. Univ. Kansas Mus. Nat Hist., Pub. Ed. Ser. 8: 1-356.

Museum of Natural History
University of Kansas
Lawrence, Kansas

PREFACE

This paper was written in the school year 1911-12 for partial requirement for a Master of Science degree. As the writer left school in March of 1912 to accept a government position in the Philippine Islands, the paper was never formally accepted, although read and criticized by Dr. C. E. McClung. Credit to the amount of seven hours was given when bound and formally submitted.

As Dr. McClung left the University of Kansas soon after I had gone, no further effort was made to complete the requirements for the degree, at that time.

On my return from the Orient, effort was made to complete the work required for the degree. Much to my surprise, I learned that a thesis had been prepared during my absence on "The Lizards and Turtles of Kansas" by Mr. Victor Housholder. I have been able to review this paper, and will say that Mr. Housholder has worked absolutely independently in the matter. This latter paper has been accepted by the Kansas Biological Survey for publication. As this writer has had access to material collected during the past four years, it doubtless represents a more complete piece of work.

It is my duty to acknowledge my indebtedness to Dr. C. E. McClung for suggestions and assistance; to various members of the faculty for help in various ways; to members of the Biological Survey for specimens and notes; and to Mr. Jack Sterling for an extremely rare specimen of *Eumeces pluvialis* (Cope) taken in Dickinson County.

University of Kansas
August 13, 1916
Lawrence, Kansas

(signed) Edward H. Taylor

HISTORICAL

The reptiles of the state, with the exception of snakes, have never been studied thoroughly. Specimens in the National Museum from this state have been listed by Cope and Yarrow in their checklists. Some of the earlier surveys describe and figure species occurring here. Miss A. E. Mozely published a list of snakes in the collection of the State University in Trans. Kansas Acad. Sci., Vol. VI. Mr. E. B. Branson published a comprehensive list of species with descriptions and figures in Kansas Univ. Sci. Bull. Vol. IV, no. 9, 1904.

The work done on lizards is much more meager. In 1881, F. W. Cragin published a paper entitled, "A Preliminary Catalogue of Kansas Reptiles and Batrachians", Trans. Kansas Acad. Sci., Vol. VII. In this paper, he lists 12 species of lizards and adds short notes and observations. In a supplementary list, he includes *Phrynosoma modestum, Eumeces epipleurotis, Eumeces leptogrammus, Eumeces multivirgatus*, and Baird's species, *Eumeces inornatus*, as liable to occur in this state. In a second paper, "Second Contribution to the Herpetology of Kansas with Observations on the Kansas Fauna" Trans. Kansas Acad. Sci., Vol. IX, 1883, he adds to the list of species occurring in the state, *Sceloporus undulatus thayeri, Sceloporus consobrinus, Cnemidophorus tessellatus*, and *Eumeces multivirgatus*. The *S. u. thayeri* is regarded by Cope as merely a color variation and not constant. This, with the former list, brings the number up to 15 recognized species and subspecies.

F. A. Hartman has published from this laboratory (Trans. Kansas Acad. Sci., Vol. XX, pt. 2, 1906) a paper entitled "Food Habits of Kansas Lizards and Batrachians". Here he has given his personal observations of the food habits of the commoner varieties. He includes ten species.

METHOD OF PRESENTATION

The method followed in the description of species is that similar to all scientific literature; i.e. name, synonomy, technical description of family, genus, species, and subspecies as regards scalation, length, coloration, etc. Most of the color details have been worked out from specimens in the collection of the University of Kansas, and observations on living specimens collected during the past four years. The nomenclature used is that of Cope. Almost without exception, the observations are those of the author. During the summer of '09 and '10 (sic), a number of specimens of lizards were kept in captivity for the

purpose of observing their habits as regards food, sleeping, reproduction, oviposition, etc. The work was extremely interesting and many facts were learned. Data regarding dates of capture, time of day, etc. were kept, but the author has not considered them worth recording.

The text figures are taken from Cope's *Crocodilians, Lizards, and Snakes* (Rept. National Mus., 1898). The photographs are from specimens in the University collections. The food tables are based on the examination of the stomach contents of an extended number of specimens and also on the work of F. A. Hartman mentioned above. The information in the introduction has been derived from a great number of sources as well as from personal observation, and only where parts have been transferred as a whole has credit been given the author. A partial list of such works used is included in the bibliography.

GENERAL DISCUSSION OF THE GROUP

CLASSIFICATION OF LIZARDS

The lizards belong to a group known as the order Squamata, in which also are classed the Ophidia or snakes, and the Rhiptoglossa or chameleons. The differences between these three groups may be summed up as follows:

I. Ophidia. There is fibrous union of the right and left halves of the lower jaw, an absence of functional limbs, of which, at most, only vestiges remain, and an elongate form of body. The single eyelid cannot be moved, and is transparent.

II. Rhiptoglossa. The toes are separated into groups of two and three, respectively, so that the feet form grasping organs. The tongue is long, extensile, and club-shaped. The skeleton lacks clavicles and interclavicles. The skull is casque-shaped and studded with tubercles.

III. Lacertilia. In this group, the right and left halves of the lower jaw are connected by a bony union. The great majority possess functional limbs, movable eyelids, and horny scales. Many have a snake-like form, with reduction or loss of one or both pairs of limbs. In some cases, the eyelids are transparent and fixed as in snakes, while in others the scales may be rudimentary or wanting. In some of the limbless, burrowing forms, the quadrate bone has become more or less fixed.

The batrachians (frogs, salamanders, toads) for a long time were classified among the Reptilia because of similarity of form. The following distinctions have placed them in a class of their own. They have a gill-breathing apparatus at some time during their life history. The reptiles do not. The embryonic development of the reptiles is much the same as in the other higher forms belonging to the group Amniota, and in this they differ from the batrachians also.

TEGUMENT

The covering of the lizards is divided into a great variety of structures. Sometimes the scales are ossified and in such cases they are traversed by canals, as in the Scincidae. In others, as in the *Phrynosoma* or "horned toads", the epidermis has developed into horny plates or scales which are elevated into acute spines. In these horns, the epidermis is a smooth corneous covering. On the posterior part of the interior face of the thigh, in many genera, the scales of one or two rows are rosette-shaped or fossate. This fossa is occupied by a waxy plug which projects somewhat beyond the level of the surface of the thigh. The uses of these organs are unknown although there are many conjectures.

In most species, the body scales are arranged in rows, and present a variety of coloring. The scales on the digits of some species are produced into spines as an aid in securing a good foothold on an unstable surface. This is true in certain species of the desert.

REPRODUCTION

Reproduction in lizards is both ovoviviparous and oviparous. These characters have no generic value for both methods are found in the single genus *Phrynosoma*. In the oviparous species, the eggs are usually buried either in the sand or earth, or left under a rock where there is more or less (sic) soil and moisture. The period of incubation is from a few hours to several weeks. The number of eggs or young varies considerably in the genus as well as among individuals of the same species. Certain species of the "horned toads" may have as many as thirty young at a single time. The time of the year in which the eggs are laid varies from the first of June to the middle of August.

Concerning breeding habits, little is known, save in few species. Mr. J. K. Strecker* has made some very careful observations on the breeding habits of the *Sceloporus spinosus* and *Phrynosoma cornutum*.

* Note: Baylor Univ. Publ.

TABLE OF CLASSIFICATION

Class Reptilia
Order Squamata
Suborder Sauria
Family Iguanidae
Genus *Crotaphytus*
Genus *Sceloporus*
Genus *Phrynosoma*
Genus *Holbrookia*
Family Anguidae
Genus *Ophisaurus*
Family Teiidae
Genus *Cnemidophorus*
Family Scincidae
Genus *Leiolopisma*
Genus *Eumeces*

LIST OF SPECIES KNOWN TO OCCUR IN KANSAS

Crotaphytus collaris
Sceloporus undulatus undulatus
Sceloporus undulatus consobrinus
Phrynosoma cornutum
Phrynosoma douglassi hernandesi
Holbrookia maculata maculata
Holbrookia maculata lacerata
Ophisaurus ventralis
Cnemidophorus sexlineatus
Cnemidophorus tessellatus
Cnemidophorus gularis gularis
Leiolopisma laterale
Eumeces obsoletus
Eumeces quinquelineatus
Eumeces guttulatus
Eumeces multivirgatus
Eumeces septentrionalis
Eumeces pluvialis
Eumeces leptogrammus
Eumeces epipleurotis

SUPPLEMENTARY LIST OF LIZARDS MORE OR LESS LIKELY TO OCCUR IN THE STATE

Anota modestum. Taken in northern New Mexico and along the Cimmaron and Canadian rivers.

Eumeces anthracinus. Missouri, northern Arkansas

Eumeces inornatus. Sand Hills along the Platte valley, Nebraska (This species in not recognized by Cope)

Uta stansburiana. Texas, Colorado, etc.

SCINCIDAE

Description of family [largely from Boulenger (1887)]

Tongue moderately long, free and feebly nicked in front, covered with imbricate, scalelike papillae. Dentition pleurodont, teeth conical, bicuspid, or with spheroidal or compressed crowns; new teeth hollow out the base of the old ones. Pterygoid teeth may be present. Premaxillary bones two, sometimes completely separated; nasal double. Frontal single or double; parietal single; postorbital and postfrontotemporal arches, complete, osseous; interorbital septum and columella present; cranii well-developed; infraorbital fossae present, bounded by the maxillary, the transverse bone the palatine, and often also the pterygoid Skull with bony dermal plates overroofing the supratemporal fossa. Limbs absent or present. Pectoral and pelvic arches constantly present.

Clavicle dilated and usually perforated proximally, interclavicle cruciform. Ossified abdominal ribs are present. Body protected by bony plates underlying the scales which are cycloid hexagonal, rarely rhomboidal, imbricate. These are supplied with symmetrical tubules which usually consist of a transverse one anastomosing with several longitudinal ones. Head covered with symmetrical shields; an azygosoccipital rarely present. Pupil round. Eyelids well-developed. No femoral pores. Cosmopolitan. All Kansas species are oviparous or ovoviviparous.

EUMECES Wiegmann

Eumeces Wiegmann (part) Herp. Mex., 1834; Arch. fur Naturg., 11, 1835, Arch. f. Naturg., 1837; Peters, Mon. Berlin Acad., 1864; Stolickza, J. Asiat. Soc. Bengal, 41, 1872; Bocourt, Miss. Sci. Au., Mexico Rept., 1879, (Boulenger), Cat. Liz. Brit. Mus., 3, 1887.

Mabuya Fitzinger, (part), N. Classif. Rept., 1826.

Euprepis Wagler, (part) Syst. Amph., 1830; Cocteau, Tabl. Synop., 1857.

Plexniodian Dumeril and Bibron, Erp. Gén., 5, 1839; Cope, Proc. Acad. Nat. Sci. Philadelphia, 1861.

Lamprosaurus Hallowell, Proc. Acad. Nat. Sci. Philadelphia, 1852.

Eurylepis Blyth, J. Asiatic Soc. Bengal, 23, 1854.

Mabouia Günther, Proc. Zool. Soc. London, 186(sic); Reptiles of Brit. India, 1864.

Description of Genus

Nostril pierced in the nasal plate. Palatine and pterygoid bones separated on the median line of the palate, the latter with teeth. Supranasal plates present. Limbs pentadactyl. The digits not denticulated laterally. The nostrils are lateral. The postnasals vary; either one or two. The head is covered with ossified plates concealing the muscles and with an external epidermis. The tongue is thick, elongate, chordate, or arrow-shaped, slightly notched anteriorly, and quite homogeneously squamose throughout. The flap covering the anus is margined behind two large plates, with smaller ones on either side.

Cope gives the following keys of the American species of *Eumeces*. He divides them into four groups having common characteristics.

Postnasal and one mental plate I
A postnasal and two mental plates II
No postnasal and two mental plates III
No postnasal and one mental plate IV

Owing to the extreme difficulty in classifying the scinks on color (since in nearly all species the color of the young and an adult is different), the keys are given complete as regards species occurring in the state.

Division I.

No species of this group are found in this state.

Division II.

A large postnasal in full contact with the supranasal. Hind leg applied twice forward, reaching the tip of the snout and contained 2 ⅓ times in the head and body. Fifth toe longer than second. Head depressed. Scales in young: black, 28-32 rows. Five equidistant white lines, the two lateral each on adjacent edges of two rows of scales. A white line behind the thigh. The upper dorsal stripe separated by 4-5 whole rows of scales. With age, the dorsal stripes become indistinct, and the color more olivaceous above. Males with head very broad behind, reddish. The color of the body more or less plain olive ..... *Eumeces quinquelineatus*

Limbs short; hind leg applied twice forward reaches the ear, contained over 2½ times in head and body. Fifth toe shorter than the second. Scales in 28 rows. Young black, with two rows of rounded, whitish-blue dots on each side of head and another on each side of the chin. With increasing age, it becomes more olivaceous. Scales each with a dusky margin; lighter and plain beneath. .....*Eumeces guttilatus*

Limbs short, hind leg applied twice forward reaches to the insertion of the arm anteriorly; applied three times it reaches to the nose. Contained three times in head and body; from knee 4⅓ times; head five times. Fifth toe shorter than the second. Scales in 28 rows, the laterals smaller and in oblique series. Adults light brown olive above; each scale edged laterally, less distinctly behind, with darker under the greenish white. Labials edged laterally with brownish black; (postnasal sometimes wanting) .....*Eumeces obsoletus*

Head short. Adpressed limbs meeting on the side. Hind limbs applied twice forward reach midway from arm to ear; contained three times in head and body; hind leg from knee four times; head 4½ times. Fifth toe shorter than the second. Scales in 26 rows. Internasals equal the prefrontals. Young dark olive, black above, black on sides, blue beneath and on tail. Five very narrow whitish dotted lines, the two lateral on the centers of single rows of scales; the two dorsal lines margined narrowly by almost inappreciable black, and the lines separated by four rows of scales all lighter in the centers, becoming lighter olive with age .....*Eumeces leptogrammus*

Adpressed limbs separated by a space the length of forefeet. Internasal plate smaller than prefrontals; rostral elevated. Scales in 24 rows. Three dark bands on each side of the middle line; no lateral light bands; size medium .....*Eumeces epipleurotis*

Postnasal small, more or less separated from contact with the supranasal by the prefrontal. Head short, conical, contained at least five times in head and body as is the hind leg from knee also. Hind leg short; when applied twice forward, falling behind forelegs. Fifth toe shorter than the second. Vertical and frontal plates often in contact. Distance between centers of insertion of forelegs and hind legs twice that from center of foreleg to snout. Scales in 24 rows. Light olive, paler beneath. A broad median dorsal light band, bordered on each side by five dark and four light stripes; the first and fourth dark stripes broadest; the second light stripe in the middle of the third row scales and bordering the head, but

defining no spots on sides of labials. Sometimes unicolor .....
.....*Eumeces multivirgatus*

Division III

Scales in 28 rows. Four supraorbital plates; loreal not separating the supranasal and prefrontals, which meet and enclose the small internasal. Olive, above with four equidistant and equal dark stripes on adjacent half rows of scales, the two inner sometimes effaced. Sides with narrow white lines, on the centers of single rows embracing a black stripe and margined above and below by black; the black upper margin of one of the dorsal stripes mentioned; the interval of the two upper lateral stripes six rows of scales; lower lateral stripe passing along the upper edge of ear. Beneath light greenish .....
.....*Eumeces septentrionalis*

Division IV

Four supraocular plates. Loreal plate elevated extending up to the rather longitudinal rhomboid internasal. The posterior edge of the loreal plate above the middle of the second labial; mental plate long and pentagonal. Adpressed limbs overlapping. Scales of body in 24 rows. Dark olive green above. Sides with two narrow white stripes, the upper separated by four rows of olive scales; the interspace and narrow margin above coal black or gray. Beneath, greenish livid, the tip of the chin white. Upper labials dusky with white stripe.....
.....*Eumeces anthracinus*

Mental single, four supraorbital plates present and no postnasal. Loreals elevated. Scales in 26 rows. Adpressed limbs overlap.....
.....*Eumeces pluvialis*

Eumeces quinquelineatus (Linnaeus)

Eumeces quinquelineatus (Bocourt). Miss. Sci. Mex., Rept. 1879; Smith, Geol. Surv. Ohio Zool., 4; — (Peters). Monatsc. K. Akad. Berlin, 1864; — (Cope), Croc., Liz., and Snakes of N. Amer., Rept. Nat. Mus., 1898.

Eumeces fasciatus (Cope). Checklist N. Amer. Batr. and Rept., 1875; — (Boulenger), Cat. Liz. Brit. Mus., 3, 1887.

Lacerta quinquelineata (Linnaeus). Syst. Nat. 12th ed. 1, 1786; — (Shaw), Gen. Zool., 3, pt. 1, 1800.

Lacerta tristata (Latreille). Hist. Nat. Rept., 1.
Scincus laticeps (Schneider). Hist. Amph., 2, 1801; — (Daudin). Rept. 4, 1802-1803.
Scincus quinquelineatus (Schneider). Hist. Amph., 1801; — (Latreille), Hist. Rept., 2, 1801; — (Daudin), Rept., 4; — (Merrem), Tent. Syst. Amph., 1821; — (Kuhl), Beitr. Z. Zool.U. Virg. Anat.; — (Harlan), Jour. Acad. Nat. Hist. Phila., 6, 1827; — (Holbrook), N. Amer. Herp., 2, 1842.
Scincus tristatus (Daudin) Rept. 4.
Scincus erythcephalus (sic) (Gilliams), Jour. Acad. Nat. Sci. Phila., 1, 1818; — (Harlan), Jour. Acad. Nat. Sci. Philadelphia, 6, 1827. Phys. Med. Res., — (Holbrook), N. Amer. Herp., 2, 1842.
Scincus americanus (Harlan). Phys. Med. Res.
Scincus bicolor (Harlan), Jour. Acad. Nat. Sci. Phila., 4, 1824. Phys. Med. Res.; — (Cuvier), Regne. Anim., 2nd ed., 2, 1829.
Tiliqua bicolor (Gray). Griffith's Cuvier's Anim. King., 9, 1831.
Tiliqua quinquelineata (Gray). Griffith's Cuvier's Anim. Kingdom, 9, Syn., 1831.
Plestiodon laticeps (Gray). Catr. Liz., 1845; — (Dumeril and Bibron), Erp. Gén., 5, 1839; — (Holbrook), N. Amer. Herp., 2nd ed.
Plestiodon quinquelineatus (Dumeril and Bibron) part. Erp. Gen. 5, 1839; — (Gray), Cat. Liz. Brit. Mus., 1845; — Gravenhorst, N. Ac. Leop. Carol., 23, 1851.
Scincus fasciatus (Holbrook), N. Amer. Herp., 2nd ed.; — DeKay, New York Fauna, 3.
Eumeces laticeps (Peters). Monatsc. K. Akad. Wiss. Berlin, 1864; — Bocourt, Miss. Sci. Mex., Rept., 1879.
Mabuya quinquelineata (Fitzinger). N. Class. Rept. Vienna, 1826.
Euprepis quinquelineata & fasciata (Wagler). Syst. Amph., 1830.
Euprepis de Costesby Cocteau. Tabl. Synopt. Scine, 1837.
Plestiodon quinquelineatus & fasciatus Holbrook. N. Amer. Herp., 2, 1842.

Description of species

Rostral moderate, much wider than high, forming only narrow sutures with the internasal; the frontonasal a little wider than deep, narrowly in contact with the frontal which is much narrower than long; three supraoculars in contact with the frontal; frontoparietals moderate, distinct with the interparietal completely separating the parietals; postnasal present followed by a tall loreal; second loreal very large;

sixth labial entering the eye; three rather enlarged preanals. The hind leg applied twice forward reaches the tip of the snout; fifth hind toe longer than second, scales in 28-32 rows.

Color

Five equidistant white lines, the two lateral each on adjacent edges of two rows of scales; a white line behind the thigh. The upper stripes separated by four or six whole rows of scales; old specimens olive the stripes becoming indistinct, with the head broadened and reddish.

One of the most common skinks in the state, usually found under stones around limestone cliffs.

Eumeces guttulatus (Hallowell)

Eumeces guttulatus Cope. Checklist N. Amer. Rept., 1875. — (Boulenger), Cat. Liz. Brit. Mus., 3, 1887

Lamprosaurus guttulatus (Hallowell). Proc. Acad. Nat. Sci. Phila., 1852; Sitgreaves Exped. Zuni and Colo. Riv. 1853.

Plestiodon guttulatus (Hallowell). Proc. Acad. Nat. Sci. Phila. 1857.

Description of species

Frontal transversely rhomboid, lateral corners truncate and in contrast with the second postnasal, separating the postfrontals from the two internasals. Of the two pairs the latter is about one half the smaller. Behind it a small squarish postnasal, nearly equal to it and resting partly on the second labial; this is succeeded by a second, twice its area and height, higher and half as long as the loreal. Upper labials seven, lower labials eight.

Plates of the head generally similar to those of *E. quinquelineatus*- The frontal small, transversely lozenge-shaped and about equal to the postfrontals. Quite acute laterally, where it touches the posterior postnasal, passing above it the two about the same length, and together about as long as the loreal. The limbs are short, the hinder applied forward reaching halfway to the ear and contained rather more than 2 1/2 times in the body. The foreleg reaches to the angles of the mouth and are longer than the head. The hindleg from the knee is contained 3 1/2 times in head and body and is 1 1/3 times the head to the ear, which is contained 4 1/2 times in head and body. The first toe is rather shorter than the fifth and the free portion of the longest toe is very little more than

half the head to the ear. Scales on sides arranged very obliquely so as to render it impossible to count the encircling series. There are, however, about 28 rows and about 57 scales in a row from the head to the tail.

Length

The average of ten adult specimens in the University collections: Complete length – 92 mm, from head to vent – 40 mm, from vent to end of tail – 53 mm.

Coloration

Adult specimens are from dark greyish to black (in rare cases brownish), the tail blue. The belly is a dull bluish to gray and much lighter than back. Each of the upper and lower labials with a white spot, the last three the largest. A row of white spots from the prefrontal to the back of the eye, one on each intervening plate. Some specimens show light spots on all head plates, with the line on either side extending to the ear. In the young the ground color is dark black and the tail is a brilliant blue

Observations

The writer collected four specimens from under a large flat rock in Riley County. A large specimen of *E. quinquelineatus* was found under this same rock. One of the *E. guttulatus* had been killed and another injured, probably by the larger species.

Three specimens collected in Anderson County in June, 1909, were kept in a small vivarium (a screened box with leaves and rock for hiding). They were fed on flies and crickets, and soon grew rather tame. They were voracious feeders and would feed even when someone was about the vivarium. They were crafty in their approach of a fly which showed any movement. They would crouch, then crawl very slowly to the unsuspecting fly and, with a sudden final jerk of head, would grab it and swallow it after a series of chewing movements. They paid no attention to a dead or motionless fly or bug.

One of the specimens kept was a female heavy with eggs. She was very cross and when either of the males approached her she would fight them. One failed to get away and lost two inches of his bright blue tail in consequence. The female died before her eggs were laid. When placed in a box with *Leiolopisma laterale*, they seemed quite afraid of

the smaller lizard and did not fight but kept as far away as possible from them. A nest of four eggs was found in June in some leaf mold under a thin, flat rock. The eggs were transferred to the vivarium but the embryos, then nearly an inch long, did not develop. The nest indicated that the eggs had been brooded.

The food ordinarily consists of various types of small insects, flies, crickets, and grasshopper nymphs. Crickets were found in the stomachs of five out of ten examined. They are voracious and must consume a countless number of these insects which are injurious to crops and instrumental in carrying disease.

F. A. Hartman says of their habits, "The stomach of a single specimen contained a fly, a spider, two leafhoppers, and a cricket. Two specimens kept in captivity ate flies and grasshoppers with avidity. Five specimens of *Sceloporus undulatus* were placed in the same cage with them. Three of these were young, varying in size from 3/4 to 1 1/2 inches in length. In a few days, no trace was left of the young. A little later, one of the old ones was observed crawling about merely by the use of his front legs, his hind legs apparently useless from injury. A little later, an *E. guttulatus* was found in the act of shaking a *Sceloporus* by the back of the neck. The *Sceloporus* was quite as large as the Scink. On examining his hind legs, they were found to be broken and chewed. This shows how aggressive and warlike these little creatures are."

Habitat

They are usually found on rocky hillsides on or about rock fences and walls, and are never seen feeding save in a bright sunlight.

Distribution

Cope reports the species from Texas, Oklahoma, Arkansas, and west to the Pacific (as far north as San Francisco). The species seems quite common in Kansas as the writer has collected more than thirty specimens. It is not reported from Missouri by Mr. Hurter, nor is there any record of its having been taken in Nebraska. Kansas is probably its northern limit. Localities in Kansas: Dickinson, Labette, Cowley, Sumner, Anderson, Franklin, Douglas, Shawnee, Riley, Russell [Counties].

Eumeces obsoletus Baird and Girard

Eumeces obsoletus Cope, E. D. Nat'l. Mus. Rep. (1898) 646; F. W.

Cragin, Trans. Kas. Acad. Sc. (1879-80), 7, 118; Strecker, Baylor Uni. Bull. ( ), 18, No. 4, 26; Bailey, N. Ann. Fauna (1906) No. 25, 45; W. Stone, Proc. Acad. Natl. Sci. Phil. (Mar. 1911); Checklist N. A. Papt. (1875), 45; Bocourt, Miss. Sci. Mex. Rept., (1877): 443, pls. XXIIa, fig. 4, XXIId, fig. 4; Cope, Bull. U. S. Nat. Mus. (1880): No. 17, 39; Boulenger, Cat. Liz. Brit. Mus. (1887), 3, 374.

Plestiodon obsoletum Baird and Girard, Proc. Acad. Nat. Sci. Hil. (1852), 129; Hallowell, Sitgreave's Exp. Zuni and Col. Riv. (1853), pl. 3; Baird, U. S. Mex. Bound. Survey Rept. (1859), pl. 25, figs. -16

Description of species

Postnasal in full contact with supranasal. When present, fifth hind toe shorter than second; the prefrontals are in contact in front of frontal. The frontal is elongate more than twice as wide as long, truncate behind: there are three supraoculars in contact with it; the frontoparietals are comparatively smaller, smaller than interparietal which is close gate (sic), completely separating the parietals.

Color

Pale ashy brown above with bluish on the side, each scale having a darker border; the young are jet black, except the tail which is a brilliant blue, with white spots on the labials; sometimes faint lines are discernible on the dorsal surface. The young of this species is quite similar to the adult of *E. guttulatus*, so much so that one is frequently in doubt. It is the largest scink, attaining a length of 18 mm (sic).

Eumeces leptogrammus (Baird)

Eumeces leptogrammus (Cope), Checklist n. Amer. Batr. and Rept., 1875, pg. 45; — (Boulenger), Cat. Liz. Brit. Mus., III, 1887, pg. 378.

Plestiodon leptogrammus (Baird), Proc. Acad. Nat. Sci. Phila., 1858. pg. 256.

Description of species

Head short, rather broad with the profile sloping or convex. Plates much as in *quinquelineatus*.. Seven upper labials. Limbs short and weak. Hind leg laid forward twice reaches midway between the arm and

ear. Tail 1 ¼ times the head and body; cylindrical. Usually 24 scale rows around the body and about 58 from head to tail. The fifth toe shorter than second; free portion ⅗ the length of head to ear.

Color

Generally black, or dark olivaceous above, with five very narrow and inconspicuous greenish-white dotted lines. One mediodorsal and two lateral on each side. Beneath tail and body dark blue. Hind legs a uniform black.

Habitat

This species has been found in Kearney and Woodson Counties. No specimens are in the collections at the University of Kansas.

Eumeces epipleurotis Cope

Eumeces epipleurotis Cope, Bull. U. S. Nat. Mus., No. 17, 1870, pg. 40.

Description of species

Head much as in the *quinquelineatus* form. The prefrontals are broadly in contact in front of the frontal; the frontonasal narrow; snout rather obtuse. A small postnasal in front of the lower part of the anterior loreal, which is contact with the frontonasal; five supraoculars. A large temporal bordering the parietals, which are wholly separated by the interparietal. Scales in 24 rows. The mental followed by a very narrow postmental several times as large. First pair of chinshields in contact only. The limbs are short, not touching when adpressed.

Coloration

The median dorsal pale stripe covers only the adjacent halves of the two median rows of scales. A black band bordering it occupies the remaining row. A black line passes along the adjacent edge of the next row, whose middle is white. The external edge of the same row is involved in the superior edge of a white band which covers two rows and two half rows of scales. Thus there are three dark bands on each side of the of middle line, the inferior widest. The color of the abdomen extends to the lower dark band. Size small. Not common. Only one specimen taken.

(Note)

Mr. Housholder has found this species in Labette County. He states that the single specimen was sent to Dr. Leonhard Stejneger, who confirmed his classification, thus making a first undoubted record of this species in the state and increasing greatly the known range of the form.

Eumeces multivirgatus Hallowell

Eumeces multivirgatus Cope, Checklist N. Amer. Batr. and Rept. (1875), 45.

Eumeces inornatus Cope, Checklist N. Amer. Batr. and Rept. (1875), 145.

Plestiodon multivirgatus Hallowell, Proc. Acad. Nat. Sci. Phila. (1857), 251.

Plestiodon inornatus Baird, Proc. Acad. Nat. Sci. Phila. (1858), 255.

Description of species

Rostral appearing from above, in contact with the two internasals by narrow sutures; frontonasal smaller than in *E. quinquelineatus*; frontal strongly concave laterally touching the frontonasal; three supraoculars in contact with it; two postnasals usually of equal size; 24-26 rows of scales around the body; body cylindrical, slender; legs far apart; head short, convex above; ear very small, circular; hind leg applied forward twice falls behind the foreleg and three times reaches the angle of the mouth and is contained 3⅓ times in head and body. Tail 1½ times the head and body; fifth hind toe shorter than second.

Eumeces septentrionalis Baird

Eumeces septentrionalis (Cope), Checklist N. Amer. Rept. and Batr. 1875.

Plestiodon quinquelineatus (Baird), Proc. Acad. Nat. Sci. Phila. 1858. Rept. U. S. Expl. Surv. Pc. R. R. pg. 4, 1859.

Description of species

Body and neck cylindrical, stout; head small, conical, and depressed. Interfrontonasal plate small, rhomboidal, embraced between the supranasals and prefrontals, which are broadly in contact. A single postnasal (about equal to the nasal) equal in height and half the length

of the loreal. Seven upper labials; two mentals; limbs short, the hinder reaching forward less than half way to the forelegs and contained 3½-4 times in head and body. Head to ear contained between five and six times in head and body. Fifth hind toe a little shorter than second; the free portion of the longest toe equals half the side of the head. There are 28 rows of scales around the body, the lateral parallel with the dorsal, with approximately 59 scales from head to tail. Tail 1¼ times body in length.

Coloration

The general color above light olive green with two lateral white stripes enclosing a black one, the upper on each side along the center of one row of scales and separated by six dorsal rows. Four equal and equidistant black dorsal stripes between the white ones, each on two adjacent half rows of scales, the exterior margining the white lines; the inner obsolete in old specimens. Beneath greenish white, more yellowish under the chin, lower white line passing above the ear. Upper labial white. A faint whitish line below the thigh, margined above and below with dusky olive.

This species differs from *E. quinquelineatus* in that one has a postnasal, the other none (sic). The upper lateral stripe is on the middle of one row, not on adjacent edges of two; the lateral stripes are closer together, the lower passing above the ear instead of through it.

Distribution

Minnesota, Nebraska, and Kansas. Has been taken close to Canada.

There are no specimens in the state university and only a single specimen in the National Museum from Kansas. It has been reported from the southeastern corner of the state.

Eumeces anthracinus (Baird)

Eumeces anthracinus (Cope), Checklist N. Amer. Batr. and Rept. 1895. Croc. Liz. and Snakes. Rept. Natl. Mus. 1898; — (Boulenger), Cat. Liz. Brit. Mus., 2, 1887.
Plestiodon anthracinus (Baird) (sic)

Description of species

Body and head depressed, quadrangular, in sections rather slender; tail cylindrical, alternated 1½ times the head and body. Supranasals,

internasals, and prefrontals rhomboid, the former smaller and more transverse than the rest. One prefrenal equal to the supranasal, half as long as, and higher than the pentagonal loreal, extending upward to contact with the internasal. Upper labials six or seven. One large transverse pentagonal mental plate. Scales on the body in 24 rows, quite parallel on the sides. Forty seven scales from head to tail.

Coloration

This species is darker olive-greenish with two well-defined white lines on each side; their interval and border above and below grayish black. Upper lateral stripe generally on the middle, sometimes a little below, of the third row of scales from the back; the lower on the adjacent edges of the sixth and seventh. This passes anteriorly through the ear, along the upper labials. The portion of the third row of scales on the back anterior to the white stripe is black, leaving four dorsal rows perfectly dark olive-green, without any trace of a median line. Under parts light greenish, paler beneath the head; the tail is bluish black. Legs black above the under parts without trace of stripes. Very young specimens are lustrous black on the sides and exterior surface of their hind legs; the belly is greenish-blue; the tail is bluish beneath. With age the sides become gray, the under parts are lighter greenish.

Distribution

This is a widely scattered species occurring from Pennsylvania to Texas. Has been taken in Missouri. Reported from several localities by Julius Hurter, Sr. No specimens have been reported as yet from Kansas.

Eumeces pluvialis Cope

Eumeces pluvialis (Cope), Bul. U. S. Nat. Mus. No. 17, 1880; (Boulenger), Cat. Liz. Brit. Mus. vol. 3, 1887; — (Cope), Rept. Natl. Mus. 1898.

Eumeces anthracinus Baird var Cope, Proc. Amer. Phil. Soc. 1887.

Description of species

There are four supraorbital plates present and no postnasal. The loreals are rather elevated, the prenasal reaching the transverse interfrontonasal. The two preoculars are wedged between the fourth and fifth superior labials, of which the fifth is elongate and beneath the orbit.

The scales are in 26 rows and the limbs are well-developed. When laid along the side, they overlap, the foreclaws reaching the end of the second toe. The mental is single. Length 119 mm. Tail 82 mm.

Coloration

The color is olive-black to black below, bluish green to blue (sic). Two narrow greenish-white lateral bands are separated from each other by a black band 2 ½ scales wide, the upper ones separated by the width of six scales. There is a faint trace in the typical specimen of a pale vertebral line with a somewhat darker border on either side, and there is also a blacker border above and below the upper and lower lateral lines. These lines extend to the orbit and ear respectively. The superior labials are greenish, and darker bordered. The other head plates are blackish brown.

Observations

This is one of the rarest types of the scinks, and its occurrence in the state is surprising. The only specimen in our collections is one collected by Mr. John Sterling in Dickinson County. The only other reported specimen is from Alabama, collected by Dr. Joseph Carson near Mobile. This specimen agrees with the original type in every detail save in the matter of color. There is a tendency in our specimen to be darker, the blackish rather than the greenish predominating. The other differences are not determinable.

The taking of this specimen in this state has extended the known range of the species greatly. The specimen is the personal property of the writer, and is deposited in the University collection, having been presented by Mr. Sterling, its discoverer .

Leiolopisma (Dumeril and Bibron)

Leiolopisma (Dumeril and Bibron), Erp. Gén. V. 1839. (Gray), Cat. Liz. Brit. Mus. 1845.

Description of genus

Nostril pierced in the nasal plate. Palatine bones in contact on the medial line of the palate. Tympanum not covered with integument.

Pterygoid bones in contact on the middle line. Eyelids movable; digits with non-retractile claws. Supranasal plates wanting. Lower eyelid with a transparent disk; two frontoparietal plates; digits 5-5.

Body fusiform, cylindrical. Head short, pyramidal; limbs well-developed; scales smooth. This genus differs from the other genus of the Scincidae in the absence of internasals, the frontal as well as the nasals in broad contact with the rostral. The palate has a triangular notch running to a point instead of being more linear and hollowed anteriorly. There are no pterygoid teeth. The tongue appears flatter and more extensible at the tip.

Leiolopisma laterale (Say)

Leiolopisma laterale (Dumeril and Bibron), Erp. Gén., V. 1839; (Holbrook), N. Amer. Herp., 2nd ed., II, 1842; (Boulenger), Cat. Liz. Brit. Mus., 1885 III

Scincus lateralis (Say), Long's Expd. Rocky Mts., II 1823; — (Harlan), Journ. Acad. Nat. Sci. Phila. V. 1825; — (Holbrook), N. Amer. Herp., 1836 I.

Scincus unicolor (Harlan), Journ. Acad. Nat. Sci. Phila. V.1825.

Oligosoma gemmingeri (Cope), Proc. Acad. Nat. Sci. Phila. 1864.

Oligosoma laterale (Cope) Checklist N. Amer. Rept. (sic)

Lygosoma lateralis (Bocourt), Wis. Sci. Mex. Rept. 1881.

Mocoa lateralis (Gray), Cat. Rept. Brit. Mus. 1845; — (Günther) Biol. Centr. Amer., Rept., (sic)

Lygosoma gemmingeri (Bocourt), Miss. Sci. Mex., Rept. (sic)

Description of species

Body slender, quadrangular; vent rounded, attenuated $1^1/_2$ times the body; frontal in contact behind with the verticle (sic), before with the rostral; prefrontal small; lateral. Nasal above the first labial, in contact with the postfrontal. Seven upper labials. Ears large, vertical. Lower eyelid transparent in center; without scales.

Scales very thin and membranous; generally 28 around the body. The hindleg applied twice forward reaches halfway between the arm and ear; contained three times in the head and body. Fifth hind toe shorter than second. Free portion of longest toe half the head. Tail cylindrical, pointed with transversely widened plates underneath.

Length

Whole length 124 mm. Head to vent 47 mm. From vent to end of tail 76 mm.

Coloration

The upper part of the body is a uniform reddish-olive to brown. Two dark stripes on either side run from the tip of the snout through the eye and above the ear to tail, sometimes continuing to the tip of the tail. These stripes are of a dark brown color and are bordered by a lighter color above and below. The belly is yellowish to drab, with faint lines along adjacent edges of the scales. Most of the specimens show two faint rows of black dots running from the back of the head to the tail. The young show the markings quite the same and very distinct.

Observations

This diminutive lizard is a rather timid creature. It feeds usually in sunlight and does not come out after sundown. It is very inquisitive and the author has observed two which would come out from a pile of leaves whenever the leaves were rattled slightly. When a movement was made towards them, they would hide only to reappear soon. One was observed making a large meal from flies swarming about the base of a tree that was leaking sap. Several specimens were kept during the summer and winter of 1910. They grew quite tame and would crawl lazily over ones hands and take flies from ones fingers with scarcely any hesitancy. When one attempted to replace them in their box, they would scurry away and attempt to hide. A female deposited three diminutive eggs, 6 mm in length, 3 mm in width, in the corner of the box. A small hole was dug and the eggs deposited. Then some earth and bits of leaves were thrown around them. They were not bothered again by the female. Whether this is proof that the eggs are not brooded, as in some species of scinks, is a question. The author has never found the eggs of wild specimens.

Specimens kept in captivity ate ants and flies, with a preference for the latter. One specimen has eaten as many as 20 flies at a single meal. The attitude of the female toward the males was interesting; the female, heavy with eggs, would not allow the males to approach. She would crouch down and hold the head quite close to the ground and blow out her breath forcibly.

Habitat

The author has found this species usually under logs and rocks in heavy woods. It appears to prefer shade to the open.

Distribution

Stejneger reports it from China in Asia. In North America, it occurs from the Atlantic to the Rocky Mountains and as far north as Nebraska, Illinois, and Indiana.

It Kansas, it has been reported from Riley, Bourbon, Anderson, Franklin, Douglas, and Labette Counties.

TEIIDAE

Description of family

The tongue is flat, more or less elongate, ending in two long smooth points, the greater part of the surface covered with rhomboidal imbricate scale-like papillae; in a few genera the tongue is particularly long and narrow at the base, which is retractile into a sheath (sic). In others it is bicuspid posteriorly; head pyramidal, with large, regularly disposed plates above, one pair supranasal plates. Nostrils opening in the midst of a plate or between two plates. Scales of the back granulate or carinate. Scales of the abdomen are large. The premaxillary teeth are conical. Pterygoid teeth but seldom present, and if present feebly developed. Limbs or rudiments are always present. Premaxillary single. Nasals double, frontal and parietal single.

Cnemidophorus (Wagler)

Cnemidophorus (Wagler) part. Syst. Amp., 1830; (Wiegman) Herp. Mex., 1834 - (Dumeril and Bibron) Erp. Gén. 5, 1839-(Gray), Cat. Liz. Brit. Mus., 1845-(Bocourt) Miss. Sci. Mex. Rept., 1874-(Boulenger) Cat. Liz., 2, 1885.

Description of genus

Scaly portion of tongue cordate behind and not retractile. Tail rounded. Teeth longitudinally compressed. Head shields large and rectangular; ventrals large; parietals and frontoparietals distinct; superciliaries segmental. A collar fold. Femoral pores present, in the center of a rosette of scales. Tongue with no sheath, free behind.

Cnemidophorus sexlineatus (Linnaeus)

Cnemidophorus sexlineatus (Gray). Cat. Liz. Brit. Mus. 1845—(Dumeril and Bibron). Erp. Gén., 5, 1839.—(Dumeril). Cat. Meth. Rept., 1851—(Cope), Checklist N. Amer. Batr. Rept., 1875; Trans. Amer. Phil. Soc. 1892—(Bocourt). Miss. Sci. Mex. Rept., 1874—Boulenger Cat. Liz. Brit. Mus., 2, 1885.

Lacerta sexlineatus (Linnaeus) Syst. Nat., 12th ed. 1, 1766—(Gmelin) Syst. Nat. 1788—(Latreille). Hist. Nat. Rept., 1, 1801. (Daudin) Hist. Rept. 3, 1803. (Harlan) Jour. Acad. Sci. Phila., 1727.

Ameiva sexlineatus (Holbrook), N. Amer. Herp., 1st ed., 1, 1838.

Cnemidophorus sexlineatus (Dumeril and Bibron) Erp. Gén., 5, 1839 — Aug. Dumeril, Cat. Rept., 1, 1851.

Scales of collar large, in few rows, the largest forming the lower. Scales of the upper surfaces minute, not larger than .33 mm in diameter. Four supraorbital plates, the posterior small. Frontoparietals larger than parietals, with transverse anterior border. Interparietals longer than wide. Loreal as high as, or higher than, long in consequence of the rather short muzzle. Superior labials five to below orbit, the last acuminate posteriorly, larger gular scales beginning rather abruptly in a line which extends entirely across the throat. Brachial scales in five or six longitudinal rows, very rarely in seven; antebranchials in three rows. Large antebranchials absent. Femorals in six rows, less frequently in seven; tibials in three rows. Femoral pores 15-17. Principal anal scuta three, two marginal, the third anterior (sic). The longest toe of the extended leg reaches the auditory meatus.

Head somewhat compressed and pointed. The ear opening is vertical and oblong. Two neck folds. Limbs well developed with their upper surface covered with large scales. Tail covered with whorls of large carinated scales; smooth beneath. Eyes small.

Length

Average of three large adult specimens; 232 mm; from head to vent 84 mm, vent to end of tail 150 mm. Specimens from the western part of the state are larger on the average.

Coloration

The ground color above is greenish brown to purple. The head is

a light brown, and a purplish brown stripe extends along the median dorsal scales from the head to the tail; on either side are three bright yellow lines with a darker line enclosed. The second line is the longest and extends from the eye to the sides of the tail. The throat is silver white, and the abdomen is bluish white. The tail similar to the back, but very rough. The under surface is whitish. Some of the stripes of the back extend to the tail.

Observations

This species is probably the most active of all our lizards. The speed with which they go over the ground is truly amazing. In countries (sic) where there are no rocks for hiding they dig temporary holes probably for shelter at night. These seem to be used continually. The writer has chased these wily creatures, recently, over cultivated fields for several rods only to have them disappear in one of these holes. These burrows are about a foot deep and are not large enough for the lizard to reverse its position. The eggs are laid in the open and are covered with sand or dirt.

In the chalk country of Trego and Gove Counties these lizards are very common but only a small number were obtained, due to their great agility. Their food consists chiefly of grasshoppers, but other species of insects are eaten.

The writer observed a large male specimen chase a grasshopper (*Melanoplus differentialis*) for a number of feet, only to have it jump and fly some distance. This was repeated three times. The "hopper" was finally captured by the lizard's climbing near the top of a weed (nearly three feet high), and jumping out to one of the branches and falling to the ground with the struggling insect. Another specimen was seen to jump for a grasshopper nymph which flew about a foot from the ground; the lizard failed to catch it. Ditmars states that they frequently eat the eggs of birds which they find on the ground. They break the eggs with their strong jaws and lap up the contents with their long, flat, forked tongue. The tail is very brittle. Their very appropriate common name is the "Race Runners".

Habitat

These seem to have no definite or distinctive habitat. The writer has found them on rocky hillsides, open corn fields and meadows, low sandy river banks and about chalk cliffs.

Distribution

They have a very wide distribution. Found from the Atlantic to the Pacific. Occurs as far north as Illinois., Nebraska, Colorado, Arizona, and California.

The distribution in the state is not uniform, in five years collecting the writer has failed to find this species in Anderson, Douglas, or Franklin Counties. Yet in the counties of the southeastern part of the state also the central and western parts, it is very common. Mr. Hurter says it is rather common in Missouri. Has been reported from the following counties in the state. Trego, Gove, Graham, Rooks, Cherokee, Miami, and Labette.

Cnemidophorus tessellatus tessellatus Say

Cnemidophorus tessellatus (Baird) U. S. Pac. R. R. Sur. 10, 1859. Gunnison's report (sic). — Cope. Checklist Batr. Rept. N. A. 1875. Trans. Amer. Phil. Soc., 1892.
Ameiva tessellata (Say), Long's Exped. Rocky Mts. 2, 1892.

Description of species

Scales of the back and sides generally coarse, 5 mm in diameter. Scales of the collar not larger than those of the throat, the edge of the collar with smaller often granular scales. Four supraorbital scales, the scales posterior smaller than the others. These are separate from both the superciliaries, and the frontal and frontoparietal by granular scales whose extension anteriorly differs in different individuals. Frontoparietal longer than broad, longer than each parietal. The latter undivided. A transverse series of small plates bound the parietals and interparietals posteriorly. Frenal plate longer than postnasal. One row of scuta above and below orbit, separating the latter from the superior labials. Superior labials five to below middle of the orbit, the fifth acuminate posteriorly. Infralabials five.

Brachial scales in four to eight longitudinal rows counted at the middle continuous with antebrachials, which are in three rows, and tibial plates in three longitudinal rows. Femoral pores varying from 19-21 in number.

Length

Varies from 260 mm to 350 mm in length.

Coloration

Color varies from olivaceous black to greenish brown, which is marked by light yellow or orange longitudinal stripes of spots on the darker ground (sic) or reversed by black spots on a dark ground (sic). Belly to near black or spotted.

Key to subspecies

1. Brachial scales 4-5 rows; femorals 6-7 rows. Blackish olive above, with a median dorsal paler stripe and three similar stripes on each side; belly and throat unspotted ..... *C. t. perplexus*

The pale stripes one each side only the interspaces pale spotted (sic), and frequently broken up into black or olive spots, so as to destroy their integrity; generally sparsely spotted with black below .... *C. t. melanostethus*

No stripes, but 12-14 longitudinal series of pale spots on an olivaceous ground (sic), more or less confluent; hind legs with numerous pale spots; throat, collar, and more or less of the throat black..... ..... *C. t. melanostethus*

II. Brachial scales in 5-6 rows; femorals 8-9 rows. No stripes; ground color olive brown, with three rows of more or less obsolete (sic) black spots on the back and vertical black bars on the sides; abdominal plates pale, black edged; hands, and inferior faces of hind legs and tail red; larger ..... *C. t. rubidus*

III. Brachial scales 7-8 rows; femorals in 8-9 rows. Four light stripes above, interrupted and connected with light spots and lines in the black interspaces; sides, throat and inferior surfaces variegated black and white, medium ..... *C. t. multiscutatis*

This species has been included in this list on the authority of F. W. Cragin. He says of the species — "The occurrence of this species in Kansas was hardly expected; but a specimen of the typical variety has been sent me from McPherson County, by Dr. John Rundstrom". No specimens have been found in the state other than this.

Cnemidophorus gularis (Baird & Girard)

Cnemidophorus gularis (Baird & Girard). Proc. Acad. Nat. Sci. Phila. 1852. — (Baird) U. S. Mex. Bound. Sur., Reptiles — (Cope). Trans. Amer. Phil. Soc. 1892 — Croco. Liz. and Snakes. Rept.

Nat'l. Mus. 1898.
Cnemidophorus guttatis (Hallowell). Proc. Acad. Nat. Sci. Phila. 1854.

Description of species

This species is closely allied to the *C. sexlineatus* but differs by the greater number of femoral pores, and the longer muzzle. It is very variable in form and color. There are postantebrachial plates present, the broader stripe (sic) and larger size of the scales (sic). The frontonasal plates are smaller comparatively in *gularis*. There are a number of subspecies each well defined in its geographical distribution.

Cnemidophorus gularis gularis Baird & Girard

Cnemidophorus gularis (sic) (Baird & Girard). Proc. Acad. Nat. Sci. Phila., vol. 6, 1852: Marcy's Expl. Red River, 1854 — (Hallowell), Proc. Acad. Nat. Sci. Phila. vol. 8, 1856 — (Baird). U. S. and Mex. Bound. Sur. Rept. 1859.

Description of species (sic)

The muzzle is very elongate, with the postnasals longer than in *sexlineatus*. Frenal plates present. There are one or two rows of large scutes on the posterior face of the forearm. Femoral pores from 18-22, average 20. The longest toe of hind leg reaches forward to the auditory meatus. Frenoocular plate sometimes present.

Coloration

There are six longitudinal stripes. There is a series of light spots between the longitudinal stripes, which are not confluent with the white stripes, and consequently does not break up the dark background into black spots. Most specimens have light spots on the sides below the inferior stripe. Usually larger than *C. sexlineatus*. This species is probably rare in the state. There are six specimens in the National Academy of Science at Philadelphia, from Kansas, which were taken in the southwestern part of the state. As this part of the state has as yet not been covered by the survey (sic), it is probable that later search will bring to light a goodly number of this species.

Widely distributed in Southwestern United States. Texas, New Mexico, and Arizona.

ANGUIDAE

The limbs may be more or less developed, or entirely absent, externally. The rudiments of the pelvic arches however, are always present. The clavicle is slender, and the inner clavicle, in limbed species, cruciform. Abdominal ribs present. Body serpentine. Two grooves on either side of the body. Teeth inside of jaws and pointing inward. Tongue bifid, the posterior part covered with vitiform papilli.

Genus *Ophisaurus* (Daudin)

Ophisaurus (Daudin) Hist. Rept; VII. (Fitzinger) U. Classif. Rept. 1826 — (Wagler) Syst. Amph., 1880 — (Wiegmann) Herp. Mex. 1834 — (Dumeril et Bibron) V. 1839. (Gray) Cat. Liz. 1845 — (Boulenger) Cat. Liz. Brit. Mus. 1885. *Hyalinus* (Merrem) Teut. Amph. 1820. (sic)

Description of genus

Body serpentiform, without external traces of limbs. A deep lateral groove from head to anus. Scales hard and bony in transverse series. An external ear and scaly eyelids. Nostril lateral and in a single plate. Tongue arrow shaped, notched and flat anteriorly, where it is free for about half its length. Two longitudinal series of teeth on the roof of the mouth borne on the pterygoids and palatines. Several supranasals. Sternal bones represented by cartilages.

Ophisaurus ventralis (Linnaeus)

Ophisaurus ventralis (Daudin) Hist. Rept. VII
Anguis ventralis (Linnaeus) Syst. Nat. 1766
Camaesaura ventralis (Schneider) Hist. Amp. 1804
Hyalinus ventralis (Merrem) Tent. Syst. Amp. 1820
Anguis fragilis (Gmelin) Syst. Nat. 1798
Ophisaurus punctulatus (Cuvier) Regne. Anim. 1829
Ophisaurus stratulatus (Cuvier) Regne. Anim. 1829
Ophisaurus lineatus (Gray) Ann. Mag. 1838
Ophisaurus ventralis (Hallowell) Proc. Nat. Acad. Sci. Phila. VIII 1856

Description of species

A large and broad frontal plate. Behind this is a pentagonal interparietal, bordered by an elongate parietal plate on each side. The

interfrontonasal is half as long as the frontal. There are two frontoparietals which are in contact with the fourth supraocular plate. There are two series of plates, supraorbitals and superciliaries along the edge of the head above the eye. Head continuous with the body, compressed and pointed. Eyelids quite distinct, the lower well covered with scales. Seven supranasals; nasal plate small and perforate (sic) by the nostril. Rostral wider than high; 11 supralabials, ninth and tenth the largest. Marginal series of infralabials elongate and narrow. Ears a short longitudinal slit varying in size, in line between mouth and lateral groove. Lateral fold extending from behind ear to anus. Palatine teeth present. The pterygoid teeth in three to five longitudinal series. Teeth conical. Scales bluntly carinated on dorsal side. Tail nearly twice as long as body, brittle. Seven or eight preanal scales, a little larger than the abdominal scales. The space between the nostril and eye occupied by two rows of five plates, with two other rows in a line above these posteriorly; labials bordering on orbit or separated by one or more rows of small scales.

Coloration

Dorsal ground color grayish drab to olive brown. Belly yellowish white. A mediodorsal stripe of dark brown extends from the center of the frontal to the end of the tail. On either side a large brown line enclosing three thin white lines. A white stripe above the groove. Below the groove there are two dotted brown lines. Many variations in these stripes. Young specimens show three dotted lines below groove. Some adults only one. The white stripe above the groove is frequently mottled. Sides of the head and neck are various mottled (sic) with brown spots or blotches. Each labial has one or more brown spots. Head plates sometimes with scattered spots.

Length

Two large adults measured 700 mm and 715 mm. From head to vent 243 and 251 (sic) respectively; from vent to end of tail 456 and 462 (sic) respectively.

Observations

This little snake like lizard is a very interesting creature and a great feeder. The stomach of one taken in August under a wheat shock contained more than twenty bugs — mostly small coleoptera and grasshoppers. One kept in a screened box for a time thrived well on

grasshoppers, and in time he grew rather tame and did not struggle when held. He would take grasshoppers from one's hand.

One specimen was found late in November about the roots of a hedge tree, a foot and a half under ground. It was coiled and was motionless. The specimen when brought out in the sun showed some signs of life. It was not preserved. The species seems common over most of the state. Probably very rare in the extreme west and southwest.

Habitat

This snake like creature is [a] burrowing form and is not met frequently on the surface. Frequently found under shocks of grain, and in ground that is being plowed.

Distribution

Found commonly throughout south and eastern United States as far west as Texas and as far north as Ind. and Iowa.

Localities in state

Douglas, Allen, Rooks, Osborne, Cherokee Counties

IGUANIDAE

Description of family

Dentition pleurodont. Teeth are attached to the inner face of the jaws. The tongue is thick and villose, entirely fixed to the floor of the mouth, or slightly free anteriorly, and feebly nicked, frequently not. Pupil round and eyelids well developed. Tympanum usually distinct. Femoral pores usually present. Scaling of the head extremely varied and gular appendages and crests and cranial ornamentation frequently present. Upper head scales usually small. Premaxillary not cut off (sic) from maxilla-palatines by maxillaries. Vertebrae procoelus. Premaxillary single. Mesosternum anchor shaped. Axyshisternal (sic) fontanol (sic) present. Abdominal ribs seldom present.

Crotaphytus (Holbrook)

Crotaphytus (Holbrook), N. Amer. Herp., 2, 1842 — (Baird and Girard), in Stansb. Expl. Gr. Salt Lake, 1852 — (Bocourt), Miss.

Sc. Mex. Rept., 1874 — (Boulenger), Cat. Liz. Brit. Mus. 2nd Ed., 2, 1885.

Leiosaurus (A. Dumeril), part, Arch. Mus., 8, 1856.

Description of genus

Throat and sides of neck wrinkled; a gular fold; femoral pores present. Scales above, small tuberculate and paved; beneath larger, imbricate and hexagonal. Tail much longer than body, rounded. Head scaled above. Occipitals small; suborbitals of small plates. Ear distinct. Nostril rather lateral, anterior to end of canthus rostralis. Tongue arrow shaped, slightly notched at tip; where it is free as at the sides, the tip beneath with two discs. Palatine teeth. Cheek teeth compressed, with three-lobed crown behind; conical anteriorly; the bases in a shallow groove. The ear openings large. Males with enlarged postanal plates.

Crotaphytus collaris (Say)

Crotaphytus collaris (Holbrook), N. Amer. Herp., 2, 1842. (Baird and Girard) in Marcy's Red Riv. 1843 — (Hallowell), Proc. Acad. Nat. Sci. Phila., 8, Oct. 1856 — (Wied). Nov. Act. Ac. Leop. Car. 32, 1865 — (Baird), Rept. U. S. Expl. Sur., 13, Pt. 3. 1857; U. S. and Mex. Bound. Surv., 1859 — (Cope) Proc. Acad. Nat. Sci. Phila. 1866 — (Bocourt), Miss. Sc. Mex., Rept., 1874 — (Boulenger), Cat. Liz. Brit. Mus., 2nd ed. 2, 1885.

Argana (sic) collaris (Say) Long's Exped. Rocky Mts., 2, 1823. (Harlan) Med. Phys. Res. 1835.

Leiosaurus (A. Dumeril), Arch. Mus., 8, 1856.

Description of species

Head very broad, its width fully equal to the distance from snout to ear. Supraorbital plates smaller than those on the middle and front of the head. Of these there are two rows between the middle orbits, and about seven between their anterior extremities; about six between nostrils. Infraorbital plates nearly equal, in a chain of eight. Scales on the anterior border of ear subacutely tubercular. Scales of the gular fold as large as those between the forelegs. Scales on the belly subhexagonal and imbricated; on the back smaller, rounded, tubercular and not larger along the median line. Femoral pores about 22. Scales on the under surface of hands and feet larger, conspicuously carinated and mucronate; on the hinder part of the tail moderately so. Elsewhere the scales

are smooth. Labials small. Limbs long. Hind limbs reach to the eye or to the tip of the snout. Tail not brittle.

Coloration

The upper parts of a variable shade of dark green or bluish; the thighs, back, and sides marked pretty regularly and closely with rounded or oblong light spots, which on the lower part of back and tail above exhibit a tendency to transverse light bands. The upper part and sides of head, the tibia, and tail marked with similar dark spots. Two half rings of black, extending across the back between the insertion of the forelegs, each bordered with yellowish. Under parts yellow-white tinged in some specimens with greenish especially between the forelegs; the chin and throat green or blue, and quite reticulated with yellow. The double half collars are constant; sometimes the anterior is interrupted above and the brachials extend forward (sic). Both begin on the shoulders and seldom if ever connect below.

The coloration is exceedingly variable. In life the light spots, especially in young specimens, are of various shades of red orange, yellow, or white. The females are of a more reddish brown color and never as brilliantly colored as the males, and seldom as large. Both exhibit the tendency to change color, (as in *Anolis*), when excited, or at different times of the day. It (sic) does not seem to do this for protection. Males are much more brilliantly colored during the breeding season.

Length

Measurements of large specimens (male) from Anderson County. Total length 302 mm; length from snout to vent 102 mm; from vent to end of tail 198 mm.

Certain specimens from the southwestern part of the state exhibit a certain variation in the scutellation of the head, having two, instead of one, row of interorbital plates. The heads appear larger in these specimens. The writer does not deem it advisable to separate these forms as a specimen from Anderson (sic) seems to be more or less intermediary having a normal head scales but the two rows (sic). The number of undivided interorbital scutes in the normal form varies between one and four.

Observations

This species is a very good one for observation. On a sunny

morning they may be seen on rocks along roadsides sunning themselves, or chasing a grasshopper, often refusing to be frightened by the passersby. They are one of the commonest lizards in the central and eastern parts of the state.

The writer has collected many of them, finding them chiefly under rocks. When caught they bite quite ferociously, and hold one with the tenacity of a bulldog. Frequently old males will not run but will attempt to fight. When a boy, the writer was badly frightened by having a large male run towards him and jumping on him, run up his clothes to his shoulder. Three specimens have allowed themselves to be taken, refusing to move, but standing quiet with their mouths wide open. They run very swiftly with their tails over their back; often they run on their hind legs alone.

The writer has endeavored to keep these lizards in captivity in the vivarium but they are not good objects for study, as they refuse to become accustomed to their surroundings. They refused all food offered them, and soon became poor (sic) and colorless. They would not try to hide under rocks but continually tried to escape, jumping against the screen of their cage. One finally died of starvation in the midst of much food. Others when forced to eat would eject the food as soon as it was swallowed. They would fight each other.

This species lays from five to seven eggs. They are deposited at the end of shallow tunnels immediately below a large flat rock, and are cared for no more by the female. The passageway near the eggs is then stopped up by the female with closely packed earth, and the young, when they hatch, must dig out through this. Eggs were found on July 20 freshly laid. Eggs found on August 15th contained embryos nearly double the others size. Eggs have been transferred from their original nests to the vivarium but they failed to develop.

These lizards are more generally feared by ignorant people than any other. They are commonly known as "Mountain Boomers".

Their food consists chiefly of grasshoppers, adults and nymphs of various species. They are cannibalistic. The writer has found the remains of two young in the stomach of a large male.

Habitat

Usually found about rock quarries, and rocky hillsides. They are strictly diurnal and are seldom seen out save when the sun shines. They spend the nights under flat rocks.

Distribution

Missouri and Kansas south to Texas, west to California, Nevada, and Utah.

Dr. Stejneger remarks - "In spite of the fact that this species, in certain localities at least, ascends the mountains as high as 5,600 ft., it does not occur anywhere in the interior valley of California —; in fact it does not seem to reach the coast anywhere; it is evidently an inland form".

Holbrookia (Girard)

Holbrookia (Girard) Proc. Amer. Acad. Ad. Sci. IV. 1851. Stansbury's Exp. Gr. Salt Lake 1852. —A. Arch. Mus., VIII 1856. — (Bocourt). Miss. Sci. Mex., Rept. 1874. (Boulenger) Cat. Liz. Brit. Mus. VII. 1885

Cophosaurus (Troschell) Arch. f. Nat., 1850.

Description of genus

Angular fold of large scales (sic), side of neck various plaited (sic). Scales above and on sides small, nearly even, considerably less than ventral, all rhomboidal, imbricated. Tail moderate; not very brittle. Femoral pores distinct. No external ear. Nostrils superolateral, anterior to the end of canthus rostralis. A large infraorbital plate. Upper labials very oblique and imbricated. Head plates, including interparietal small. Tongue barely notched at tip, with two sessile triangular palates beneath. No palatines. Cheek teeth conical, posterior only faintly tricuspid.

Holbrookia maculata (Girard)

Holbrookia maculata (Girard) Proc. Amer. Ass. Adv. Sci. IV, 1851 (Stansbury) Exp. Rep. 1852. (Baird & Girard) Marcy Red River (sic) 1853. (Hallowell) Proc. Nat. Sci. Phila. (sic) VIII 1856. (A. Dumeril) Arch. Mus. VIII. 1856. (Cope) Bull. U. S. Nat Mus. XVII 1880. (Boulenger) Cat. Liz. Brit. Mus. 1885

Holbrookia approximatus (Baird) Proc. Acad. Nat. Sci. Phila. 1859. (Bocourt) Miss. Sci. Mex. Rept. 1874.

Description of species

Scales on back rather large, wider for six or eight scales, then more laterally, about 125 from head to anus; head broad very short and

convex; the lateral profile of upper part of the head rapidly curve[s] toward mouth. Upper labials six, temporal plates smaller than those on the side of chin. Hind toe about 1/3 the head and body; free portions of its longest toe equal to the length of the cephalic plates.

Above olive or ashy gray or green with sometimes a dorsal series of subquadrate dark blotches into lighter areola. Beneath white. The tail beneath without bands. A whitish stripe from eye along the sides below the dorsal blotches. A second less distinct from mouth in line with lower edge of colored sides (sic). Both sometimes broken up into small spots also seem more or less thickly on sides and above (sic). Two oval indigo black spots in anterior half of each side scarcely visible from below.

Key to subspecies

A. Snout more pointed; anterior supralabials narrower; muzzle plates smaller. Under surface of tail black spotted; no black spots on sides. Dorsal spots large, transverse, yellow bordered digilate (sic) posteriorly ..... *H. m. lacerata*

B. Spots absent or rarely present on inferior side of tail; two small spots on each side; dorsal spots small ..... *H. m. maculata*

Holbrookia maculata lacerata (Cope)

Holbrookia maculata lacerata (Stejneger) N. Am. Fauna No. 3, 1890.
Holbrookia lacerata (Cope) Bull. Nat. Mus. No. 17. 1880 (Boulenger) Cat. Liz. Brit. Mus. 2nd ed. II 1885

Description of subspecies

Tail cylindrical, slender, a little longer than body; hind foot short, less than 1/3 of head and body; six or eight supraorbital scuta surrounded by minute tubercules; scales of muzzle tubercular. Labials less elongate, five oblique, one flat; femoral pores 12-13.

Coloration

No spots on sides; transverse blue spots on the inferior side of tail brown (sic) with six pairs of transverse dark-brown bars between the scapular region and groin, which extend downward and backward to the abdomen. Their posterior border is serrate or digitate and edged with yellowish, producing a variegated pattern. The inner part of the spots is frequently cut off entirely. Spots continued on the upper half of the

tail, and there are six longitudinal brown bars on the neck. A brown band across the supraorbital regions and a spot on the upper surface of the muzzle. Lips brown and cross banded. A pale band on inferior part of side which is crossed by the ends of the lateral spots. Below this are five or six small dark spots sometimes obsolete (sic).

Length

Total length 99 mm; to vent 56 mm; from vent to end of tail 44 mm.

There are no specimens in the University collections of the Biological Survey thus made so far. One specimen in the Smithsonian Institute collection is from Neosho, Kansas. Common in central Texas. The finding of this subspecies so far north is very unusual.

Holbrookia maculata maculata (Girard)

Description of subspecies

The body is moderately stout and depressed; much more so in the females. The head is broad and short, as wide as long, pointed anteriorly to the broad and rounded muzzle. The lateral line of the head is very convex posteriorly, then sloped from the middle to (sic) the head nearly in a straight line to the line of the mouth. The head above is covered with small polyhedral or pyramidal plates except in the supraorbital region. The occipital plate is large and polygonal, the edges raised with a central tubercle; it is surrounded by small plates. The eyelids are granular, with a series of longer flat plates along the edge. The loreal and supralabials are small and tubercular. The nostrils are superior situated (sic) in a single plate, except anteriorly, but closely surrounded by others (sic)which appear to form their outer border . The scales immediately behind the back of the head are smaller than elsewhere on the back. 120 scales from the occipital plate to the arm. The belly scales are rhomboidal and larger than any dorsal body scales. Those in front of arms the largest. Two transverse folds on the throat. The male has two plates behind the arms not seen in the female. The femoral pores distinct.

Coloration

The ground color is an ashy gray and the belly immaculate white. Some specimens show a tendency to minute spots on the under part of

arms and chin. Behind the head two rows of dark brown to blackish blotches extend to narrow part of the tail, about 12 to 13 in number. The size of the blotches varies. On either side above the legs is another row of blotches 8 to 10 in number and more indistinct. The arrangement of the blotches gives a superficial appearance of five straight lines, one mediodorsal, the other lateral. Legs are blotched irregularly with brown. The top of the head shows a variety of dull markings, the brown color sometimes covering the whole head.

Females taken in June were much more brilliant in coloring than the male. The ground color on the side was a dull orange color and the blue spots on the sides were very conspicuous. Some of the specimens showed a tendency toward having the ground color about the blotches emphasized so as to give the appearance of white dots.

Observations

A great many specimens were taken in the chalk country in western Kansas. These with *Cnemidophorus sexlineatus* and *Sceloporus undulatus* were the only lizards found here. They were found in all types of localities and at all times of day. When found they were nearly always in pairs, male and female. No specimens were observed in copulation. The females had not yet deposited their eggs.

They are very lively creatures and run very fast. Their tails are not brittle as those of the Scinks or *Sceloporus*. The number of eggs is from 5-8. None were found deposited.

Of the food habits F. A. Hartman says "a squat, stubby-headed little fellow, common in sandy regions, especially in the sandhills sparsely covered with vegetation. Lives upon grasshoppers and small beetles. The stomachs of three specimens collected in Graham Co. contained small beetles and a grasshopper nymph. Sixty of these little fellows were kept in captivity for a few months. They thrived on grasshopper nymphs. Grasshoppers which showed no signs of life when put into the lizard cage were never touched. But as soon as a grasshopper would move one of the lizards would creep up quietly to within an inch or two, turn his head quizzically, then suddenly grab the unsuspecting victim and jerk his head from side to side swallowing it".

Distribution

This subspecies is very common in the central plains region [of] Texas, New Mexico, Arizona, Oklahoma, Nebraska, Wyoming, and Kansas.

In the state it has been taken as far east as Shawnee County. In the western part of the state it is quite common.

Specimens are recorded from Trego, Gove, Graham, Osborne, Dickinson, Logan, Wallace, and Barton Counties.

Mr. Hurter does not report it from Missouri. This state (sic) is probably its northeastern limit.

SCELOPORUS (Wiegmann)

Sceloporus (Wiegmann). Isis. 1828; Herp. Mex. 1834. (Fitzinger), Rept. Syst., 1843 — (Bocourt), Miss. Sc. Mex., Rept. 1874 — (Boulenger), Cat. Liz. Brit. Mus., 2, 1885

Tropidolepis (Cuvier), Régne. Anim., 2nd ed., 2, 1829 — (Dumeril and Bibron), 4, 1837. — (Fitzinger), Rept. Syst., 1843. — (Gray), Cat. Liz., 1845.

Tropidurus (Wagler), part. Syst. Amph., 1830

Description of genus

No gular constriction; one lateral fold on the neck. Femoral pores. Scales imbricated; rhomboidal, rather verticillate on tail. Above generally carinated. Head above with regular plates. Superciliary plates imbricate toward a median keystone scale (sic); labials not imbricate. Ears distinct. Tongue fleshy, arrow shaped; rounded at tips; broadly adherent, except at end where [there] are two triangular discs beneath. No palatine teeth. Cheek teeth compressed. Tail rounded, very brittle.

Sceloporus undulatus

Sceloporus undulatus (Wiegmann), Isis. 1828; Herp. Mex., 1, 1834. — (Fitzinger) Syst. Rept., 1843. — (Girard), Herpet. U. S. Expl. Ex. 1858. — (Bocourt), Miss. Sci. Mexique. Rep. 1874. — (Cope). Proc. Amer. Phil. Soc., 1885. — (Boulenger). Cat. Liz. Brit. Mus., 2, 1885.

Lacerta undulata (Bosc) MMS. (sic)

Stellis undulatus (Latreille), Hist. Rept., 2, 1802

Agarna (sic) undulata (Daudin), Hist. Rept., 3, 1805. — (Harlan), Jour. Acad. Sci. Phila., 6, 1829.

Lacerta fasciata (Greene), Jour. Acad. Nat. Sci. Phila., 1, 1818. (Male).

Uromastix undulatus (Merrem), Tent. Syst. Amph., 1820.

Tropidolepis undulatus (Cuvier), Regne. Anim. Au. 2nd ed., 2, 1829 — (Gray). Syn. Rept. Griff. Cuv., 9, 1831; Cat. Liz. Brit. Mus., 1845. — (Dumeril and Bibron), Erp. Gen., 9, 1837. — (Holbrook), N.

Amer. Herp. 1st ed., 3, 1838. — (Aug. Dumeril), Cat. Meth. coll. Rept. Mus. Hist. Nat., 1851.

Sceloporus occidentalis (Baird and Girard), Proc. Acad. Nat. Sci. Phila., 6, — (Girard), Herp. U. S. Expl. Exp., 1858.

Sceloporus longipes (Baird), Proc. Acad. Nat. Sci. Phila., 1858.

Sceloporus elongatus (Stejneger), N. Amer. Fauna, No. 3, 1890.

Description of species

Cephalic plate smooth or longitudinally rugose, especially anteriorly, and laterally. Supraorbital region with one crescentric series of five or six large, transverse plates, embracing a short series of small plates in its concavity. Two frontal plates, one before the other, the anterior undivided, usually with a third anterior and its adjacent one so arranged as to be surrounded by four plates. Free part of longest hind toe equal to the length of cephalic plates. Scales of the back and rump about equal, smaller than those near base of tail. Lateral scales smaller than dorsal. Dorsal scales angular pointed, well carinated, with conspicuous spines, and the lateral denticulations indistinct. The belly scales smooth, and strongly emarginated. The scales on the inside of the tibia distally, and behind anus decidedly carinated. Femoral pores about 14. There are about 41 oblique rows of scales from head to tail, and about 23 from cervical fold.

Key to subspecies

Head scales usually wrinkled; color brown, with undulating brown cross bars. Tail usually blotched or dark .....*S. u. undulatus*

Head scales smooth, two pale dorsolateral stripes, or small, brown dorsal spots; smaller. No spots on tail only in median dorsal line (sic) .....*S. u. consobrinus*

Sceloporus undulatus undulatus (Latreille)

Sceloporus undulatus undulatus (Cope). Checklist Batr. Rept. N. Amer., 1875.

Sceloporus undulatus (Baird), U. S. Pac. R. R. Reports 10; Whipple's Rept. (sic)

Description of subspecies

This species is of rather small size, plates on the anterior portion of the above (sic), with a tendency to being rugose, carinate, the more

posterior with a slight trace of the same. Smaller supraocular scales squamoform or imbricate and carinate. The neck is constricted and narrower than the head. The head plates exhibit a great amount of variation so no exact formulas can be stated. Scales around the body are about 44 in number, and about 40 from back of head to anus. Scales on the back are all acute, and strongly carinated and spinous behind, with one or two slight denticulations on each side. Belly scales smooth. About seven scales from orbit to ear. There are about 13 well defined femoral pores.

Coloration

This species is of a brownish olive or gray above. There is a central dorsal portion covering about ten dorsal rows margined by a still lighter line. On each side of the back, from head to anus, are eight or ten narrow undulating V-shaped dark angular bands, the angle anterior, and situated in the edge of this light dorsal portion. The space on the back immediately behind the edge of this dark band, is generally lighter than the ground color, especially in the light lateral stripe. In the male they are most usually obliterated by a nearly continuous dusky band, which extends from the back in front of the shoulder to the groin. The male has the under surface of the head dark with two large blue spots on the sides of belly, one on either side. The scales on belly are frequently dark or light speckled with black. Sometimes the specks are aggregate where they form dark short lines. There are some dark, transverse lines on the head.

In the female the sides sometimes appear spotted with whitish, from the tips single scales being of this color (sic). There is occasionally a trace of blue on chin and sides, and generally of black at the insertion of the arm.

Length

Total length 160 mm. From snout to vent 68 mm. From vent to tail 92 mm.

Observations

The *S. u. undulatus* is the form found in the central and northern part of the state. They are very active and run with great speed. The writer has seen them raise their spinous scales in a rather formidable

manner when angered. They do show a slight tendency to change color, as observed in *Crotaphytus* and *Anolis*. The change is usually only from darker to lighter shades.

Dr. O. P. Hay says of their egg laying habit, "The eggs are said to be laid in the sand, in groups. They are deposited about the first of June, and hatched about July 10th. The eggs are long and narrow and covered with a tough coat with no calcareous material. The egg weighs about 20 (sic) gr. They are abandoned to their fate by the female, but when the young are hatched, they are treated with the utmost gentleness by the adults."

The number of eggs laid is approximately ten. The food consists chiefly of grasshopper nymphs, ants, and small coleoptera.

Habitat

In the east they are found commonly along fence rows, about fallen trees, etc. It has gained the name "Fence Lizard." Often seen along roadside in very dry or rocky places.

Distribution in state

In the central and northeastern part of the state it is found commonly. In the eastern part it is rare. In the west it replaced by *S. u. consobrinus*. Specimens are reported from Rooks, Riley, Cloud, Wyandotte, and Republic Counties.

Sceloporus undulatus consobrinus (Baird and Girard)

Sceloporus consobrinus (Baird and Girard), Marcy's Rept. on Red Riv. Rept. 1853 — (Baird), U. S. Pac. R. R. Surv., Whipple's Rept. 1859 — (Cope), Bul. U. S. Nat. Mus., No. 17, 1880 — (Stejneger), N. Amer. Fauna No. 3, 1890.
Sceloporus garmani (Boulenger), Proc. Zool. Soc. Lond., 1882.

Description of subspecies

Supraorbital region with one crescentric series of six large transverse plates embracing a much smaller one of (4-5) in its concavity (sic), the whole bordered by a complete row internally and externally (sic). Two central single plates, with a third more anterior, surrounded by five others, the plates all smooth. Occipital large, with two or three plates on each side. Scales of back, rump and sides of body not

conspicuously different in size; those of the tail alone larger. Dorsal scales angular, strongly carinated, mucronate with tall spines, and with lateral denticulations, the belly scales decidedly notched. Scales on inside [of] femur, and behind anus smooth. There are about 41 oblique series from head to above anus; about 30 from the lateral cervical fold. There are scarcely any material differences in the head scalation of the two species (sic) save in their external appearances. The head plates appear thicker and more raised; a little wider on the occipital, and the plates on the whole appear to form a more rounding crown in the *undulatus*, while those of *consobrinus* seem more depressed, and thinner, the head scales smoother. The tail is without blotches save on the median line. The scales of the hind leg and under surface of the tail are smoother.

Coloration

The ground color is a slight drab-olive color. A broad mediodorsal stripe of this color extends from the occiput to the tail, and sometimes may be traced to near its end. On the back this is about six scales wide while it narrows (owing to the obliquity of the scales), to about two scales wide. On either side are two lighter yellowish lines, two scales wide extending from back of eye to some distance on the tail. On either side below the light line is another dusky line of the ground color, this is also bordered by another lighter line extending along the sides between the legs. In the males, below this second light line is found a large oval azure spot, extending from near the forearm to hind leg. The dusky stripes on the back are covered with a series of dark brown spots, the mediodorsal with two rows of about 13-14 in number, these appear to be the inner legs of V's with the outer leg on the second dusky line. The belly is a yellowish white. Back of arms and legs blotched. Head almost a uniform brown.

Length

(A large specimen from Trego County), total length 142 mm. From the head to the vent 65 ½ mm. From the vent to end of tail 77 mm.

Observations

This subspecies is very common in central and western Kansas. During the summer of 1909 more than 200 specimens were obtained in

Trego and Gove Counties, chiefly around the chalk cliffs. This species is very agile and great numbers of them would take refuge under the thistles blown about the cliffs. Their tails are not as brittle as the scinks yet show this tendency to quite a degree. Females taken in July had not as yet deposited their eggs. The number of eggs laid is from 10-20. One very large female contained 15 eggs. The females of *S. u. undulatus* examined contained a smaller number usually from 7-10. I do not know whether this is a constant differentiating characteristic or not.

Farmers in the western part of the state say that they are seen in large numbers in wheat fields, especially under the grain shocks. The writer has found as many as five under a single shock of wheat. Their food consists chiefly of small coleoptera, crickets, ants and grasshoppers.

Habitat

They are found in a great variety of places, about cliffs, in open fields and along low sandy river banks under wheat shocks. They have no permanent holes or burrows.

Distribution

In the United States they are found from Texas to California and north in Nevada, Utah, Oklahoma, Kansas, and Nebraska. In Kansas specimens are reported from Trego, Gove, Graham, Rooks, Osborne, Riley Counties.

Phrynosoma

Phrynosoma (Wiegmann) Isis, 1828. Herpt. Mex., 1834. — (Wagler), Syst. Amph. 1830. — (Dumeril and Bibron), Erp. Gèn., 4, 1837. — (Fitzinger), Syst. Rept. 1843. — (Gray), Cat. Liz., 1845. — (Girard), U. S. Expl. Exp. Herp., 1858. — (Bocourt) Miss. Sci. Mex. Rept., 1874. — (Boulenger), Cat. Liz. Brit. Mus., 2, 1885.

Batrachosoma (Fitzinger), Syst. Rept., 1834 (sic). — (Girard) U. S. Expl. Exp., — (Bocourt), Miss. Sci. Mex.

Tropidogaster (Fitzinger), Syst. Rept., 1843

Anota (Hallowell), Proc. Acad. Nat. Sci. Phila., 1852. — (Bocourt), Miss. Sci. Mex., Rept., 1874.

Tapaya (Girard), U. S. Expl. Exp. — (Bocourt), Miss. Sci. Mex. 1874

Description of genus (Bryant 1911)

Head short, cordiform, and elevated at the vertex; occipital and temporal regions bearing flattened and grooved spines which vary in length and number; cephalic plates small and polygonal; nostrils anterior or lateral, teeth small and bluntly conical; palatine teeth lacking; body short, suborbicular, greatly depressed and usually fringed by one or two rows of spinal scales; back covered with scales which vary greatly in size and shape; scales of ventral surface smooth and equal sized; gular folds present; tail short usually rounded and conical; limbs short, digits moderately developed; tympanum visible or covered more or less with scales; femoral pores present; preanal pores lacking; no dorsal or caudal crest. Body broad with a lateral fringe. Dorsally it is covered with keeled scales which are irregular in shape and size. Ventrally the scales are small and regular, having an imbricated appearance. The head is short and triangular in shape with sharp projecting margins. A row of femoral pores, varying in number in the different species from 7-20, are found in both sexes on either thigh. Those of the male are most highly developed. The large postanal scales in the male is the sex determining characteristic. Anal pores are absent.

Phrynosoma douglassi (Bell)

Phrynosoma douglassi (Wagler), Syst. Amph., 1830. — (Wiegmann), Herp. Mex., 1834. — (Holbrook), N. Amer. Herp., 2, 1842. — (Girard), Stans. Expl., 1852. — (Cope), Proc. Acad. Nat. Sci. Phila., 1866. — (Coues) Wheeler's Report Expl. W. 100th Mer., 5, 1875. — (Gray), Synopsis Rept. Griff., Cuv. Anim. King., 9, 1831. Cat. Liz., 1845. Zool. Beachey's Voy., 1839. — (Dumeril and Bibron), Erp. Gèn., 4, 1837. — Fitzinger, Syst. Rept., 1843. — Boulenger, Cat. Liz. Brit. Mus. 1885

Agama douglassi (Bell), Trans. Linn. Soc. 16, 1833 (sic) — (Harlan), Med. and Phys. Res.

Phrynosoma orbiculare (Hallowell), Sitgreave's Exp. Zuni and Colo. Riv. 1853.

?*Tapaya hernandesi* (Girard), U. S. Expl. Exped. Herp., 1858. U. S. and Mex. Bound. Surv. 1859. — (Bocourt), Miss. Sci. Mex. Rept. 1874.

Tapaya brevirostris (Girard), U. S. Expl. Exped. Herp. 1858. — (Bocourt) Miss. Sci. Mex. Rept., 1874.

Tapaya douglassi (Girard), U. S. Expl. Exped. Herp. 1858. — (Bocourt), Miss. Sci. Mex., Rept., 1874.

Phrynosoma brevirostre (Cope) Proc. Acad. Nat. Sci. Phila., 1866.

Description of species

Temporal region wide, but not especially expanded. Horns represented by conical protuberances on each side. Three temporal and one occipital. Occipitals widely separated at the base. Six posterior inferior labials enlarged. Two short oblique rows of conic scales on the sides of the neck, the superior the longer. Two larger scales in vertical relation behind the nasal, and separated from it by a row of smaller scales. A small keystone (sic) superciliary. Gular scales rounded smooth. Back covered with occasional larger spring (sic) scales arranged more or less in rows. A rather larger single row of spinous scales extend on the side. Series of conic scales on sides of tail. Femoral pores 16.

Phrynosoma douglassi hernandesi (Girard)

Phrynosoma hernandesi (Stejneger), N. Amer. Fauna, # 3, 1890
Tapaya hernandesi (Girard), U. S. Expl. Exped. Herp., 1858. U. S. and Mex. Bound. Sur., 1859. — (Bocourt), Miss. Sci. Mex. Rept., 1874
Tapaya brevirostris (Girard), U. S. Expl. Herp., 1858. — (Bocourt), Miss. Sci. Mex. Rept., 1874.
Phrynosoma brevirostris (Cope), Proc. Acad. Nat. Sci. Phila., 1866 — (Boulenger), Cat. Liz. Brit. Mus., 2, 1885.

Description of subspecies

Head broader than long, with spines very small; nostril pierced in the line of the canthus rostralis; tympanum naked; the head spines, which are subequal, not, or slightly, larger than the largest spinous scales of the body, and turned upward; they number on each side, one postorbital, one occipital, and three temporals; in very young specimens the spines are not distinguishable; lower labials terminating in a series of four or five, large, compressed, obtuse, or pointed scales; a series of enlarged scales, as large as or a little larger than, and parallel to, the lower labials; gular scales equal[ly] smooth; gular fold strong; a dermal thickening, bearing a few, small, erect spines on each side, between the gular fold and the tympanum. Back and limbs with scattered, rather large, erect, keeled, spinous scales, which are longer than broad. A regular lateral series of spines; pectoral and ventral scales smooth. Fifteen to 21 femoral pores on the male and 12-15 in the females. Male with enlarged postanal scales. Tail 2½ times length of head.

Coloration

The ground color presents a more or less mottled arrangement of yellow gray or brownish colors. Behind the occiput there are two rows of brown blotches four in number, extending somewhat beyond the middle of the back. These are partially edged by a lighter area, extending medially from head to tail. The blotch nearest the head is usually the largest. The remainder of the back is covered with small white areas on a darker background. Head more or less mottled. Under surface of head and body almost white.

Length

Total length of medium (sic) specimen from Rooks County 102 mm. From point of snout to vent 81 mm. Vent to end of tail 22 mm.

Observations

These strange, little "horned toads" as the *Phrynosoma* are commonly called, are probably the most unique of all our reptiles. They are quite inoffensive, readily become tame, and make fine pets. When stroked or handled they show an interesting habit of playing dead. They readily "come to life" if they think they can escape. So closely do they imitate their surroundings in color, that they are seen with great difficulty unless they are moving. The writer has never seen one attempt to bite.

Mr. Handel T. Martin of the University of Kansas states the following concerning the egg-laying habits of this species, "Specimens of females were placed in a box of dry sand, and carefully observed. Prior to ovoposition the females would endeavor to hide in the loose sand in the box. This was probably due to the fact that they were watched. The eggs were from ten to twelve in number and from two to five minutes would elapse between the extrusion of eggs.

When an egg was deposited, some 30 seconds would elapse before the egg showed any movement. Then I could notice a slight motion of the head of the young, since the covering of the egg was semi-transparent; the motion was directed back and forth and after a few such motions the covering would tear and the young would emerge. Before the last egg was deposited the first young hatched would be picking up small ants placed in the cage. The female gave no attention whatever to the young. This is practically true of five females observed."

This species seems to be on the border line between oviparous and the ovoviviparous. Some of the species of this genus require a number

of days to hatch the eggs after laying, others have their young born with no covering.

The food consists chiefly of ants, beetles, etc. Practically all of the specimens examined had small pebbles in the intestine. The occurrence of these is probably accidental as the pebbles were quite angular; such would doubtless not have been true had they been used for grinding. The specimens also contained a great number of small roundworms. More than 200 were counted in the stomach and intestine of a large specimen. These were from ⅓ to one inch long.

Habitat

The "horned toad" is strictly terrestrial in its habits. Most species are found in a dry sandy climate with very little vegetation.

Distribution

This subspecies ranges from Nebraska to Texas, and west to the Pacific. It has been taken in Montana, Idaho, and Oregon in the north.

In Kansas it is reported from the following counties: Riley, Rooks, and Douglas. Specimens have been turned loose about the University of Kansas in the last years and are occasionally met with now.

Phrynosoma cornutum (Harlan)

Phrynosoma cornutum (Gray), Syn. Rept. Griff., Cuvier Anim. Kingd. 9, 1831; Cat. Liz. Brit. Mus., 1845. — (Holbrook), N. Amer. Herp., 2, 1842. — (Girard), Stansb. Expl. Gt. Salt Lake 1852. — (E. Blanchard), Organ. Reg. Anim. 1852. — (Hallowell), Sitgreaves Exped., Zuni, 1853. — (Girard), Herp. U. S. Expl. Exped., 1858., U. S. Mex. Bd. Sur., 1859. — (Bocourt) Miss. Sci. Mex. Rept. 1874. — (Boulenger), Cat. Liz. Brit. Mus.

Agama cornuta (Harlan), Jour. Acad. Nat. Sci. Phila., 4, 1825; Med. and Phys. Res., 1835. — (Griffiths), Cuv. Anim. Kingd. 9, 1831.

Tapaya cornuta (Cuvier), Reg. Anim. 2nd ed., 2, 1829.

Tropidogaster cornutus (Fitzinger), Syst. Rept., 1, 1843.

Tropidogaster bufonium (Fitzinger), Syst. Rept., 1, 1843.

Lacerta tapayaxin (Barton), Med. and Phys. Jour., 3, 2, 1807 (?)

Phrynosoma bufonium (Wiegmann), Isis 1828. — Gray Syst. Rept. Griff., Cuvier's Anim. Kingd., 9, 1831.

Phrynosoma harlanii (Wiegmann) Herp. Mex., 1, 1834. — (Dumeril and Bibron), 4, 1837. — (Spring and Lacordaire), Anat., pt. 2,

1842. — (Aug. Dumeril), Cat. Meth. Coll. Rept. Mus. Paris 1851. *Phrynosoma orbiculare* (Hallowell), Proc. Acad. Nat. Sci. Phila., 6, 1852.

Description of species

Head short descending steeply in profile. Nostrils directed forward and separated from the scales of the canthus rostralis by a single scale. Posterior superciliary angle produced into a short horn. Temporal region expanded, supporting three horns, the anterior short, the median equal to or longer than the posterior. The series does not extend below the orbit. Occipital horns moderate, acute, well separated and divergent, and directed 45 degrees upward. Scales of front and vertex rugose; three conic scales posterior to the occipital, the posterior a median occipital., A row of conic scales connecting the posterior superciliary angles in front of parietal. Infralabials prominent and acute posteriorly, the last equal to, or longer than the first temporal. One row of enlarged gulars. On each side of the posterior gular border a small spine. Two longitudinal folds on the side of the neck, several spinous scales on the inferior and longer and one on the superior and shorter. Dorsal scales larger, flat, and keeled medially, smaller laterally. A row of large flat keeled scales on each side of the vertebral line. External to these on each side, about four series of enlarged keel scales, with free spines directed posteriorly. Gular scales small. Two rows of spinous scales on each, the superior the larger scales and longer. Tail with a marginal row of spines on the basal half. Hindlimbs short not reaching the axilla. Femoral pores present in males only, 9-12 in each series.

Coloration

The general ground color is yellowish to dark brown. A mediodorsal light stripe runs from behind the occiput. This is widest immediately behind the head but narrows after two stripes branch off. These two narrow stripes run back and out for only a short distance. Immediately behind the head are two large dark brown spots one on either side of the white line. Behind these and equidistant from each other, are five pairs of brown spots each partially edged with a narrow line of white. The three final pairs merge on the tail and are not separated by the white line. The fore and hind limbs are more or less mottled with brown blotches. On the head there is a darker area between the eyes and a second immediately behind it. Below and slightly behind the eye extend two

darker areas. The chin and neck are an immaculate, yellowish-white. The belly is yellowish white with or without small, dull, black spots. The occipital horns dark brown or reddish. Lateral rows of spines whitish.

Length

Total length 130 mm. From snout to vent 96 mm. From vent to end of tail 34 mm.

Observations

This species is similar to the preceding species in many of its habits. It is scarcely more active and has practically the same food habits. Stomachs examined showed the presence of many ants and a number of sand grains the size of a radish seed.

The egg-laying habits of this species is markedly different from that of *P. d. hernandesi*. In this species the eggs are buried and the time of incubation is some four or five weeks. Strecker in his paper on the breeding habits of *P. cornutum* states, "The usual site selected for the nesting burrows is the base of a slanting bank of earth or sand. As soon as one layer of eggs has been deposited, the lizard fills in ground over them, and is then ready for the next layer. In one nest examined by me the eggs were arranged in four layers of six each. The period of incubation is from 35-40 days. They do not receive any care from the mother, who probably never returns to the spot where she buries the eggs."

Habitat

They have no fixed habitat. The writer has collected them in open fields, in pastures and along roadsides. In damp and wet weather they burrow into the earth.

Distribution

This has probably the widest range of any *Phrynosoma*. Found from Missouri and Arkansas to Mexico and California; north to Kansas and Colorado. Not found on the Pacific slope. In Kansas it is reported from the following counties: Riley, Pratt, Labette, Cowley, Dickinson, Kingman, Ness, and Pawnee.

Hartman states that the species is not as common in the state as formerly.

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APPENDIX 1

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ABOUT THE KANSAS HERPETOLOGICAL SOCIETY

The Kansas Herpetological Society is a non-profit organization established in 1974 and designed to encourage education and dissemination of scientific information through the facilities of the Society; to encourage conservation of wildlife in general and of amphibians and reptiles in Kansas in particular, and to achieve closer cooperation and understanding between herpetologists, so that they may work together in common cause.

MEMBERSHIP

All interested persons are invited to become members in the Society. Membership dues per calendar year are $10.00 (U.S., Regular), $15.00 (outside North America, Regular), and $15.00 (Contributing) payable to KHS and send to KHS Secretary-Treasurer, 303 West 39th Street, Hays, Kansas, 67601.

All members are entitled to participate in Society functions and have voting privileges. They receive copies of Society publications, which include **KHS Newsletters**, as well as other publications of interest or those co-sponsored by the Society. In addition, members may participate in the spring field trip, occasional fall field trips, and the annual meeting held in November at the home town of the current KHS president.