

FAMILY JASSIDÆ STÅL.

The insects included under the name Jassidæ, form a large and well-defined natural group. They are readily distinguishable from members of the allied families as follows: from Cicadidæ by the possession of but two ocelli (or none) instead of three, as in the latter family; from Cercopidæ by having broad transverse posterior coxæ instead of conical ones, and having the posterior tibiæ prismatic instead of round; and, lastly, from Membracidæ by having the thorax only slightly convex and not strongly declivous. Aside from this there is a general resemblance between forms of the same family, so that they may be very readily distinguished at a glance; but the above characters are useful chiefly for doubtful cases, before the student becomes familiar with the various forms.

By Linnæus, in his *Systema Naturæ*, this family together with the above enumerated related ones was first all included in the single genus Cicada, which was thus characterized:

“Rostrum inflexed. Antennæ setaceous. Wings 4, membranous, deflexed. Feet (generally) saltatorial.”

Later, Geoffroy proposed the name Tettigonia for those having but two ocelli, reserving Cicada for those having three ocelli situated on the vertex. Fabricius in his *Entomologia Systematica*, 1794, seems to have misunderstood Geoffroy, for he used Tettigonia for Cicada and applied the latter name to our present group Jassidæ, having separated from them the Cercopidæ and Membracidæ as genera, giving them the names Cercopis and

*The present article includes only the subfamily Tettigininæ. I hope soon to complete the remaining part.

I have made use of the collections and library of the State Laboratory of Natural History in preparing the present paper, and wish here to acknowledge the kind favors and encouragement received from the Director, Prof. S. A. Forbes.

Membracis, so that, transposing the names Tettigonia and Cicada, we have a series of genera nearly equivalent to the families of later systematists. I say nearly, because a few aberrant forms of Jassids (such as Ledra) were included in the Membracidæ. A few other genera were established by Fabricius, in his later writings, by the dismemberment of these groups, and subsequent authors have added greatly to the list of genera, so that now as many as two hundred have been proposed, of which perhaps half may stand the test of time.

STRUCTURE.

As in all other true insects, the body is composed of a series of more or less irregular chitinous rings, called segments, disposed in three regions, the head, thorax, and abdomen. The head in this group is very variable in shape, but always somewhat triangular when seen directly from before or from behind, the two large and often prominent eyes forming the upper corners, and the beak arising from the much reflexed apex. The first of the three segments which comprise the thorax is very prominent above, but small and nearly covered by the inflexion of the head beneath. The other segments are closely connected, and about equal above and below. The abdomen consists of seven or eight segments tapering backwards and provided near the tip with a rather large genital apparatus.

Head. Returning now to the head, we can distinguish two surfaces besides the backside, which is concealed by the thorax: one above, the dorsal surface, more or less flat; and the other, called the face, often very convex, and including all that portion looking downward, forward, and to the sides. These planes are separated by a more or less distinct edge known as the front edge.

Above the head, between the eyes, and generally surrounding them, a large variable piece, not very distinctly marked off from the one in front, may be seen, which is known as the vertex (Pl. I., Fig. 3). The separation from the piece before it, is quite distinct at the sides of the vertex, being by sutures (Pl. I., Figs. 1, 2), but often not so at the middle, where it may not be visibly divided at all.

The vertex is sometimes inflexed over the front edge of the head, and sometimes does not reach it.

In front of or below the vertex, and often not distinctly separable from it, the face extends as a long median piece upon the front, often presenting somewhat the shape of an inverted pear. The upper end varies in shape and position with the size and shape of the vertex. The clypeus is a piece attached to the lower end of the face. It varies much in shape, being round, square, expanded at base or at apex, or constricted at the middle or near the base. On either side of the clypeus is a more or less elongate piece, the lora, which also covers a portion of the face; the inner margin is quite straight, and the outer, curved and sometimes constricted at its upper end.

The remaining portion of the cheeks consists of broad expanded pieces, which may for convenience be divided into two parts,—one forming a somewhat elevated plane or ridge above the antennæ and entirely in front of the eyes, and the other being on a lower plane than the rest of the front. The outer edge of this lower portion of the cheeks is variable, being sometimes bent outward, sometimes inward, but always forming a thin sharp edge.

The eyes are somewhat oval organs, situated at the upper posterior corners of the head. They are finely granulate. On the anterior edge, near the antennæ, there is in some species, a considerable notch; otherwise the margin is entire.

Of even more importance, from a systematic point of view, are the ocelli. These are small round organs often situated on low elevations. In position they are constant in their variation, and therefore of the highest value for classification. Their normal position seems to be at the junction of the vertex, front, and cheeks. In the Tettigoninæ they are on the middle of the vertex; in Acocephalini, just before the eyes, on the front edge of the head; in Allygus, and its allies, on the face,—etc.

The antennæ of Jassidæ (Pl. I., Fig. 4) are almost uniformly setaceous; the basal joint is very large, rounded, about as wide as long; the second is much smaller, but still quite large, and of nearly the same shape; the third is as much smaller than the second as the second is smaller than the first, being smallest at

base, and enlarging nearly to the tip, then decreasing. The succeeding segments are short and decrease regularly in diameter. There are peculiar thickened curved hairs on the third, fourth, and fifth joints. A peculiar form of antenna is found in *Idiocerus*, having comparatively few joints, and the terminal three or four greatly enlarged into a club.

The mouth parts consist of five pieces; a greatly enlarged labrum, forming a fleshy proboscis surrounding four slender lancet-like processes homologous with the mandibles and maxillæ.

Thorax. The most anterior segment of the thorax, the prothorax, consists of a large dorsal plate above — the pronotum or disk of the thorax. Beneath (Pl. I., Fig. 5), the pleurites and sternum are small, except the episternum, which is often expanded into a broad plate which touches the episternum of the other side along the median line. The pronotum covers the edge of the head before and the base of the wings behind. It is square or hexagonal in shape, the corners being designated (beginning from before) as the anterior, posterior, and scutellar,— the latter, however, are sometimes wanting.

The pleurites are well shown in the figure, and the sternum simply forms the bottom of a groove into which the beak is received. With regard to the two remaining segments little need be said. The dorsal surface is covered by the wings (elytra) to which they give rise, with the exception of a large triangular portion called the scutellum. This piece appears to be composed of part of the dorsum of both segments. The portion covered by the wings is sometimes almost membranous, and is never as strong as the rest of the body wall. The pleurites are on the sides; the epipleuræ are large and distinct; and the episterna are small. The sterna are transverse and the coxæ extremely large.

A pair of legs arises from each thoracic segment (Pl. I., Fig. 6). They are alike in general appearance, except that they increase greatly in size from before backwards and become proportionally more slender and spiny. Each leg consists of (1) a large rounded oval basal joint, the coxa, which is partly received in a hole in the thorax, the coxal cavity; (2) a small, somewhat triangular joint, the trochanter; (3) the femur, a long,

thick, and strong joint; (4) a slender, somewhat prismatic, and more or less spiny tibia; and (5) a three-jointed tarsus terminated by a pair of thick slightly curved claws.

The anterior wings, or elytra, are long, rather slender organs, quite hard in texture, forming a shield to the delicate true wings. The inner basal triangular portion, called the clavum or claval area, is separated from the rest of the wings by a bend or suture known as the claval suture. The venation of the anterior wings is of considerable value for classification. The veins arising from the base have been called sectors. The one on the margin is called the marginal vein. Transverse veins are those appearing towards the tip, and connecting sectors or their branches. The areas between the veins are known as basal and apical cells, and when more than one series exists beyond the basal cells, the additional ones are called the anteapical cells. The veins in the clavum are the claval veins. The hind wings have about six sectors, variously forked and united by a few cross-veins, and afford some of the best and most tangible generic characters. The marginal vein does not lie on the margin but parallel with it. It does not extend all around the wings, therefore some of the posterior basal cells are open.

Abdomen. The abdomen consists of five segments in the male and six in the female. They taper gradually towards the tip, where are the large genital organs. Figs. 7-9, Plate I., show the structure of the abdominal plates around the ovipositor.

CLASSIFICATION.

The classification of the Jassidæ has undergone the usual amount of change and confusion and is still not satisfactorily settled; but most authorities agree in placing these insects in a series of quite well-defined groups. Primarily they arrange themselves naturally into two large groups or subfamilies. These subfamilies are characterized by the position of the ocelli. Not that these characters are necessarily of such fundamental importance that we may establish such high groups upon them, but because they seem correlated with other characters harder to express but none the less evident and essential. We will therefore divide this family as follows:

Ocelli situated upon the disk of the vertex TETTIGONINÆ.
 Ocelli situated on the front or near the front margin of the
 head JASSINÆ.

SUBFAMILY TETTIGONINÆ.

Two very natural groups of genera can be distinguished as follows:

Body broadly oval flat TRIBE I. GYPONINÆ.
 Body more or less cylindrical TRIBE II. PROCONINÆ.

TRIBE I. PROCONINÆ STÅL.

GENUS 1. ONCOMETOPIA STÅL.

Proconia Am. and Serv., Hist. des Hemip., p. 571 (1843).

Oncometopia Stål, Hemip. Fabr. Part II., p. 62 (1869).

Somewhat cylindrical, with head and anterior parts of the thorax bent downwards at an angle of about 15° , or more. Head with prominent eyes extending laterally beyond the sides of the head. A faint groove behind each ocellus. Ocelli situated on feeble nodules, farther from each other than from the eyes. Vertex not attaining the front margin. Front very convex, with the usual striations extending over the front margin on to the top of the head. Genæ projecting outwards and forwards beyond the margin of the head. Clypeus convex and not entirely separate from the front, extending beyond the margin of the side of the head. Lore rather small but distinct. Pronotum with its sides inflexed, surface irregularly wrinkled by transverse striations formed of coarse punctures. Scutellum triangular, with a depressed transverse line about the middle. Beneath, the coxæ are very large and the mesothoracic, episterna are large and flat. Elytra with the apical and anteapical cells remarkably uniform in size. The anterior sector is forked about the middle, and a third fork is given off towards the apex. A narrow apical membrane is present. Claval veins two, sometimes united by one or two cross-veins. First sector of the wing giving off a faint marginal fork, posterior fork connected with the anterior fork of the second sector

by a cross-vein. Posterior fork of the second sector likewise connected with the third simple sector. Fourth sector simple; the fifth forked, and the sixth small and simple. The marginal vein turns abruptly to the margin after attaining the posterior fork of the fifth sector. Abdomen with six segments in the female, seven in the male.

Two very dissimilar species in our fauna belong to this genus; *O. undata* Fabr., and *O. costalis* Fabr. The former is long and slender; the head and thorax are much deflexed; the elytra have rather large apical cells; and the claval veins are united with one or more cross-veins; while in the latter species the body is short and thick, with the head and thorax relatively but little deflexed, the apical cells in the elytra small, and the claval veins separate.

These species are known in collections, and in most books, under the generic name *Proconia*, but Stål has shown (in Hemip. Fabr.) that *Proconia* Lep. & Serv. is not *Proconia* of Am. & Serv. He therefore uses *Proconia* as originally intended and divides *Proconia* Am. & Serv. into several genera, one of which is *Oncometopia*.

O. undata Fabr. (Pl. II., Figs. 10-14.)

Cicada undata Fabr. Ent. Syst. IV., p. 32, 23; Fabr. Syst. Rhyng. p. 62, 5.—Coqueb. Illust. 1, p. 32, tab. 8, fig. 3.—Blanch. Hist. Nat. III., p. 192, 160.

Cicada orbona Fabr. Ent. Syst. Sup., p. 520, 25-6; Fabr. Syst. Rhyng. p. 72, 50.

Tettigonia undata Germ. Mag. d'Ent. Tome IV., p. 61, 6.—Sign., Ann. Soc. Ent. Fr. Tome II., p. 486, 225, Pl. 17, fig. 5.

Proconia undata Walk., List of Homop., p. 783, 3.

Proconia nigricans Walk., l. c., p. 783, 8.

Proconia tenebrosa Walk., List of Hemip., p. 787, 16.

Proconia plagiata Walk., List of Homop., p. 788, 17.

Oncometopia undata Stål, Hemip. Fabr., Part II., p. 62.

Cylindrical, slate-blue or gray above, head, scutellum, and the under side reddish yellow.

Length 12 mm.

Head. Above marked with somewhat irregular black lines in the following manner: a line along the hind margin next the thorax; one around the front edge of the head; a pair

of lines going backward from this frontal line and uniting, thus forming a pear-shaped cell, from the back edge of which two pairs of lines radiate; an elbowed line to the eyes; and another meeting the front margin at the fore end of the genæ, forming an oval cell. There is often an additional line dividing this cell in halves. The peculiarities of the sculpturing consist in a shallow median longitudinal groove and a pair of shallower and wider ones extending from the ocelli to the hind margin. Beneath irregularly marked with black spots; a median line from the middle of the front edge to the middle of the front; an additional line often present, from the middle of the side of the front edge, parallel with the median line. Generally a faint line on the suture between the clypeus and the front. The lower margin of the eyes is distinctly concave.

Thorax. Pronotum slaty blue or gray, anterior margin reddish yellow, more or less distinctly separated from the darker parts by a sinuous black line; punctures dark or black; base darker. Scutellum bright reddish yellow marked with black as follows: a transverse line on the depressed portion; a pair of longitudinal lines from the outer ends of this to the anterior margin; a short transverse line connecting the middle of these; and, lastly, a still shorter median line connecting the middle of the transverse lines. Besides this the front median area is irregularly spotted with black. Beneath, the thorax is marked with irregular dots and patches of black, variable in form, number, and position, so that all that can be said is that the pleurites of the mesothorax and metathorax are generally darkest. The coxal cavities are large. The elytra are slate-blue or gray with the tips hyaline, the apical cells quite large, and the claval veins connected by one or more transverse veins. The wings are smoky or hyaline.

Abdomen. The abdomen is reddish yellow, all but the lateral edges of the first five dorsal segments and the bases of the sternal pieces, which are black.

Not a very common insect, but may be found at almost any time in all parts of the State. It lives on the grape vine and is said to become so numerous sometimes as to be very injurious.

O. costalis Fabr.

Cercopis costalis Fabr., Syst. Rhyng., p. 96, 44.

Cercopis lateralis Fabr., Ent. Syst. Sup., p. 524, 24-5.—Coqueb., Illust. 1, p. 35, tab. 9, fig. 3.

Cercopis marginella. Fabr., Syst. Rhyng., p. 96, 44.

Tettigonia lugens Walk., List Homop., p. 775, 108.

Tettigonia pyrrhotelus Walk., l. c., p. 775, 109.

Tettigonia costalis Sign., Ann. Ent. Soc. Fr. Tome II. (1854), 359, 210.

Black marked with fine yellow spots and two longitudinal red lines on each elytron.

Length 7 mm.

Head. Above evenly marked with a very great number of very small yellow spots. The head is much smoother than in the previous species, there being no indication of a median groove and scarcely any behind the ocelli, which are nearer the hind margin than in that species, the yellow spots along the front margin forming a quite distinct line. Beneath, the surface has likewise the yellow spots, those on the front generally following the striations. Those on the cheeks are fewer and larger, and there are only two or three on the clypeus.

Thorax. Pronotum with the sides less inflexed than in *O. undata*, black, spotted with yellow like the head. Scutellum black, marked with yellowish lines, four on the anterior portion, one pair of which is longitudinal, and the other oblique, lying on the edges of the scutellum. The posterior portion has three lines, an oblique one on either margin and a single longitudinal median one. Sometimes a transverse line is also present on the groove separating the two portions. Beneath, the pleurites have a prominent yellow stripe extending backwards from the posterior corner of the eyes. Below these, several irregular yellow spots are found, larger than those marking the dorsum. Legs black, with the rows of spines on the femur and tibiae yellow. Elytra black, marked with two broad red bands, one on the costa and one on the sutural edge of the clavum. The cells which are not covered by the red bands are generally margined with yellow. The apical cells are small and the claval veins distinct. Wings as in *O. undata*.

Abdomen. Above black, margined on each side with a broad yellow stripe, the continuation of the stripes on the thorax.

Beneath black, marked, as the head and thorax above, with fine yellow spots.

This species is not so widely and commonly distributed as the preceding, but often occurs in considerable numbers.

GENUS 2. AULACIZES AM. & SERV.

Aulacizes Am. & Serv., Hemip. p. 571 (1843).

Size and general appearance of *Oncometopia*. Head with less prominent eyes, hardly wider than the thorax; ocelli situated on a nodule which springs from a cavity on the vertex, nearer the eyes than to each other. Vertex flat, having, in addition to the broad shallow pits in which the ocellar nodules rest, three deep, broad sulcations, one larger and median, and the other two situated one on either side between the eye and the ocellus. The front is but little reflexed over the front margin on to the top of the head. It is very convex below. The clypeus is slightly convex. The gulæ extend forwards and outwards, being slightly arched and somewhat enlarged at the tip. The basal joints of the antennæ are also peculiarly enlarged at the tip. Pronotum with its sides inflexed, surface irregularly wrinkled by transverse striations formed of coarse punctures. Scutellum smaller than usual, transversely striate, and not so distinctly separated into an anterior and posterior portion. Behind, it is prolonged into a spinous process. Beneath, the coxæ are very large, and the mesothoracic episterna are large and flat. The venation of the elytra is very variable. The figure shows one form. The cells are irregular both in size and position. There are two cells in the clavum. The wings are much more constant. The first sector gives off a marginal fork, and a cross-vein connects the posterior fork of the first sector with the anterior fork of the second. The second sector forks so near the tip that the cross-vein connecting its posterior fork to the third simple sector is extremely long. Fourth and fifth sectors forked. Marginal vein not attaining the margin till near the sixth simple sector. Abdomen with six segments in the female, seven in the male.

A single species represents this genus in our fauna.

A. irrorata Fabr. (Pl. II., Figs. 15-18.)

Cicada irrorata Fabr., Ent. Syst., IV., p. 33, 24; Fabr., Syst. Rhyng. p. 62, 6.—Coqueb., Illust. 1, p. 32, tab. 8, fig. 3.—Blanch. Hist. Nat. III., p. 192, 17.

Tettigonia rufiventris Walk., List Homop., p. 796, 12.

Tettigonia irrorata Sign., Ann. Soc. Ent. Fr., Tome III. (1852), p. 59, 276.

Size and general appearance of *Oncometopia undata*. Color yellowish brown to black, sprinkled with yellowish white.

Length 12 mm.

Head. Above nearly black, mottled with yellowish white and tinged in places with rose-red. End of gula, above, rosy. Eyes gray, ocelli brown. Beneath, face yellowish marked with red lines in the furrows, and with black irregular projections on the upper and lower edges. From the latter a conspicuous blunt hook-like line extends on each side, and anterior to these lines are eight small symmetrically arranged spots. Clypeus black above, with yellow on the sides. The cheeks are dusky yellow, hairy, with some black near the clypeus. Lore small, as in *Oncometopia*, color black.

Thorax. Pronotum nearly black, with yellow spots much finer and thicker than those on the head, the deflexed side-margins, however, with fewer and coarser spots. Scutellum small, triangular, basal portion black, middle portion yellow, and extreme tip brown, shading into black on the terminal spine. Beneath yellow, dusky towards the middle, marked with a few black spots. Femur light yellow, basal end black, and apical third brownish yellow; tibiæ and tarsi dark yellow tipped with black. Not so spiny as *Oncometopia*. Elytra reddish brown irrorate with minute yellow spots, tip hardly hyaline, marginal membrane distinct, venation variable. Wings transparent.

Abdomen. Red above, yellowish beneath, with a broad median and a narrower sutural black line. Female ovipositor black with the sheaths red. The male differs in the still wider median black genital armature.

This fine species is not an uncommon insect, and though easily mistaken for *Oncometopia* at a first glance is easily distinguishable.

GENUS 3. TETTIGONIA GEOFFR.

Tettigonia Geoffr., Hist. des Ins. I., p. 429.

Body elongate, slender. Head rounded or triangular in front, not wider than the thorax, above generally flat, vertex not reaching the front margin. Front large, convex, striate as usual, the portion reflexed over the front edge only slightly, and sometimes not at all, striate. Clypeus large, generally convex. Ocelli nearer the eyes than to each other. Genæ large, deflexed, tips projecting downwards, and not forwards and outwards as in the preceding genera. Pronotum hexagonal, with the scutellar angles often very obtuse and the outer side much rounded, deflexed at the sides. Scutellum triangular, divided by the usual transverse groove; surface quite smooth. Beneath, the coxæ are very large and the mesothoracic episternum is large and flat. Legs with the tibiæ long, prismatic, and spinulose. Elytra with four different types of venation, with a small marginal membrane. Wings with the second sector having the two branches connected with the first and third simple sectors by short cross-veins. Fourth sector forked and fifth simple. Marginal vein apparently attaining the margin immediately after joining the posterior fork of the fourth sector.

This genus is one of large extent, possessing members both common and variable. Indeed it may be considered one of the dominant groups of insects. Many of our species belong to the genus *Diedrocephala*, but the characters which separate it from *Tettigonia* are not of generic importance, as European authors now agree. Nevertheless differences enough do exist to divide it into a number of well-marked subgenera and sections.

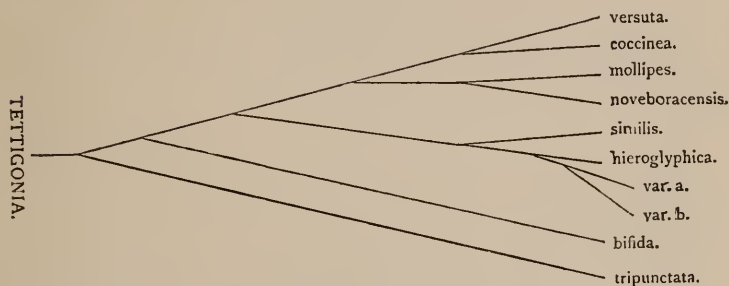
One of the most striking of these is represented by a single species, *T. tripunctata* Fitch. The peculiarity of this species consists in the short vertex, the remarkably long front and clypeus, the absence of the anteapical cells in the elytra, and also in the forking of the first sector near the base, so that it appears like an additional sector.

The second section is represented by *T. bifida* of Say, and is characterized by its very short, rounded vertex, the absence

of anteapical cells in the elytra, and the almost basal forking of the first sector.

The remaining species group themselves into the two subgenera *Diedrocephala* and *Tettigonia* as limited by Signoret, which are distinguishable by the more rounded vertex and front margin of *Tettigonia* and the more or less conical head of *Diedrocephala*. To *Tettigonia* belong *T. similis*, n. sp., *T. hieroglyphica* Say, and two varieties of the latter; and to *Diedrocephala*, *T. versuta* Say, *T. coccinea* Forst., *T. mollipes* Say, and *T. noveboracensis* Fitch.

The relation of these species is well shown in the following diagram:



The following synopsis will serve to distinguish our species:

TETTIGONIA.

Face not greatly elongate.

Elytra with anteapical cells.

Head more or less flat above, with the front margin distinct. Subgenus I.

But one row of anteapical cells in elytra. Sect. I.

Vertex with two longitudinal black lines.

..... T. VERSUTA SAY.

Vertex not lineate.....T. COCCINEA SAY.

Several rows of anteapical cells. Sect. II.

Head long, with no black spots near the tip.

.....T. MOLLIPES SAY.

Head shorter, with a pair of black spots near the tip.....T. NOVEBORACENSIS FITCH.

Head rounded at tip, with no distinct front margin.

Subgenus II.

Scutellum with a median black portion.

.....T. SIMILIS, n. sp.

Scutellum with median portion red or yellow.

Color reddish...T. HIEROGLYPHICA SAY.

Color slate-greenvar. *α*.

Color nearly black.....var. *β*.

Elytra without anteapical cells. Subgenus III.

.....T. BIFIDA Say.

Face greatly elongated, Subgenus IV.

.....T. TRIPUNCTATA FITCH.

SUBGENUS I.

Head conical, front margin distinct. General color green.

SECTION I.

Elytra with a row of apical and one of anteapical cells.

T. versuta Say.

Tettigonia versuta Say, Phila. Acad. Nat. Sci., Vol. 16, p. 311.

Green lineate with red. Head above with black-bordered marginal and light yellowish green median lines.

Length 8 mm.

Head. Above reddish, marked with yellowish green, and with narrow black lines as follows: narrow a black line on the posterior margin and a larger one on the front edge; one on either side of the narrow longitudinal median light stripe; one margining the lateral light stripes; and, lastly, one transverse to this stripe, opposite the genæ. The lateral light stripe sends a small lobe inwards towards the ocelli. Beneath yellowish green without markings, except faint dark lines on some of the striations of the front.

Thorax. Pronotum bluish green, with a large median spot and a lateral line on each side, red, and with the extreme lateral and front edge lighter green. Scutellum orange, with the anterior and posterior extremities yellow, marked with five parallel black longitudinal lines on the anterior portion, the three inner of which are connected by a transverse line on the

median impression. From this two lines extend back over the posterior portion. Beneath unicolorous yellowish green. Legs yellowish green with spurs at tip of tibiæ, and tarsal joints brown or black. Elytra dark bluish green with two broad red stripes separated by a blue line; tips and the costa near the tip, spotted brown. Wings dusky brown, veins deep brown.

Abdomen. Beneath yellowish green.

Not rare in southern Illinois in the middle and latter part of the summer.

T. coccinea Forst.

Cicada coccinea Forst., Nov. Species Insect., p. 96.

Tettigonia 4- *vittata* Say, Journ. Acad. Phila., Vol. VI., p. 312, 3.

Proconia 4- *vittata* Fitch, Cat. Ins. N. Y. State Cabinet, p. 55.

Diedrocephala coccinea Uhler, List Hemip. West of Miss. R., p. 91.

Green lineate with red. Head with black anterior border, but unmarked above.

Length 10 mm.

Head. Above orange, eyes green, front margin prominently marked with a black band. The usual narrow black line running inwards from the genæ is present. Beneath uniform yellowish green, lateral edges of eyes dark.

Thorax. Pronotum green, marked with a transverse red line near the front margin, from which project backwards and outwards a pair of heavier curved lines. A yellow scar on the anterior corners. Scutellum deep orange, apical spines lighter. Beneath green, pleurites margined with a deep black stripe above, which is the continuation of that on the margin of the head. Legs yellowish, spurs on tips of tibiæ, and tarsal joints, brown. Elytra bluish green, with two longitudinal stripes red, the outer one being the wider and having a green central portion; tips black. Wings nearly black.

Abdomen red above, yellowish green beneath.

Common throughout the State. It has the same general appearance as *T. versuta* but is quite distinct.

SECTION II.

Elytra with several rows of irregular cells at the tip.

T. mollipes Say. (Pl. III., Figs. 19-23.)

Tettigonia mollipes Say, Journ. Acad. Phila., Vol. VI., p. 312, 4.

Aulacizes mollipes Fitch, Cat. Ins. N. Y. State Cabinet, p. 56.

Diedrocephala mollipes Uhler, List Hemip. West of Miss. R., p. 92.

Bright green, head acutely conical.

Length 12 mm.

Head. Above light yellowish green, marked with very narrow black lines: one line in a median shallow groove; a double-curved one on either side, extending from behind the ocelli inwards and forwards, nearly touching the median line; another on either side in the broad conspicuous groove separating the vertex from the reflexed portion of the front; and, finally, the usual bent one, extending inwards from the gena. Below, the face is brown, darkest near the upper and lateral margins. The striations of the front are darker, and the dark lines thus formed extend back on the cheeks.

Thorax. Pronotum green, anterior and lateral margins concolorous with the head. Scutellum light green, transverse impression small, a white median longitudinal line being generally present. Beneath brownish green, the lateral edges of the pleurites with a black line which is the continuation of the darkened border of the head. Legs greenish, with spurs on femora, tibiae, and tarsi brown or black. Elytra green unicolorous. Wings hyaline.

Abdomen. Above black; sides yellow; beneath green.

Our most common species, and widely distributed. The females differ greatly from the males in the length of the head.

T. noveboracensis Fitch.

Aulacizes noveboracensis Fitch, Cat. Ins. N. Y. State Cabinet, p. 56.

Green; form, size, and general appearance of *T. mollipes*, but with four conspicuous black spots on the front margin.

Length 12 mm.

Head shorter than in *T. mollipes*. Above yellowish green, marked with black as follows: a large black spot on the front margin on either side of the tip; another on the genæ above,

just before the eyes; the usual line from the anterior edge of the genæ, which, however, is soon bent forward, proceeding along the junction of the reflexed portion and the front; and, lastly, a smaller line parallel with the latter on the vertex. Beneath, the face is yellowish green, and the lower and anterior margins of the genæ are black.

Thorax. Pronotum green, anterior and lateral margins concolorous with the head, a median line white. Scutellum light green, transverse impression small, with a white median longitudinal line. Beneath, yellowish green, sometimes with a few black spots on the pleurites. Legs yellow, with terminal spurs of tibiæ and tarsal joints brown. Elytra unicolorous green. Wings hyaline.

Abdomen. Above black; sides yellow; beneath green.

Rather rare. From northern Illinois.

SUBGENUS II.

Vertex and frontal margin rounded. Markings on the vertex complex.

T. similis, n. sp.

Color light yellow, marked all over with fine brown lines and dots.

Length 7 mm.

Head. Above yellow, tinted with rosy, and marked with brown lines as follows: beginning at the base of the head, two parallel lines, close together, extend about half way to the front edge, then, making a regular curve, they pass backward and around the ocelli, making two or three angular bends, and then proceed directly forwards till they touch another pair of black lines bordering the large striated portion of the reflexed front. Eyes black at the ends. Tip of the front margin with a single round median black spot. Beneath reddish yellow, with brown lines on the striæ of the front. Cheeks with two reddish stripes extending from the ends of the eyes to the clypeus.

Thorax. Pronotum irregularly spotted with brown, except four broad bands of lighter,—one pair almost on the middle of the dorsum, and one pair lateral. Scutellum brownish, with three triangular black patches on the base, the middle one

of which extends to the transverse furrow which is marked with a narrow black line; from this two lines extend towards the tip. Beneath reddish yellow, with a narrow brown line laterally. Legs yellowish, terminal spurs on tibiae and tarsal joints brown. Elytra light yellow, finely marked with longitudinal brown lines. Wings brown.

Abdomen. Above black, with white lateral margins; beneath yellowish green.

Rare. Described from one specimen, taken at Bloomington in May, 1884. Quite similar in general structure to the succeeding species, but the simple sharply defined markings on the vertex, etc., seem to indicate true specific differences.

T. hieroglyphica Say. (Pl. III., Figs. 24-26.)

Tettigonia hieroglyphica Say, Journ. Acad. Phila., Vol. VI., p. 313, 6.

Color variable, generally reddish, sometimes slaty green, or even black, in varieties. Head and thorax with hieroglyphical black markings.

Length 8 mm.

Head. Above reddish, with variable black markings. These markings consist of a curved spot on the middle and base of the vertex, one between the ocelli and the eyes, one on the margin of the reflexed front, and a large median one on the tip of the vertex. These spots are variously connected by narrow lines, and other smaller spots may be present. Beneath, with light spots on the middle of the front and adjoining parts of the cheeks. Front generally marked with a black line around the striated part, striations brown or black. Clypeus with a large black median spot.

Thorax. Pronotum reddish, with numerous small black and white spots irregularly arranged. Scutellum variably marked, a broad central longitudinal band generally lighter. Black triangular spots about the middle of the sides of the base. Often a median black line present. Transverse striation black. Beneath, reddish spotted with yellow, and with two black spots laterally. Legs yellowish, terminal spurs on tibiae and tarsal joints brown. Elytra reddish, often margined with white; sometimes also with many short longitudinal light lines.

Abdomen. Above black, with white lateral margins; beneath yellowish green.

A very common and extremely variable species. The two following varieties are very noticeable:

Var. α .

This variety differs from *T. hieroglyphica*, in being almost entirely slaty green, though possessing the same black markings. The median band of the scutellum is a beautiful bright yellow. The elytra have five black longitudinal lines. Body yellowish green beneath.

Var. β .

This variety is deep black in color, apparently due to the blendings of the black lines in var. α ; the specimens show a tendency to an obliteration of the slate-green markings and may become entirely black. The most persistent lines, which may indicate something of the original marking of the group, are a yellow line before the eyes, one on the cheeks nearest the base of the clypeus, and one just beneath the antennæ. The median band on the scutellum seems to become even brighter. There are also lines on the claval sutures of the elytra.

These remarkable varieties would probably have been ranked as distinct species if connecting links were not often taken.

SUBGENUS III.

Head very short, elytra apparently with an additional sector and no anteapical cells.

***T. bifida* Say.**

Tettigonia bifida Say, Journ. Acad. Phila., Vol. VI., p. 313, 5.

Green; head and thorax transversely, and elytra longitudinally, lineate with black.

Length 6 mm.

Head. Above yellow, with a broad black band in which are situated the ocelli, and a conspicuous black tip. Eyes brown. Beneath black, with two small yellow spots, one on either side of the tip of the front margin. Sides of the front and tip of the clypeus, brown. The gulæ are margined with yellow, and the antennæ are yellow.

Thorax. Pronotum with the central part green, and, at the anterior and posterior margins, a double band of black and yellow,—the black being in front of the yellow. Scutellum small, black, margined with white. Beneath black, except the narrow pleurites of the prothorax, which are yellow. Legs yellowish, terminal spurs on tibiae and tarsal joints brown. Elytra green, veins black or brown. Wings subhyaline, veins brown.

Abdomen black, anal segments yellow.

This is a very beautiful and quite common insect. It seems to differ so much from all others of the genus that a subgenus must be made for it. It is well distributed over the State.

SUBGENUS IV.

Head above, short, face very much elongate. Elytra without anteapical cells.

T. tripunctata Fitch. (Pl. III., Fig. 27.)

T. tripunctata, Fitch. Cat. Ins. N. Y. State Cab., p. 53.

Pale brownish yellow, lineate with brown. Head with three black spots above.

Length 5 mm.

Head. Above light brownish yellow, with a large black spot around both ocelli and one on the apex of the front margin; the striations of the reflexed portion are brown. Eyes marked with a brown spot. Beneath light brownish yellow, with a pair of brown lines on each side of the front, bounding the striated portion and converging till they meet on the clypeus. The cheeks are ornamented with two broad brown stripes.

Thorax. Pronotum light brownish yellow, with two transverse brown lines. Scutellum small, yellowish, with a central pale brown spot. Beneath yellowish, side pieces often bordered with lighter. Legs yellowish, terminal spurs on the tibiae and tarsal joints brown. Elytra brownish yellow, veins black or brown. Wings subhyaline, veins brown.

Abdomen beneath, yellowish.

Rare in southern Illinois.

TRIBE II. GYPONINA.

GENUS IV. GYPONA.

Gypona Germ., Mag. d'Ent. Tome IV., p. 73.

Oval, flattened insects, about one cm. long by two or three mm. wide; generally green.

Head about twice as wide as long; anterior margin strongly, and the posterior but slightly, curved. Eyes, as seen from above, large, triangular, situated on the outer corners. Ocelli on the vertex, often on short tubercles. Vertex often longitudinally furrowed. Thorax about two and a half times as wide as long; the anterior and posterior edges about equally curved; lateral edges composed of two nearly straight portions, united at about one third from base in an obtuse angle,—the outer angle. The sculpturing consists of a series of nearly parallel transverse striations, sometimes interrupted anteriorly by a large scar. Scutellum triangular, the top-shaped tip generally marked off by a distinct suture. The whole scutellum is sculptured like the thorax, even to the large lateral anterior scars. Elytra with two veins on the clavum, the radial vein forked and the apical and anteapical cells variable according to the species. Wings hyaline. Abdomen with six segments in the male and five in the female. Beneath, the legs close together, increasing in size from before backwards.

I have seen five species of this genus from Illinois, four new. Two others have been described from this State; one by Uhler, the description of which I append, and the other by Sahlberg, which I have not seen.

The following table will serve to distinguish the five species that I know:

Not red above.

Elytra white or light yellow.

Head and thorax light yellowish.

Thorax 8-lineate with red G. 8-LINEATA.

Thorax bipunctate with black . . G. BIPUNCTULATA.

Head and thorax black G. NIGRA.

Elytra black, except the outer edge, which is whitish.

..... *G. ALBIMARGINATA*.

Reddish all over the back..... *G. BIMACULATA*.

The insects of this genus are remarkably uniform, but the species are distinctly marked.

***G. 8-lineata* Say.**

G. 8-lineata Say. Jour. Acad. Phila., Vol. IV., p. 340.

Green, with eight red or yellow lines on the thorax, which continue on the head and scutellum. Elytra with yellowish veins.

Length 10 mm.

Head. Above green, with the continuation of the reddish lines as follows: a middle pair, close to the median furrow, continuing nearly to the apex; the next pair represented only by small yellowish spots; while the third follows along the edge of the eye and the anterior margin of the head, the outer pair not being present. Beneath, the color is lighter than above, unicolorous, the front and clypeus not separated by a distinct suture.

Thorax. Pronotum very narrowly margined, disk finely striate, and with eight equal parallel reddish lines. Scutellum green, anterior portion with six reddish lines continued from the thorax, terminal portion transversely striate. Beneath, and legs, light green. Elytra uniform green, apical and anteapical cells irregular, numerous.

Abdomen unicolorous green.

The most common species of this genus.

***G. bipunctulata* , n. sp.**

Green, unmarked, except by a black spot near the anterior edge of the prothorax on either side.

Length 10 mm.

Head shorter, and with slightly blunter anterior margin than in *G. 8-lineata*. Transverse striations visible on the front, and the lore distinct.

Thorax with the pronotum faintly transversely striate, with the usual scars, and also bipunctate with black. Scutel-

lum with the usual scars and striations behind. Legs and under surface lighter. Elytra with five apical and four anteapical cells. Wings hyaline.

Abdomen unicolorous green.

Not so common as the preceding species.

***G. nigra*, n. sp.**

Black above; margin of the thorax and the elytra yellowish green; beneath green.

Length 9 mm.

Head. Above without median groove, the surface irregularly striated, the striæ extending obliquely forward; color black; eyes, a narrow margin near them, a line extending forwards and inwards from the ocelli, and a spot near the posterior margin of the head, behind them, yellowish green. Beneath green.

Thorax. Pronotum black, with the lateral margins, and sometimes a spot on the anterior edge, green. Beside the usual lateral scar, there is a smaller additional one just behind it. Only the posterior portion of the disk striate. Scutellum black, with the corners yellowish green. Legs and under surface lighter. Elytra with five apical and four anteapical cells, color light yellowish green, semi-transparent.

Abdomen black above and green below.

***G. albimarginata*, n. sp.**

Scutellum and elytra black; head, thorax, and edge of elytra greenish yellow. Beneath greenish marked with black.

Length 10 mm.

Head. Above, with a scar on either side near the base; color pale greenish yellow with the median groove and scars brown. Beneath yellowish green, with brown patches in the prominent frontal striations and on the genæ.

Thorax. Pronotum pale yellowish green, with the posterior border brown. Scars four, as in *G. nigra*. Only the posterior half of the disk striate. Scutellum black, with two brownish spots on either side near the front margin, and also, sometimes, a broad, shallow median groove, brown. Posterior

part brown, with lateral edges yellowish white. Elytra black, outer margin with a very broad, and the inner margin with a very narrow, edge of light greenish yellow. Veins near the tip margined with brown.

Abdomen. Beneath yellowish, marked with dark brown or black; lateral pieces with a curved dash of brown, and the median pieces with the basal half or two thirds, black or brown.

G. bimaculata, n. sp.

Rosaceous, head and anterior portion of the thorax greenish. Eyes, ocelli, and a small discal spot on elytra black.

Length 10 mm.

Head shorter than usual. Above, with the median groove represented by a black line, eyes and ocelli deep black, conspicuous. Beneath paler green; the upper edge of the genæ acute, black; antennæ black.

Thorax. Pronotum reddish, anterior part green and not striate. Scutellum finely and irregularly striate, reddish; posterior portion marked off by a narrow brown line and a coarsely granulated brown patch on either side, near the anterior corners. Elytra rosaceous, with a small conspicuous black spot near the middle. Wings brown, veins black.

Abdomen, beneath, green.

A beautiful species, also rare.

G. cinerea Uhler.

G. cinerea Uhler, Bull. U. S. Geol. Surv., Vol. III., p. 460.

I have not seen this species, but as it was described from Illinois I copy the original description:

"Aspect of *Philænus*, short, dark cinereous, more or less tinged with yellow. Head long-semilunate, angular at tip, and with the tip recurved, black; vertex flat, coarsely punctate with black, a little pubescent, impressed behind the apex generally with a short, impressed, longitudinal line, and each side with a longer one, or with simply indentations in their places; face irregularly dotted with piceous, and with a few punctures on the sides, the front convex transversely, more prominent above, triangularly impressed at base, sometimes with traces

of transverse brown lines; cheeks broad, the outer ones oblique, a little expanded, and broadly rounded, very slenderly tapering on the apical half. Antennæ largely piceous, or banded with piceous. Pronotum transversely rugulose, pointed with fuscous, a little punctate anteriorly and near the sides, a transverse series of short, indented lines behind the forward margin, and with a bald patch in the place of callosities; lateral margins oblique, slanting beneath the middle of the eyes, the edge narrowly recurved; propleuræ dotted with fuscous, the meso- and meta-pleuræ pale, a little tinged with piceous on the disks. Legs pale brownish, or dull testaceous, dotted with fuscous; the coxæ clouded with fuscous, and the femora and tibiæ more or less piceous on the upper face, and the latter sometimes also on the under face; tarsal joints either black beneath or at the apex or with the last joint; nails and pulvilli piceous. Scutellum short, acute, minutely rugulose and punctate at base and in patches, minutely dotted with fuscous at remote, unequal intervals. Hemelytra very broad, and with the costal margin more arcuated in the female than in the male, and with the cells shorter and more irregular; the nervules thick, prominent, margined each side, throughout, with fuscous, impressed punctures; the costal edge thickened, a little recurved, the submargin punctate with fuscous; apical cells longer and less oblique-sided in the female than in the male. Tergum more or less black, and the venter black basally, or with the disks only of the segments before the apex black, or with all the segments simply punctate with fuscous. The surface is generally invested with minute, prostrate, yellowish pubescence."

Length to tip of hemelytra, 7-9 mm. Width of pronotum, 2.5-3 mm.

EXPLANATION OF PLATES.*

PLATE I.

- Fig. 1.—Face of *Allygus irroratus* Say.
Fig. 2.—Face of *Agallia siccifolia* Uhler.
Fig. 3.—Vertex of same.
Fig. 4.—Antenna of *Oncometopia undata* Fabr.
Fig. 5.—Thorax of *Tettigonia mollipes* Say; ventral view.
Fig. 6.—Legs of *Oncometopia undata*.
Fig. 7.—Female generative organs of *Oncometopia undata*; ventral view.
Fig. 8.—The same; dorsal view.
Fig. 9.—The same; lateral view.

PLATE II.

- Fig. 10.—Head of *Oncometopia undata*; dorsal view.
Fig. 11.—The same; lateral view.
Fig. 12.—The same; ventral view.
Fig. 13.—Elytra of *Oncometopia undata*.
Fig. 14.—Wing of same.
Fig. 15.—Head of *Aulacizes irrorata* Fabr.; lateral view.
Fig. 16.—The same; ventral view.
Fig. 17.—Elytra of *Aulacizes irrorata*.
Fig. 18.—Wing of same.

PLATE III.

- Fig. 19.—Head and thorax of *Tettigonia mollipes* Say (female); dorsal view.
Fig. 20.—Head of *Tettigonia mollipes* (male); ventral view.
Fig. 21.—The same; lateral view.
Fig. 22.—Elytra of *Tettigonia mollipes*.
Fig. 23.—Wing of same.
Fig. 24.—Head and thorax of *Tettigonia hieroglyphica* Say; dorsal view.
Fig. 25.—Head of same; lateral view.
Fig. 26.—Head of same; ventral view.
Fig. 27.—Elytra of *Tettigonia tripunctata* Fitch.

*These figures are all original camera lucida drawings made by the author.

PLATE I.

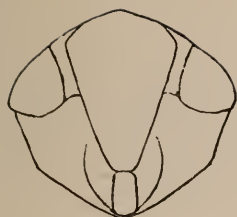


FIG. 1.



FIG. 2.



FIG. 3.

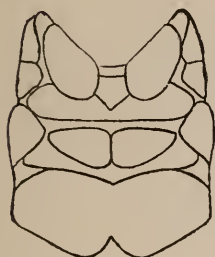


FIG. 5.



FIG. 4.



FIG. 8.



FIG. 6.

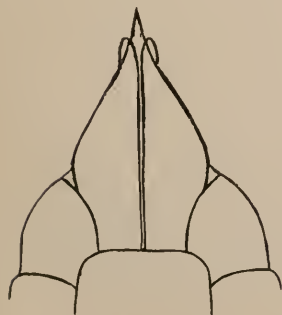


FIG. 7.



FIG. 9.

PLATE II.



FIG. 12.



FIG. 13.



FIG. 11.



FIG. 14.

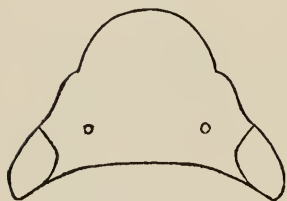


FIG. 10.

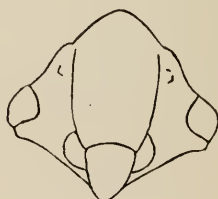


FIG. 16.

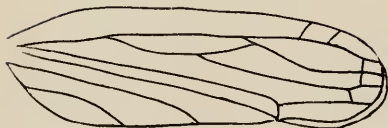


FIG. 17.

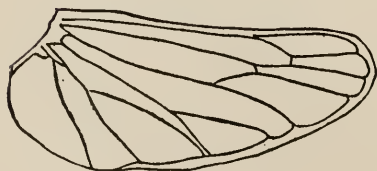


FIG. 18.



FIG. 15.

PLATE III.

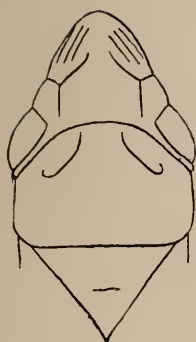


FIG. 19.



FIG. 21.



FIG. 20.



FIG. 22.

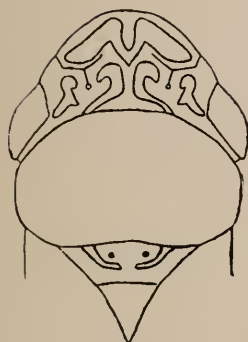


FIG. 24.



FIG. 23.



FIG. 26.



FIG. 27.



FIG. 25.

