



Title	Notes on the Japanese Mantispidae, with Special Reference to the Morphological Characters
Author(s)	KUWAYAMA, Satoru
Citation	Journal of the College of Agriculture, Hokkaido Imperial University, Sapporo, Japan, 15(4), 237-267
Issue Date	1925-06-20
Doc URL	http://hdl.handle.net/2115/12583
Type	bulletin (article)
File Information	15(4)_p237-267.pdf



[Instructions for use](#)

Notes on the Japanese Mantispidae, with Special
Reference to the Morphological Characters.

By

Satoru Kuwayama,

*Entomologist of the Hokkaido Agricultural Experiment Station ;
Lecturer on Economic Entomology in the College of Agriculture,
Hokkaido Imperial University.*

(With Plate XVI.)

INTRODUCTION.

Owing to the various works of MACLACHLAN, MATSUMURA, MIYAKE, NAKAHARA, NAVÁS, OKAMOTO, ESBEN-PETERSEN, and STITZ, our knowledge of the neuropterous fauna of the Japanese Mantispidae has gradually been extended, and it apparently required no further investigation. However, my reexamination of the material at hand reveals not only some new facts regarding the known species, but also one species and one variety new to science. In the following lines I wish to make various comments regarding them. My present study has been dealt with the species from Honshiu (Hondo), Shikoku, Kiushiu, Taiwan (Formosa), and Chosen (Corea), and the islands adjacent thereto. As far as known the family is not represented in Hokkaido and in Karafuto (Saghalien), the northern parts of our faunal region.

HISTORICAL.

The first writer to record the Mantispidae from our faunal region was MACLACHLAN. In 1875, he described (*♂*)¹⁾ a new species under the name of *Mantispa japonica* in his well known "Sketch."

1) Reference is made by number in parentheses to the bibliography.

In 1907,²⁾ MATSUMURA (7) recognized another new species, *Mantispa diminuta*, in addition to that of MACLACHLAN.

In 1909, NAVÁS (13) described a species as new to science, which he named *Mantispa Harmandi*. The specimen was captured at Tokyo.

In 1910, ENDERLEIN (5) published an epoch-making classification of the family, after studies on the collection of the Zoological Museum of Stettin. While no reference can be found in this paper to the Japanese species, yet in that year our knowledge was extended by MIYAKE and OKAMOTO. MIYAKE (8) published an account of his studies on the family in Japan proper. He recognized five species, three of them being new to science and one new to Japan, viz. *Mantispa magna* MIYAKE, *M. Nawae* MIYAKE, *M. Sasakii* MIYAKE, *M. 4-tuberculata* WEST., and *M. japonica* M' L., while MATSUMURA's *diminuta* was considered merely as an aberrant form of *japonica*. OKAMOTO (15) likewise added considerably to our knowledge of the family. His classification followed that of ENDERLEIN. He established a new genus *Eumantispa*, and recognized four genera and twelve species as occurring in Japan proper and Taiwan. His new species were as follows:—

Eumantispa suzukii, *Mantispa (Mantispsilla) formosana*, *Climaciella miyakei*, *Cl. habutsuella*, *Euclimacia vespiformis* and *Euc. badia*.

Of these species, the name of *Cl. miyakei* was proposed for MIYAKE's *M. 4-tuberculata* as his specimens were not considered to be of the latter species, but a true *M. 4-tuberculata* was represented in an example from Taiwan.

In the beginning of 1911, MIYAKE (9) reviewed and criticized OKAMOTO's work. OKAMOTO (16) also published a paper, written in German, the contents of which were almost identical with the preceding one.

In 1912, NAKAHARA (10) discussed the nomenclature of some species of *Eumantispa*. According to his conclusion, *Eumantispa sasakii* and *E. suzukii* were relegated to the list of synonyms of *E. harmandi*. Also he published (11) a paper, with annotations, of the known species and a description of one new species, *Climaciella subfusca*.

In 1913, NAKAHARA (12) also furnished a revision of the family of the regions dealt with, and recognized eleven valid species. In addition to this work, two most important papers appeared in that year. Both were concerning the species of Taiwan, and one was ESSEN-PETERSEN's work (17) on H. SAUTER's collection from Taiwan. He recognized in

2) Prior to this year, NAWA figured the Japanese species in the "Konchuu-Sekai" (Insect World), Gifu, Vol. 6, no. 59, pl. VII, figs. 5-8 (4 species), with the explanations on p. 301 (1902).

this material four species, of which one was a theretofore undescribed species, and which he named *Mantispa orientalis*. In the latter part of the same year, another treatise appeared by STITZ (19), this being his study on the collection of the Zoological Museum of Berlin. He recorded the following species as occurring in Taiwan:—

- Mantispilla nigra* STITZ
Mantispilla transversa STITZ
Mantispilla formosana OKAMOTO
 „ var. *minor* STITZ
 „ var. *major* STITZ
Mantispilla azihuna STITZ
Eumantispa harmandi NAVÁS
Climaciella quadrituberculata WESTWOOD
Climaciella habutsuella OKAMOTO
Euclimacia badia OKAMOTO
Euclimacia fusca STITZ

The works so far mentioned here are those most important for the systematic study of the Japanese Mantispidae. In fact, there are other records of the Mantispidae written in Japanese,³⁾ but they may be omitted here as foreign to our present purpose.

SOME NOTICEABLE MORPHOLOGICAL CHARACTERS FOR SYSTEMATIC STUDY.

The Mantispidae is among the most variable of insect groups, the individuals of a species differing widely in dimensions, venation, and colouration. Also some of the species possess remarkable secondary sexual characters. If due consideration is not given to these morphological characters, it is very probable that the determination will be unsuccessful. I will note on some of these characters as follows:—

I. The Variability in Dimensions.

The length of body as well as the length and width of wings are most variable among the individuals, and as NAKAHARA (12) has already

3) For example, NAKAHARA's papers in the "Konchū-Sekai" (Insect World), Vol. 16, pp. 12-15, 51 (1912); l. c., Vol. 17, pp. 94-99 (1913); the "Dobutsu-gaku Zasshi" (Zoological Magazine), Tokyo, Vol. 25, pp. 351-352 (1913); l. c., Vol. 25, pp. 620-621 (1913).

stated, the smallest and largest individuals differ in this respect to a rather remarkable extent, so that one might easily be misled into considering the extremes as being specifically distinct. A noticeable example of this variability is *Mantispa formosana*. Regarding this species ESSEN-PETERSEN (17) wrote that, among 112 specimens from Kosempo, Sokutso, Kankau and Taihorin, in the smallest specimens the expanse of fore wing measured 15 mm. and in the largest 29 mm. These variations may be recognized in other species, of which I shall cite some examples herewith.

TABLE I.—The dimensions of 12 specimens of *Mantispa japonica*.

No.	Sex	Length of body	Length of fore wing	Width of fore wing	Length of hind wing	Remarks
		mm	mm	mm	mm	<i>M. japonica</i>
1	♂	14.5	13.6	3.6	11.8	<i>japonica</i>
2	"	9.7	12.4	3.3	10.4	"
3	"	10.0	10.6	3.0	9.1	"
4	"	8.5	9.7	2.7	8.5	"
Average of ♂		10.7	11.6	3.2	10.0	
Range between the extremes		6.0	3.9	0.9	3.3	
						<i>M. japonica</i>
5	♀	14.5	15.2	4.2	13.0	<i>japonica</i>
6	"	13.6	13.0	3.6	11.2	"
7	"	12.1	12.7	3.3	10.6	"
8	"	10.6	12.7	3.6	10.9	"
9	"	10.3	12.1	3.3	9.7	"
10	"	10.3	11.8	3.3	9.4	"
11	"	10.3	11.5	3.3	10.0	"
12	"	9.7	10.6	3.0	9.1	"
Average of ♀		11.4	12.5	3.5	10.5	
Range between the extremes		4.8	4.6	1.2	3.9	

TABLE II.—The dimensions of 16 specimens of *Mantispa formosana*.

No.	Sex	Length of body	Length of fore wing	Width of fore wing	Length of hind wing	Remarks
		mm	mm	mm	mm	<i>M. formosana</i>
1	♂	12.7	11.2	3.3	9.7	<i>formosana</i>
2	„	12.4	10.3	3.0	8.8	„
Average of ♂		12.6	10.8	3.2	9.3	
Range between the extremes		0.3	0.9	0.3	0.9	
3	♀	12.7	11.2	3.3	9.4	<i>M. formosana</i>
4	„	11.5	11.2	3.3	9.7	<i>formosana</i>
5	„	11.5	10.9	3.0	9.1	„
6	„	9.4	9.4	2.4	8.2	„
Average of ♀		11.3	10.7	3.0	9.1	
Range between the extremes		3.3	1.8	0.9	1.5	
7	♂	7.9	9.1	2.7	7.0	<i>M. formosana</i>
8	„	9.7	8.8	2.7	7.6	<i>minor</i>
9	„	9.1	8.5	2.4	7.3	„
10	„	9.7	8.2	2.4	7.0	„
Average of ♂		9.1	8.7	2.6	7.2	
Range between the extremes		1.8	0.9	0.3	0.6	
11	♀	9.7	9.4	2.4	7.6	<i>M. formosana</i>
12	„	8.5	8.5	2.4	7.0	<i>minor</i>
13	„	8.2	8.2	2.4	6.7	„
14	„	8.2	8.2	2.4	6.7	„
15	„	8.2	7.9	2.4	6.7	„

Average of ♀		8. 6	8. 4	2. 4	6. 9	
Range between the extremes		1. 5	1. 5	0	0. 9	
16	♀	5. 2	5. 5	1. 5	4. 5	<i>M. formosana bella</i>

TABLE III.—The dimensions of 14 specimens of *Eumantispa harmandi*.

No.	Sex	Length of body	Length of fore wing	Width of fore wing	Length of hind wing	Remarks
		mm	mm	mm	mm	
1	♂	18. 2	20. 6	5. 5	17. 6	
2	„	19. 7	19. 7	5. 2	16. 1	
3	„	15. 8	19. 4	5. 5	16. 7	
4	„	17. 3	17. 9	4. 8	14. 5	
5	„	16. 7	17. 3	4. 5	14. 5	
Average of ♂		17. 5	19. 0	5. 1	15. 9	
Range between the extremes		3. 9	3. 3	1. 0	3. 1	
6	♀	24. 8	24. 8	6. 4	20. 6	
7	„	20. 6	23. 9	6. 4	20. 3	
8	„	22. 4	23. 6	6. 1	20. 3	
9	„	21. 8	22. 7	5. 8	19. 4	
10	„	20. 0	22. 3	5. 8	18. 8	
11	„	13. 3	19. 4	5. 2	15. 8	
12	„	16. 4	18. 2	4. 5	15. 5	
13	„	17. 0	18. 2	4. 5	15. 5	
14	„	13. 6	16. 4	4. 3	14. 5	
Average of ♀		18. 9	21. 1	5. 4	17. 9	
Range between the extremes		11. 5	8. 4	2. 1	6. 1	

TABLE IV.—The dimensions of 7 specimens of *Climaciella 4-tuberculata*.

No.	Sex	Length of body	Length of fore wing	Width of fore wing	Length of hind wing	Remarks
		mm	mm	mm	mm	
1	♂	15. 2	16. 4	4. 2	13. 6	
2	„	12. 4	11. 2	3. 0	9. 7	
3	„	7. 9	9. 1	2. 4	7. 9	
Average of ♂		11. 8	12. 2	3. 2	10. 4	
Range between the extremes		7. 8	7. 3	1. 8	5. 7	
4	♀	21. 2	15. 8	3. 9	13. 9	*approximately presumed.
5	„	18. 2	15. 8	3. 6	13. 6	
6	„	14. 5	12. 0 *	3. 5 *	10. 6	
7	„	10. 3	9. 7	2. 7	8. 5	
Average of ♀		16. 1	13. 3	3. 4	11. 7	
Range between the extremes		10. 9	6. 1	1. 2	5. 4	

As shown in the above tables, the variation in the dimensions occurs similarly in all the genera treated in my investigation, viz. *Mantispa*, *Eumantispa* and *Climaciella*, and it may be seen that any of the measurements, such as the length of body, wing, or the width of wing, are generally correlated to each other with a few exceptions. The range between the maximum and minimum is quite wide in all species examined, and they are compiled from the preceding tabulations, on a percentage basis, in the following table.

TABLE V.—The percentage range of variation between the extremes, as compared with the average, of the species treated in TABLES I–IV.

Species	Sex	Number of individuals examined	In the length of body	In the length of fore wing	In the width of fore wing	In the length of hind wing
<i>Mantispa japonica japonica</i>	♂	4	56. 1 %	33. 6 %	28. 1 %	33. 0 %
"	♀	8	42. 1	36. 8	34. 3	37. 1
<i>M. formosana formosana</i>	♂	2	2. 4	8. 3	9. 4	9. 7
"	♀	4	29. 2	16. 8	30. 0	16. 5
<i>M. formosana minor</i>	♂	4	19. 8	10. 4	11. 5	8. 3
"	♀	5	17. 4	17. 7	—	13. 0
<i>Eumantispa harmandi</i>	♂	5	22. 3	17. 4	19. 6	19. 5
"	♀	9	60. 9	39. 8	38. 9	34. 1
<i>Climaciella 4-tuberculata</i>	♂	3	66. 1	59. 8	56. 3	54. 8
"	♀	4	67. 7	45. 9	35. 6	46. 2

II. Variability in the Venation of the Wings.

The venation of the wings is one of the important taxonomic characters and has been used for diagnostic purposes. Especially, in the classification made by ENDERLEIN (5), the second anal vein or Ax_1 in the fore wing (forked or not), the cubitus in the hind wing (bent or not), the number of the cross-veins in the radial area or the number of the branches of the radial sector (especially those given off opposite the first radial cell) etc., have been used, and they are accepted by many students. But the number of cross-veins or branches is not constant, and sometimes differs in the two wings of a single individual. I will first record my data in the following tables:—

TABLE VI—The wings of 12 specimens of *Mantispa japonica*.

No.	Sex	Fore wing						Hind wing						Remarks		
		Right			Left			Right			Left					
1	♂	7 ^a	2	9	2 ^b	4	3	7	2	7	2	2	3	3	3	a) I is forked. b) Both unite at distal half. (c) Damaged. a) I is forked. b) In addition, I incomplete vein which does not cross over the cell. { a) In addition, I incomplete vein. a) I is forked. b) I is forked.
2	"	7	2	7	2	2	3	6	2	7	1	3	3	5	3	
3	"	5	2	6	1	3 ^a	2	6	4	6	{ 1 1 } 0	3	4	2	6	
4	"	5	2	5	1	2	2	5	5	2	1	2 ^a	4	2	2	
5	♀	6	2	7	2	2	2	6	2	6	2 ^a	8	2	2	2	
6	"	7	2	6	2	2 ^a	2	8	2	8	3	8	2	2	2	
7	"	7	2	6	1	3	2	6	2	6	2	4	2	2	2	
8	"	8	2	7	2	2	2	5	2	7	2	5	2	2	2	
9	"	8	2	7	1	3	3	8	2	7	2	5	2	2	3	
10	"	7	2	7	1	3	3	7	2	7	2	7	2	2	2	
11	"	6	2	7	2	2	2	7	2	6	3	7	2	2	2	
12	"	7	2	7	1	3	3	7	2	7	3	4	2	2	3	

Note:— Nos. 1—12 *Mantispa japonica japonica*.

TABLE VII—The wings of 16 specimens of *Mantispa formosana*.

No.	Sex	Fore wing						Hind wing						Remarks	
		Right			Left			Right			Left				
1	♂	6	2	1	6	2	5	2	5	1	2	2	2	2	Remarks a) 1 is forked. b) Damaged. a) Damaged. o+1 i= incomplete branch.
2	♂	8	2	1	7a	2	4	2	5	2	5	2	1	2	
3	♀	6	2	1	6	2	5	2	5	2	5	2	2	2	
4	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
5	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
6	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
7	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
8	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
9	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
10	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
11	♀	5	2	1	6	2	5	2	5	2	5	2	2	2	
12	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
13	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
14	♂	6	2	1	6	2	5	2	5	2	5	2	2	2	
15	♂	7	2	1	6	2	5	2	5	2	5	2	2	2	
16	♀	6	2	1	6	2	5	2	5	2	5	2	2	2	

Note:— Nos. 1 - 6 *Mantispa formosana formosana*
 Nos. 7 - 15 *M. formosana minor*
 No. 16 *M. formosana bella*

TABLE VIII—The wings of 14 specimens of *Eumantispa harmandi*

No.	Sex	Fore wing								Hind wing								Remarks
		Right				Left				Right				Left				
		Number of cross-veins in the costal area.	Number of cross-veins in the radial area.	Number of branches from radial sector.	Number of branches given off opposite the 1st radial cell.	Number of cross-veins in the costal area.	Number of cross-veins in the radial area.	Number of branches from radial sector.	Number of branches given off opposite the 1st radial cell.	Number of cross-veins in the costal area.	Number of cross-veins in the radial area.	Number of branches from radial sector.	Number of branches given off opposite the 1st radial cell.	Number of cross-veins in the costal area.	Number of cross-veins in the radial area.	Number of branches from radial sector.	Number of branches given off opposite the 1st radial cell.	
1	♂	11	5 ^a	11	4	10	5 ^b	11	2	12	5 ^c	11	2	10	5	11	4	a) 1 is forked. b) 2 are forked. c) In addition, 1 incomplete vein.
2	"	10	10	10	10	11	6	11	3	10	3 ^a	10	3	9	4 ^b	10	3	a) In addition, 2 incomplete veins. b) In addition, 1 incomplete vein. c) Damaged.
3	"	11	5	11	3	10	4 ^a	11	3	11	4 ^b	9 ^a	3	10	5 ^b	11	4	a) 1 is forked. b) In addition, 1 incomplete vein.
4	"	9	5 ^a	10	2	10	4 ^b	11	2	6	7 ^a	11	2	8	6 ^c	10	2	a) In addition, 2 incomplete veins. b) 1 is forked; in addition, 2 incomplete veins. c) In addition, 1 incomplete vein.
5	"	9	5 ^a	12	2	10	6 ^b	10	2	8	6 ^c	10	3	8	6 ^d	9 ^a	3 ^a	a) In addition, 1 incomplete vein. b) 1 is forked; in addition, 2 incomplete veins. c) 1 is forked. d) 1 is forked; in addition, 1 incomplete vein.
6	♀	12 ^a	4 ^a	12 ^a	3	12	5	13	3	13	4	14	4	10	7	13	3	a) 1 is forked.
7	"	10	5	10	3	9	5	11	2	10	5	11	3	7	5 ^a	12	3	a) In addition, 1 incomplete vein.
8	"	11	4 ^a	12		12	4 ^a	12	2	12	4 ^b	11	3	11	5	13	3	a) In addition, 1 incomplete vein. b) 1 is forked.
9	"	10 ^a	6 ^c	12	2	10 ^a	6 ^c	12	2	9	6 ^b	12 ^a	3	10	6 ^d	13 ^a	3	a) 1 is forked. b) 2 are forked. c) In addition, 1 incomplete vein. d) In addition, 1 incomplete vein; there are 2 series which are jointed by a short veinlet between 2 cross-veins.
10	"	10	5 ^a	10 ^b	2 ^b	11	4 ^a	12	3	8	7	10 ^c	2	10	5 ^b	10 ^c	3	a) In addition, 2 incomplete veins. b) In addition, 1 incomplete vein. c) 1 is forked.
11	"	11	6	10	2	9 ^a	6 ^b	11	2	9	6 ^c	10 ^d	3 ^c	10	6	10	3	a) In addition, 1 incomplete vein. b) 1 is forked; in addition, 2 incomplete veins. c) 1 is forked. d) 2 are forked.
12	"	11	5	11	3	-b	-b	-b	-b	11	4 ^a	13	4	11	6	12	3	a) In addition, 1 incomplete vein. b) Damaged.
13	"	10	5	11	3	9	5 ^a	11	3	9	7 ^b	11	3	9	5	11	3	a) In addition, 1 incomplete vein. b) 1 is forked.
14	"	11	4 ^a	13	4	10	4 ^b	13	3	9	4 ^c	13 ^d	3 ^d	9	5 ^e	13	4	a) In addition, 1 incomplete vein and a recurrent vein. b) In addition, 3 incomplete veins and a recurrent vein. c) 2 are forked; in addition, 2 incomplete veins. d) 1 is forked; in addition, 3 incomplete veins; there are 2 series which are jointed by a short veinlet between 2 cross-veins. e) 1 is forked.

Notes on the Japanese *Mantispa*

As shown in the foregoing tables the venation of the wings is not only inconstant in all the species, but in certain cases the variation is of a considerable extent, and it is not unusual to find a difference between the wings of the same individual. Of the three examples above noticed, *M. formosana* is much specialized and less variable than the others, while *Eum. harmandi* is the most variable one. In any case, the number of the cross-veins in the costal area is most unstable, varying from 5 to 8 in the fore wing, 3 to 8 in the hind wing of *M. japonica*, 5 to 8 in the fore wing and 3 to 5 in the hind wing of *M. formosana*, and 9 to 12 in the fore wing and 6 to 13 in the hind wing of *Eum. harmandi*. But the cross-veins in the radial area are constantly 2 in number in the genus *Mantispa* (both *japonica* and *formosana*), excepting only one example, a male of *M. japonica*, which bears normally 2 in the right fore wing but 4 in the left. While in *Eum. harmandi*, it varies not only from 4 to 6 in the fore wing and 3 to 7 in the hind wing, but some of the cross-veins are forked, and in addition, there appear even some additional ill-developed veins. But it may be true that the cross-veins in the radial area are 2 in the genus *Mantispa*, and more than 3 (variable according to the individual) in the genus *Eumantispa*, the two genera thus being separated by this character.

Regarding the branches from the radial sector, or radial sector radii, the number of them is also variable according to the individual, even on the two sides of the same individual, and for this reason the number of branches which are given off opposite the 1st cell R_1 is not constant. For instance, the number of the total branches from the radial sector varies from 5 to 9 in the fore wing and 6 to 8 in the hind wing of *M. japonica*, 3, 4 or 5 in both wings of *M. formosana*, and 10 to 13 in the fore wing and 9 to 13 in the hind wing of *Eum. harmandi*. The number of the branches of 1st cell R_1 varies from 1 to 2 in the fore wing and 2 to 3 in the hind wing of *M. japonica*, from 2 to 4 in both wings of *Eum. harmandi*, but constantly 1 in the fore wing and 1, rarely 2, in the hind wing of *M. formosana*. Thus in the above three species, the numbers concerned can not be adopted as a diagnostic character except in the case of *M. formosana*, of which the number of branches are fixed in some groups, and we may only demarcate the varieties by the use of this character. *Mantispa* and *Mantispa* were established as subgenera by ENDERLEIN on the basis of one or two branches of the radial sector from the 1st cell

R_1 , and this is used as a generic character by some students,⁴⁾ such as STITZ. If we may use only this character to separate the genera or subgenera, it surely will result in confused identifications. For example the female of *Mantispa orientalis*, which was described from the male by ESBEN-PETERSEN, was described as *Mantispilla nigra* by STITZ, and *Mantispa formosana* which was first described by OKAMOTO as belonging to the genus *Mantispa* and to the subgenus *Mantispilla*, was assigned to the genus *Mantispa* by ESBEN-PETERSEN and to the *Mantispilla* by STITZ. For the reasons mentioned above it may be proper to abolish the use of the number of branches of the radial sector from 1st cell R_1 as a generic character, and consequently to include the genus or subgenus *Mantispilla* in the genus *Mantispa*. Regarding this point of view, my opinion is in accord with that of NAKAHARA (11, 12) and COMSTOCK (4).

III. Variability in Colouration.

The shade of colour, particularly of the pronotum, the pterostigma &c., is used as a diagnostic character between the species. But Mantispidæ cannot avoid the variation in colouration such as occur in other insect groups. I will cite some examples.

(1) The ground colour of the pronotum.

One of the best examples in this respect is the colouration of *Mantispa formosana*. As recorded in the original description by OKAMOTO, the colour shade on the pronotum varies greatly according to the individual, this extending also to other parts such as the head or abdomen, ochraceous-yellow to dark brown in the ground colour, and raw sienna to blackish-brown in the longitudinal streaks of various shades. Other good examples are those of the pronotum of some *Climaciella*. Regarding this point, NAKAHARA (12) states of *Climaciella habutsuella* and *Cl. miyakei* as follows:—

“OKAMOTO stated that the prothorax of the species is deep black, but I have found a Tanegashima specimen which had the prothorax not black but brownish.” (*Cl. habutsuella*)

4) BANKS (1) recognized both *Mantispa* and *Mantispilla* as good genera, but he used as a diagnostic character the features of the pronotum, whether hairy or not, wrinkled or not &c., so that the definitions of the genera made by ENDERLEIN and BANKS differ very much, and BANKS' consideration on the genera therefore need not be referred to in the present paper.

"Prothorax is commonly brown, but sometimes deep black as in *habu-tsuella*. It is a noteworthy fact that this colour variation occurs in *Climacella*." (*Cl. miyakei*)

I also found that the ground colour of the prothorax to be deep black in *Cl. habu-tsuella* and dark brown or brownish-black in *Cl. miyakei* in general, but sometimes one has a close resemblance to the other in this respect, and it is therefore unwise to adopt this as the first diagnostic character. The tendency above mentioned occurs also in other species.

(2) The colour of the pterostigma.

The colour of the pterostigma also has been used for diagnostic purposes, though this is not constant in any species. We can observe this readily in *Eumantispia harmandi* or *Mantispia japonica*. Regarding the former case NAKAHARA (10) mentions in his paper that it varies from blood-red to dark red or dark orange-red. I find in *Mantispia japonica* that it varies from buckthorn brown to burnt sienna or brick-red in various shades according to the individual.

IV. Secondary Sexual Characters.

As in the other insect groups, we can find in the Mantispidae many remarkable secondary sexual characters indirectly correlated with the genital organs, such as colouration, structure, or dimensions. This fact requires our attention in systematic studies. I will point out some examples represented among our species.

(1) *Mantispia orientalis*.

♂. In the fore wing, the origin of the radial sector and the two following cross-veins in the radial area brownish shaded.

♀. No such shade as mentioned above is observable.

(2) *Mantispia formosana*.

♂. In both wings, the pterostigma is rather longer and comparatively narrower than in the opposite sex. In the other words, the angle of the costal margin across the pterostigma to the radius is narrow.

♀. The pterostigma of both wings is rather shorter and comparatively wider than the other. In the other words, the angle of the costal margin across the pterostigma to the radius is wide.

(3) *Eumantispa harmandi*.

♂. A blackish band across the base of the antennæ is very broad and entirely covering on the face.

♀. A blackish band on the face is narrow, scarcely wider than the width of the antennal base.

(4) *Euclimacia badia*.

Regarding this species I have not been able to examine many specimens, but I presume that the following will be acceptable according to the descriptions made by OKAMOTO and ESBEN-PETERSEN, as well as the few specimens at my disposal.

♂. Size smaller than the opposite sex; no clear markings on the pleura of the 1st abdominal segment.

♀. Size larger. A clear crescent-shaped lemon-yellow patch on each pleura of the 1st abdominal segment.

SYSTEMATIC.

Family **Mantispidæ**

On his publication of an excellent classification of the Mantispidæ in 1911, ENDERLEIN (5) divided the family into two subfamilies.

Key to the Subfamilies.

- A* Front tarsi with one claw and without pulvillus; front coxæ divided more or less plainly into two parts. Mantispidæ
AA Front tarsi with two claws and also with pulvillus; front coxæ entire. Anisopterinae

As far as I am aware, the subfamily Anisopterinae is not represented in the regions covered in this paper.

Subfamily **Mantispinae**

ENDERLEIN, Ent. Zeit., Stett., Jg. 71, p. 341 (1910).

Key to the Genera.

- A* Second anal vein (or Ax_1) of the fore wing forked; radial cells of both wings long and narrow; cubitus in the hind wing not bent towards the anal; prothorax short and stout. *Euclimacia* ENDERLEIN
AA Second anal vein not forked.
B Radial cells of both wings long and narrow; cubitus in the hind wing not bent downwards

- towards the anal, both being connected with a cross-vein; prothorax short and stout. ...
 *Cl. maciella* ENDERLEIN
- BB** Radial cells of both wings wide and somewhat angulated; prothorax slender.
- C** Radial areas of both wings usually divided into 5 to 7 radial cells on account of the several cross-veins; cubitus in the hind wing does not perceptibly bend down towards the anal, and a cross-vein connecting both. *Eumantispia* OKAMOTO
- CC** Radial areas of both wings having only 2 cross-veins which form three radial cells; cubitus in the hind wing bends down towards the anal, touching the anal or connected with it by a very short cross-vein. *Mantispia* ILLIGER

I. Genus *Mantispia* ILLIGER

Mantispia "ILLIGER, Verz. Käfer Preussens, p. 499 (1798)"; ENDERLEIN, Ent. Zeit., Stett., Jg. 71, p. 344 (Subgen. *Mantispia* and *Mantispilla*, l. c., p. 355 and 346) (1910); OKAMOTO, Zool. Mag., Vol. 22, p. 534 (1910); NAKAHARA, Zool. Mag., Vol. 24, p. 559 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 230 (1913); BANKS, Trans. Am. Ent. Soc., Vol. 39, p. 206 (1913) in part.

Key to the Species.

- A** Pronotum entirely black to brownish-black, abdomen jet-black with yellowish segmental margins; wings hyaline, with a faint yellowish-brown tinge.
 *M. orientalis* ESBEN-PETERSEN
- AA** Pronotum with some patches, abdomen not jet-black; wings hyaline.
- B** Pronotum blackish-brown with a yellowish transverse band on its dilated anterior portion, but no streaks on it. *M. transversa* STITZ
- BB** Pronotum variegated with pale yellowish-brown, brown or dark-brown in the ground colour.
- C** Pronotum with longitudinal streaks.
- D** Pronotum yellowish-brown to dark-brown with 3 dark longitudinal streaks.
 *M. formosana* OKAMOTO
- E** Body usually longer than 10 mm.; the branches from the radial sector of both wings usually totaling 5. *M. formosana formosana* OKAMOTO
- EE** Body usually less than 10 mm.; the branches from the radial sector of both wings usually totaling 4. *M. formosana minor* STITZ
- EEE** Body usually less than 6 mm.; the branches from the radial sector of both wings usually totaling 3. *M. formosana bella* var. nov.
- DD** Pronotum pale brown to yellowish-brown with a brownish longitudinal streak; the dilated anterior portion margined before and behind with dark brownish transverse bands. *M. azihuna* STITZ
- CC** Pronotum with no conspicuous longitudinal streak. *M. japonica* MACLACHLAN
- D** Pronotum dark-brown, with a blackish-brown marginal band and a yellowish transverse band on the dilated anterior portion, the latter band being nearly broken at the middle by an extension of the former. *M. japonica japonica* MACLACHLAN
- DD** Pronotum mostly brown or dark-brown; the dilated anterior portion being margined with the ground colour, and lacking or slightly showing a yellowish transverse band on that portion. *M. japonica diminuta* MATSUMURA

1. *Mantispa orientalis* ESSEN-PETERSEN

(Pl. XVI fig. 9)

Mantispa orientalis, ESSEN-PETERSEN, Ent. Mitt., Bd. 2, p. 261, fig. 11 (1913).*Mantispa nigra* STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 3, fig. 4 (1913).

Local Distribution — Koshun (1 ♀, April 25 – May 25, 1918, leg. J. SONAN, K. MIYAKE, and M. YOSHINO) [in the collection of the Department of Agriculture, Government Research Institute of Formosa].

General Distribution — Taiwan.

In August 1913 ESSEN-PETERSEN established this species as *M. orientalis* on the basis of one male specimen from Hoozan collected by H. SAUTER, and in December of the same year, STITZ described one female of the identical locality by the same collector under the name of *M. nigra*. But ESSEN-PETERSEN (18) has already noted that any specific difference cannot be found between the two descriptions, and *M. nigra* may be relegated to a synonym of *M. orientalis*.

2. *Mantispa japonica* MACLACHLAN

(Pl. XVI figs. 2, 13 & 14)

Mantispa japonica MACLACHLAN, Trans. Ent. Soc. Lond., 1875-2, p. 178 (1875); MATSUMURA, Syst. Ent., Vol. 1, p. 168, fig. 204 (1907); MIYAKE, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 220, pl. XII figs. 5, 5a-b (1910); OKAMOTO, Zool. Mag., Vol. 22, p. 535, fig. 1, pl. XVII fig. 3 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 296 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 560 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 231 (1913).

Local Distribution—Aomori (1 ♀, leg. I. NITOBE), Gifu (1 ♂, August 1914, leg. K. NAGANO), Minomo, near Osaka (1 ♀, July 24, 1915, leg. K. TAKEUCHI; 1 ♀, July, 1917, leg. T. ESAKI), Mt. Iwawaki, Prov. Kii (1 ♂, July 19, 1912, leg. S. ISSHIKI), Shakuôji, Kankyô-nandô (1 ♂, July 27, 1922, leg. T. UCHIDA), Sanbô, Kôgendô (1 ♀, August 1, 1922, leg. T. UCHIDA) [in the author's collection]; Akabane, near Tokyo (1 ♂ 1 ♀, leg. OGAWA), Shimauchi, Prov. Shinano (1 ♂ 2 ♀ ♀, July 15, 1924, leg. H. KÔNO), Mt. Iwawaki, Prov. Kii (1 ♀, July 10, 1913, leg. S. ISSHIKI), Mt. Daisen, Prov. Hôki (1 ♂ 1 ♀, August 18-19, 1922, leg. S. MATSUMURA), Prov. Iyo (1 ♀, leg. S. ARAKAWA) Shakuôji, Kankyô-nandô (1 ♂ 1 ♀, July 27, 1922, leg. T. UCHIDA) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Minomo, near Osaka (1 ♀, July, 12, 1914, leg. T. ESAKI) [in ESAKI's collection]; Shakuôji, Kankyô-nandô (2 ♂ ♂ 2 ♀ ♀, July 27, 1922, leg. T. UCHIDA), Mt. Kongô (Onseiri), Kôgendô (1 ♂, July 25, 1924, leg. H. OKAMOTO and KURISUE) [in OKAMOTO's collection].

General Distribution — Honshiu, Shikoku, Kiushiu (after NAKAHARA), Chosen.

This species is well distributed, ranging from the northern part of Honshiu to Kiushiu as well as to Chosen, and is not rare.

2a. *Mantispa japonica* MACLACHLAN

var. *diminuta* MATSUMURA

(Pl. XVI fig. 15)

Mantispa diminuta MATSUMURA, Syst. Ent., Vol. 1, p. 169 (1907); MIYAKE, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 220 (1910).

Mantispa (Mantispsilla) diminuta OKAMOTO, Zool. Mag., Vol. 22, p. 536, pl. XVII fig. 6 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 296 (1911).

Local Distribution — Mt. Ibuki, Prov. Oomi (1 ♂, August 1, 1914, leg. K. TAKEUCHI) [in the author's collection]; Nakano, near Tokyo (1 ♂, August 28, 1905, leg. S. MATSUMURA), Gifu (1 ♂, September 10, 1914, leg. NAWA), Shakuôji, Kankyô-nandô (1 ♀, July 27, 1922, leg. T. UCHIDA) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Shakuôji, Kankyô-nandô (1 ♀, July 27, 1922, leg. T. UCHIDA) [in OKAMOTO's collection].

General Distribution — Honshiu, Chosen.

Regarding this species, MIYAKE (8) quoted the original description of MATSUMURA and remarked as follows: "..... but the too simple description does not enable me satisfactorily to determine it, the more so as I can not recognize the specific difference between *japonica* and *diminuta*. Until a more precise description of *diminuta* is published, I shall have to look upon the specimen provisionally as merely an aberrant form of *japonica*." But OKAMOTO (15, 16) followed MATSUMURA's determination, placing it in subgenus *Mantispsilla*, and stating also that the two, *japonica* and *diminuta*, may be distinguished by means of the characters of the wing veins, colour of the pterostigma, spots on the abdomen, &c. NAKAHARA (11, 12) conclusively pronounced *M. diminuta* to be a synonym of *M. japonica*, representing merely an individual variation. Nevertheless, in examining many specimens of the genus from many localities of Japan proper as well as MATSUMURA's type of *M. diminuta*, I have found more distinct characters for distinguishing varietally between *japonica* and *diminuta*. That is, I conclude the chief difference between the two forms to be the colouration of the dilated anterior portion of pronotum, and the size. In *diminuta*, the dilated anterior portion is mostly brownish and not clearly, margined with a dark brownish band, but only with the ground colour,

and also lacking or slightly showing the yellowish band, the size is smaller than that of the latter species, while the genitalia of the both sexes are similar on the main points, as compared with those of *japonica*. The characters for diagnostic purposes as presented by OKAMOTO are acceptable, but they are occasionally confounded with individual variations.

3. *Mantispa formosana* OKAMOTO

(Pl. XVI figs. 6 & 16)

Mantispa (Mantisquilla) formosana OKAMOTO, (as MATSUMURA's manuscript), Zool. Mag., Vol. 22, p. 537, pl. XVII fig. 7 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 297 (1911).

Mantispa formosana NAKAHARA, Zool. Jap., Vol. 24, p. 561 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 232 (1913); ESBEN-PETERSEN, Ent. Mitt., Bd. 2, p. 261 (1913).

Mantisquilla formosana STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 6 (1913).

Mantisquilla formosana var. *major* STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 7, fig. 6 (1913).

Local Distribution — Tainan (3 ♂♂ 1 ♀, July 14–17, 1907, leg. S. MATSUMURA), Mt. Arisan (1 ♀, June 25, 1907, leg. S. MATSUMURA) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Koshun (3 ♀♀, April 25–May 25, 1918, leg. J. SONAN, K. MIYAKE, and M. YOSHINO), Taito (1 ♂ 1 ♀, February 25–March 27, 1919, leg. S. INAMURA, J. SONAN, and M. YOSHINO), Mt. Arisan (1 ♂, October 2–23, 1918, leg. J. SONAN and M. YOSHINO) [in the collection of the Department of Agriculture, Government Research Institute of Formosa].

General Distribution — Taiwan; Sumatra (after STITZ, as a variety).

This is one of the most common species in Taiwan, and varies greatly in size and colour among the individuals. STITZ (19) recorded the occurrence of this species in Sumatra and named that form var. *sumatrana*. This species closely resembles *M. luzonensis* NAVÁS, which was originally described from the Philippine Islands, but the differences in body colouration and in other characters justifies their separation into distinct species.

3a. *Mantispa formosana* OKAMOTO var. *minor* STITZ

(Pl. XVI fig. 12)

Mantisquilla formosana var. *minor* STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 6 (1913).

Local Distribution — Kanshirei (2 ♂♂ 2 ♀♀, April 23, 1922, leg. K. TAKEUCHI), Kagi (1 ♀, June 4, 1924, leg. M. KATO) [in the author's collection]; Tainan (3 ♂♂ 1 ♀, July 17, 1907, leg. S. MATSUMURA), Mt. Arisan (1 ♀, June 25, 1907, leg. S. MATSUMURA), Ako (1 ♂, July 12, 1907, leg. S. MATSUMURA), Shoka (1 ♂, July 20, 1907, leg. S. MATSUMURA) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Taito (1 ♂ 2 ♀♀, February 25–March 27, 1919, leg.

S. INAMURA, J. SONAN, and M. YOSHINO), Koshun (1 ♂ 1 ♀, April 25–May 25, 1918, leg. J. SONAN, K. MIYAKE, and M. YOSHINO), Mt. Arisan (1 ♂ 1 ♀, October 2–23, 1918, leg. J. SONAN and M. YOSHINO) [in the collection of the Department of Agriculture, Government Research Institute of Formosa].

General Distribution — Taiwan.

3b. *Mantispa formosana* OKAMOTO var. *bella* nov. var.

(Pl. XVI fig. 11)

This varietal form is very similar structurally to the typical species, but differs in the following respects:—

- 1) Size uniformly smaller throughout.
- 2) Antennae 21-jointed.
- 3) The general colour of body much darker; the streaks on the pronotum clearly blackish.
- 4) The venation of the wings is sparse; the branches from the radial sector are 3 in both wings.
- 5) On the outer side of the fore femora there appear dark brownish patches as on the inner side, forming two broad streaks.

Measurements: Length of body 5.2 mm., of fore wing 5.5 mm., of hind wing 4.5 mm., width of fore wing 1.5 mm.

Local Distribution — Kagi (1 ♀, Holotype, June 4, 1924, leg. M. KATO) [in the author's collection].

General Distribution — Taiwan.

4. *Mantispa azihuna* (STITZ)

Mantispa azihuna STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 7 (1913).

Local Distribution — Azihuna (type locality).

General Distribution — Taiwan.

This is the smallest species found in the Japanese regions, comparable in size to *M. formosana bella*. No specimens at my disposal.

5. *Mantispa transversa* (STITZ)

Mantispa transversa STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 5, fig. 5 (1913).

Local Distribution — uncertain.

General Distribution — Taiwan.

This species, originally described from as a Taiwan specimen, seems to be a very rare one on the island, and as far as I am aware, only the unique female type in the collection of the Zoological Museum of Berlin is at present known.

II. Genus *Eumantiswa* OKAMOTO

Eumantiswa OKAMOTO, Zool. Mag., Vol. 22, p. 538. (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 294 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 558 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 229 (1913).

Key to the Species.

- A* Pronotum uniformly yellow to ochraceous, with a large heart-shaped fuscous patch on the dilated anterior portion *E. harmandi* (NAVÁS)
AA Pronotum subequally fulvous, with dark brownish transverse fasciae.
 *E. taiwanensis* sp. nov.

6. *Eumantiswa harmandi* (NAVÁS)

(Pl. XVI figs. 3, 17 & 18)

Mantiswa Harmandi NAVÁS, Mem. de la Real Acad. de Cienc. y Art. de Barc., Vol. 7, p. 480 (1909).

Eumantiswa harmandi NAKAHARA, Zool. Mag., Vol. 24, p. 335, figs. 1-5 (1912); NAKAHARA, Zool. Mag., Vol. 24, p. 558 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 230 (1913).

Mantiswa Nawae MIYAKE, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 216, pl. XII figs. 4, 4 a-b (1910).

Eumantiswa nawae OKAMOTO, Zool. Mag., Vol. 22, p. 539 (1910); NAKAHARA, Zool. Mag., Vol. 24, p. 558 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 230 (1913).

Mantiswa Sasakii MIYAKE, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 217, pl. XII figs. 2, 2 a-b (1910).

Eumantiswa sasakii OKAMOTO, Zool. Mag., Vol. 22, p. 539 (1910).

Eumantiswa suzukii OKAMOTO, (as MATSUMURA's manuscript), Zool. Mag., Vol. 22, p. 538, fig. 2, pl. XVII fig. 1 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 295, fig. 1 (1911).

Local Distribution — Koiwai, Prov. Rikuchu (1 ♀, August 25, 1921, leg. C. TERANISHI), Kuzu, Prov. Shinano (1 ♂, August 4, 1914, leg. A. NOHIRA; 1 ♂, July 27, 1916, leg. K. TAKEUCHI), Minomo, near Osaka (2 ♂ ♂, June 19, 1916 & June 25, 1917, leg. K. TAKEUCHI), Mt. Daisen, Prov. Hōki (1 ♀, August 7, 1921, leg. Y. YAMADA) [in the author's collection]; Chichibu, Prov. Musashi (1 ♂, July 30, 1919, leg. S. HIRAYAMA), Shibata, Prov. Echigo (1 ♀, leg. K. HATAKEYAMA), Kyoto (1 ♀, August 4, 1907, leg. M. SUZUKI), Mt. Daisen, Prov. Hōki (3 ♀ ♀, August 18-19, 1922, leg. S. MATSUMURA), Shakuōji, Kankyō-nandō (1 ♀, July 27, 1922, leg. T. UCHIDA), [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Minomo, near Osaka (1 ♀, August 31, 1914, leg. T. ESAKI) [in ESAKI's collection]; Shakuōji, Kankyō-nandō (1 ♀, July 27, 1922, leg. T. UCHIDA), Shuotsu, Kankyō-hokudō (1 ♀, September 2, 1922, leg. Y. HASEGAWA), Gesseiji, Kankyō-nandō (1 ♀,

September 15, 1923, leg. S. MARUTA), Mt. Kongô (Chôanji & Makaen), Kôgendô (1 ♂ 3 ♀, August 1-3, 1924, leg. H. OKAMOTO and T. KURISUE) [in OKAMOTO's collection].

General Distribution — Honshiu, Chosen.

The distribution of this species is ranged from Honshiu to Chosen, and it is not at all rare throughout the regions. Heretofore many names were presented for this species, but, in my opinion all these names may be relageted to the synonyms of NAVÁS' *harmandi*. STRITZ (19, p. 31) recorded the occurrence of this species in Taiwan (1 ♂, Fuhosho, collected by SAUTER), and also described two varieties of it from Dutch New Guinea and Celebes. But it is very doubtful, especially in view of the descriptions and clear photographs of his new varieties.

7. *Eumantispa taiwanensis* sp. nov.

(Pl. XVI figs. 10 & 19)

Head dusky-orange, somewhat shiny, with pubescence sparse and of the same colour; nearly flat on the vertex, with a rather deep impression between the antennae and the margin of the eyes, and with a rather well defined central carina and crown tubercle; mid process of the occipital margin rather sharp; a large transverse -shaped raw-umber patch extends from the vertex to occiput; and a broad black transverse band covers the fore head, connecting the inner margins of the eyes across the bases of the antennae; clypeus, labrum, and palpi yellowish-brown; antennae 35-jointed, the large basal and short second joints being jet black, the others short, dull black, and with dark pubescence.

Prothorax entirely reddish-brown above, yellowish-brown on the underside; the dilated anterior portion of the pronotum margined anteriorly with dark brownish colour; two tubercles at the base of that portion rather small; between the tubercles and the pronotal base with a series of about ten transversal peaked ridges, being darkened on each peak, especially on the one or two near the base; pronotal base somewhat paler. Praescutum and mesoscutum blackish-brown, excepting the joint part of the latter which is broadly tinged with a buff colour; mesoscutellum honey-yellow; metascutum and metascutellum buff, the former somewhat suffused with grayish-brown; parapteron dark-brown; the undersides of the meso- and meta-thorax entirely grayish-brown.

Abdomen dark brown above, rather paler beneath in dry specimen. Outer genital part of the male has a brownish triangular genital plate

and two lateral appendages; the former is strongly curved upwards, darkened at the apex, and clothed with concolorous hair, from within proceeds for the whole length the spiniform penis; the latter two are stout but rather long, yellowish brown in colour with concolorous hair.

Legs ochraceous, except the anterior raptorial femora and tarsi, which are fulvous, and the tibia brownish, also each apex of the femora, tibia, tarsi, and the tibial spurs of the mid- and hind legs slightly tinged with reddish-yellow. The apex of the fifth tarsal segment, and the five-toothed claws, reddish-brown; pulvillus blackish.

Wings hyaline, with fuscous veins, excepting the basal and apical parts of the costa, the greater distal parts of the subcosta and radius, the inner margin, and anal veins, which are yellowish; pterostigma blood-red; an ochraceous opaque patch attached to the inner margin of the fore wing. In the fore wing, the cross-veins in the costal area number 10 to 11; radial area divided into 6 cells by 5 cross-veins, of which the first cell is larger than the others and followed by the sixth; the branches of the radial sector 13 to 14, arranged rather closer than those of *Eum. harmandi*, and 3 or 4 of the branches are given off opposite the first radial cell. In the hind wing, the cross-veins in the costal area number 6, excluding the indistinct ones; 6 cross-veins in the radial area, of which the first cell is the broadest, bearing 4 to 5 branches; the branches of the radial sector totaling 13 in number.

Measurements: Length of body 18.0 mm., of prothorax 5.5 mm., of fore wing 19.5 mm.; of hind wing 17.0 mm., width of fore wing 5.2 mm., of hind wing 4.7 mm.

Local Distribution — Shinchiku (1 ♂, Holotype, July 1-30, 1918, leg. J. SONAN and K. MIYAKE) [in the collection of the Department of Agriculture, Government Research Institute of Formosa].

General Distribution — Taiwan.

This species appears to be very close to *Eum. harmandi*, but differs in structure as well as in the colouration.

III. Genus *Climaciella* ENDERLEIN

Climaciella ENDERLEIN, Ent. Zeit., Stett., Jg. 71, p. 360 (1910); OKAMOTO, Zool. Mag., Vol. 22, p. 539 (1910); NAKAHARA, Zool. Mag., Vol. 24, p. 561 (1912); BANKS, Trans. Am. Ent. Soc., Vol. 39, p. 206 (1913).

Key to the Species.

A Each wing with a brownish, dark amber or nearly so, band along the anterior margin.

- B* Prothorax brown to dark-fulvous. *C. quadrituberculata* (WESTWOOD)
BB Prothorax dark-brown, brownish-black or deep black.
C A blackish line along the inner margin of the eye, which connects both the blackish occipital and frontal transverse bands. *C. miyakei* OKAMOTO
CC No blackish line along the inner margin of the eyes.
D The anterior and outer parts of both wings broadly light-brown, narrowly so along the branches of the radial sector. *C. subfusca* NAKAHARA
DD A dark amber band on the anterior and outer parts of both wings, but not along the branches of the radial sector. *C. habutsuella* OKAMOTO
AA No coloured band on either wing, suffused only with light fulvous-brown at the base of the fore wing and on the anterior margins of both wings from the base to the apex.....
..... *C. magna* (MIYAKE)

8. *Climaciella quadrituberculata* (WESTWOOD)

(Pl. XVI fig. 4)

Mantispa quadrituberculata "WESTWOOD, Trans. Ent. Soc. Lond., n. ser. 1, p. 264, pl. XVIII fig. 1 (1852)"; VAN DER WEELE, Notes Leyd. Mus., Vol. 31, p. 93, pl. V fig. 40 (1909); NEEDHAM, Rec. Ind. Mus., Vol. 3, p. 195 (1909).

Climaciella quadrituberculata ENDERLEIN, Ent. Zeit., Stett., Jg. 71, p. 361 (1910); OKAMOTO, Zool. Mag., Vol. 22, p. 540, fig. 3, pl. XVII fig. 2 (1910); OKAMOTO, Zool. Anz., Vol. 37, p. 298 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 563 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 234, (1913); ESBEN-PETERSEN, Ent. Mitt., Bd. 2, p. 262 (1913); STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 32 (1913).

Local Distribution—Takesaki (1 ♂, September 13, 1923, leg. M. KATO) [in the author's collection]; Shirin (1 ♂ 1 ♀, July 31, 1906, leg. S. MATSUMURA), Shinsha (1 ♀, July 24, 1906, leg. S. MATSUMURA) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Taihoku (1 ♂ 2 ♀ ♀, June 1919, leg. S. INAMURA) [in the collection of the Department of Agriculture, Government Research Institute of Formosa].

General Distribution—Taiwan; North India (West Himalayas, Assam), Annan (Tong-king), and West Java.

It is probable that our form should be separated from the original one described from North India, but I have no specimens from the type locality for purposes of comparison, and both of the WESTWOOD's description and drawing are entirely useless for determining specific differences. This species is one of the common Mantispidids throughout Taiwan from April to July, and it is a remarkable fact that one example has been caught in September. This example differs from the others in its larger size, somewhat pale colour of the marginal band of the wings, etc. However I consider that it is more logical to regard the above differences merely as individual variations.

9. *Climaciella miyakei* OKAMOTO

(Pl. XVI fig. 8)

Mantispa 4-tuberculata MIYAKE (nec WESTWOOD), Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 218, pl. XII figs. 1, 1 a-b (1910).

Climaciella miyakei OKAMOTO, Zool. Mag., Vol. 22, p. 541 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 299 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 563 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 235 (1913).

Local Distribution — Kyoto (1 ♀, leg. M. SUZUKI) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University]; Koshigoe, near Kamakura (1 ♂, September 5, 1923, leg. S. ONO) [in ESAKI's collection].

General Distribution — Honshiu.

This species is rather rare in Honshiu, and as far as at present known, restricted to that island, and appearing in the months of August and September. ESAKI has informed me that his specimen above mentioned was attracted to candle light during the disturbance following the terrible earthquake disaster of September 1, 1923 at Tokyo and the vicinity, and was taken at that time. That example has a deep blackish prothorax and a deep amber band on each wing, as in *habutsuella*.

10. *Climaciella habutsuella* OKAMOTO

(Pl. XVI fig. 5)

Climaciella habutsuella OKAMOTO, Zool. Mag., Vol. 22, p. 542 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 300 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 563 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 234 (1913); STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 32 (1913).

Local Distribution—Nagasaki (2 ♂ ♂, August 5, 1914, leg. Y. HORIKAWA) [in the author's collection]; Prov. Harima (2 ♀ ♀), Yakushima Is., adjacent to the southern Kiushiu (1 ♂, leg. K. HABUTSU) [in the collection of the Entomological Institute, College of Agriculture, Hokkaido Imperial University].

General Distribution — Honshiu, Kiushiu, and Taiwan (after STITZ); Philippine Islands (after STITZ, as varieties).

The specimens in my possession have the brownish-black prothorax, similar to *miyakei*, as previously stated. STITZ (19) recorded the distribution of this species in Taiwan and the Philippine Islands, and named the latter examples as var. *maculata* for Mindoro specimens and var. *fasciata* for Samar specimens.

11. *Climaciella subfusca* NAKAHARA

Climaciella subfusca NAKAHARA, Zool. Mag., Vol. 24, p. 562, figs. 1 & 2 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 232, fig. 1 (1913).

Local Distribution — Prov. Harima (type locality).

General Distribution — Honshiu.

This species seems to be a very rare one, and, as far as I am aware, up to the present time no specimens have been added to the unique type. I have not yet examined this type personally.

12. *Climaciella? magna* (MIYAKE)

Mantispa magna MIYAKE, Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. 2, p. 214, pl. XII figs. 3, 3 a-c (1910).

Climaciella magna OKAMOTO, Zool. Mag., Vol. 22, p. 542 (1910); NAKAHARA, Zool. Mag., Vol. 24, p. 564 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 235 (1913).

Local Distribution — Fukuoka-ken (type locality).

General Distribution — Kiushiu.

No specimens have been at my disposal. This magnificent species was at first placed under *Mantispa*, in the wide sense, by MIYAKE, and then transferred to *Climaciella* by OKAMOTO. But as NAKAHARA (11, 12) has mentioned already, the characters of this species do not conform entirely to that of *Climaciella*, and I consider that it may belong to the genus *Entanoneura*, which was erected by ENDERLEIN in 1910. Moreover, MIYAKE (8, p. 216) wrote that "it is allied to a certain extent to *Mantispa areolaris* of WESTWOOD, but is readily to be distinguished in many respects." *M. areolaris* has now been transferred to *Entanoneura* by ENDERLEIN (5, p. 359). As I have not been able to examine this species personally, I shall refrain from revising the generic position at the present time. According to MIYAKE, "this is undoubtedly the largest species of the genus in Japan and presumably one of the largest of the whole family," measuring in expanse of wings 64 mm., and in length of body 27 mm.

IV. Genus *Euclimacia* ENDERLEIN

Euclimacia ENDERLEIN, Ent. Zeit., Stett., Jg. 71, p. 362 (1910); OKAMOTO, Zool. Mag., Vol. 22, p. 542 (1910); NAKAHARA, Zool. Mag., Vol. 24, p. 565 (1912); BANKS, Trans. Am. Ent. Soc., Vol. 39, p. 206 (1913).

Key to the Species.

- A* Both wings pale orange-yellow, and each with a large dark grayish patch on the apical part *E. vespiformis* OKAMOTO
- AA* Both wings almost pale yellowish-brown, and each with a large brownish band on the costal half.
- B* Antennæ almost pale brown; a blackish transverse band on the pronotum.
..... *E. fusca* STITZ
- BB* Antennæ blackish, excepting two basal and four apical joints; no blackish band on the pronotum, but 4 spots arranged transversely. *E. badia* OKAMOTO

13. *Euclimacia badia* OKAMOTO

(Pl. XVI figs. 1, 20 & 21)

Euclimacia badia OKAMOTO, Zool. Mag., Vol. 22, p. 543, fig. 4, pl. XVII fig. 5 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 301 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 565 (1912); NAKAHARA, Ann. Zool. Jap., Vol. 8, p. 236 (1913); ESBEN-PETERSEN, Ent. Mitt., Bd. 2, p. 262 (1913); STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 41 (1913).

Local Distribution — Kuraru, Koshun-district (2 ♀ ♀, September 3-4, 1921, leg. T. ESAKI) [one each in ESAKI's and the author's collections].

General Distribution — Taiwan.

This species may not be so rare as compared with others of this genus in the region just referred to. This is apparently close to *Euc. tagalensis* BANKS of the Philippine Islands, but is easily distinguishable from the latter in the presence of black spots on the pronotum and in other respects also.

14. *Euclimacia fusca* STITZ

Euclimacia fusca STITZ, Mitt. Zool. Mus. Berl., Bd. 7, p. 41, p. fig. 36 (1913).

Local Distribution — uncertain.

General Distribution — Taiwan.

This species was described from one female collected by H. SAUTER, but no specimen has been available to me for examination.

15. *Euclimacia vespiformis* OKAMOTO

(Pl. XVI fig. 7)

Euclimacia vespiformis OKAMOTO, Zool. Mag., Vol. 22, p. 543, pl. XVII fig. 4 (1910); OKAMOTO, Zool. Anz., Bd. 37, p. 300 (1911); NAKAHARA, Zool. Mag., Vol. 24, p. 566 (1912); NAKAHARA, Ann. Zool. Jap. Vol. 8, p. 236 (1913).

Local Distribution — Horisha (type locality).

General Distribution — Taiwan.

No specimens at my disposal. NAKAHARA (11, 12) states concerning this species that "this seems to be a species closely allied to *Euclimacia partita* ENDERLEIN." However they are clearly distinguishable in many respects, particularly in the size of the apical patches of both wings, in the colouration of the abdomen, etc.

ACKNOWLEDGMENTS.

I take pleasure at this time in expressing thanks for the valuable assistance which Dr. S. MATSUMURA, Professor of Entomology in the Hokkaido Imperial University, and Dr. H. OKAMOTO, formerly Entomologist of the Agricultural Experiment Station, Government-General of Chosen, have given by their careful supervision of the work and for the thoughtful suggestions during the course of the study. Thanks are also due to Dr. T. SHIRAKI, Entomologist of the Government-General of Formosa, for the loan of the fine collection of the family belonging to the Department of Agriculture, Government Research Institute of Formosa. I am especially indebted to Drs. M. YANO and T. ESAKI for their kindnesses in the loan or gift of material and also for kind advices, and further I wish to thank Messrs. M. KATO, K. TAKEUCHI, C. TERANISHI, T. UCHIDA, and Y. YAMADA for supplying their collected material. Finally, I wish to express sincere thanks to Mr. CURTIS P. CLAUSEN, Entomologist of U. S. Department of Agriculture, for his kindness in reading through the manuscript, while he was staying in Japan.

BIBLIOGRAPHY.

The following bibliographical list is by no means a complete one. Only the works referred to in the preceding pages are listed below:—

- (1) BANKS, N. (1913)—Synopses and Descriptions of Exotic Neuroptera: Trans. Am. Ent. Soc., Vol. **39**, pp. 201–242 (Reference on pp. 205–211).
- (2) BANKS, N. (1913)—On a Collection of Neuropteroid Insects from the Philippine Islands: Proc. Ent. Soc. Wash., Vol **15**, pp. 170–180 (Reference on pp. 175–176).
- (3) BANKS, N. (1916)—Neuropteroid Insects of the Philippine Islands: Philip. Jour. Sci., § D, Vol. **11**, pp. 195–216 (Reference on pp. 207–208).
- (4) COMSTOCK, J. H. (1918)—The Wings of the Mantispidae: The Wings

- of Insects, pp. 174-175.
- (5) ENDERLEIN, G. (1910)—Klassifikation der Mantispiden nach dem Material des Stettiner Zoologischen Museums: Ent. Zeit., Stett., Jg. **71**, pp. 341-379.
- (6) MACLACHLAN, R. (1875)—A Sketch of our Present Knowledge of the Neuropterous Fauna of Japan (excluding *Odonata* and *Trichoptera*): Trans. Ent. Soc. Lond., 1875-**2**, pp. 167-190. (Reference on pp. 178-179).
- (7) MATSUMURA, S. (1907)—Kamakirimodoki-kwa [Mantispidae]: Konchiu Bunruigaku [Systematic Entomology], Vol. **1**, pp. 168-169.
- (8) MIYAKE, T. (1910)—The Mantispidae of Japan: Jour. Coll. Agr., Imp. Univ. Tokyo, Vol. **2**, pp. 213-221.
- (9) MIYAKE, T. (1911)—OKAMOTO Nogakushi no "Honpo-san Kamakirimodoki-kwa" naru Ronbun wo yomite Honpo Konchiugakusha ni Ichigen su. [Review and Criticism on "The Mantispidae of Japan" by Mr. OKAMOTO]: Zool. Mag. (Dobutsugaku Zasshi), Vol. **23**, pp. 17-19.
- (10) NAKAHARA, W. (1912)—Kikamakirimodoki no Gakumei. [On the Scientific Name of *Eumantispa sasakii* and its Synonymy]: Zool. Mag., Vol. **24**, pp. 332-336.
- (11) NAKAHARA, W. (1912)—Nippon-san Kamakirimodoki-kwa no Kenkyu [Studies on the Mantispidae of Japan]: Zool. Mag., Vol. **24**, pp. 558-566.
- (12) NAKAHARA, W. (1913)—A Revision of the Mantispidae of Japan: Annot. Zool. Jap., Vol. **8**, pp. 229-237.
- (13) NAVÁS, L. (1909)—Mantispidos nuevos: Mem. de la R. Acad. de Cienc. y Art. de Barcelona, Vol. **7**, pp. 473-485.
- (14) NEEDHAM, J. G. (1909)—Notes on the Neuroptera in the Collection of the Indian Museum: Record Ind. Mus., Vol. **3**, pp. 185-210 (Reference on p. 195).
- (15) OKAMOTO, H. (1910)—Honpo-san Kamakirimodoki-kwa [The Mantispidae of Japan]: Zool. Mag., Vol. **22**, pp. 533-544.
- (16) OKAMOTO, H. (1911)—Beitrag zur Mantispiden-Fauna Japans: Zool. Anz., Bd. **37**, pp. 293-302.
- (17) ESBEN-PETERSEN, P. (1913)—H. SAUTER's Formosa-Ausbeute. Plani-pennia II, Megaloptera and Mecoptera: Ent. Mitt., Bd. **2**, pp. 222-228, 257-265. (Reference on pp. 261-262).
- (18) ESBEN-PETERSEN, P. (1917)—Neue und wenig bekannte Mantispiden:

- Arkiv f. Zool., Bd. **11**-#10, pp. 1-15 in separate.
- (19) STITZ, H. (1913)—Mantispiden der Sammlung des Berliner Museums: Mitt. Zool. Mus. Berl., Bd. **7**, pp. 1-49.
- (20) VAN DER WEELE, H. W. (1909)—Mecoptera and Planipennia of Insulinde: Notes Leyd. Mus., Vol. **31**, pp. 1-100 (Reference on pp. 87-97).
-

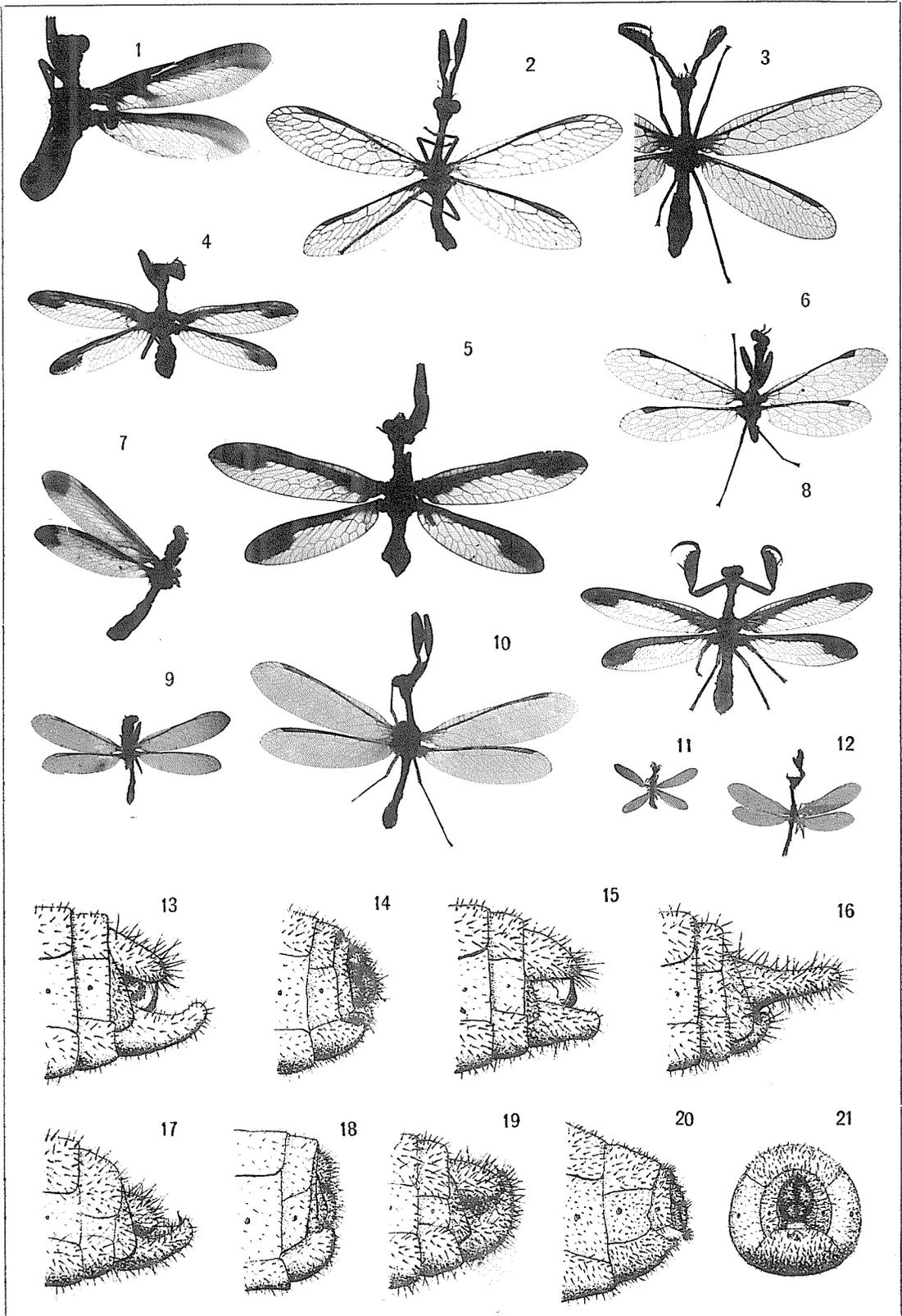
EXPLANATION OF PLATE XVI.

Figs. 1-8. Photos by Dr. H. OKAMOTO.

Figs. 9-12. Photos by the author.

Figs. 13-21. Figures by the author.

- Fig. 1. *Euclinacia badia* OKAMOTO ♂ × 1.7
 Fig. 2. *Mantispa japonica japonica* MACLACHLAN ♂ × 2.0
 Fig. 3. *Eumantispa harmandi* (NAVÁS) ♀ × 1.3
 Fig. 4. *Climaciella 4-tuberculata* (WESTWOOD) ♂ × 1.9
 Fig. 5. *Cl. habitsuella* OKAMOTO ♂ × 2.2
 Fig. 6. *Mantispa formosana formosana* OKAMOTO ♀ × 2.2
 Fig. 7. *Euclinacia vespiformis* OKAMOTO ♂ × 1.8
 Fig. 8. *Climaciella miyakei* OKAMOTO ♂ × 1.2
 Fig. 9. *Mantispa orientalis* ESBEN-PETERSEN ♀ × 1.3
 Fig. 10. *Eumantispa taiwanensis* KUWAYAMA (n. sp.) ♂ × 1.3
 Fig. 11. *Mantispa formosana bella* KUWAYAMA (n. var.) ♀ × 1.3
 Fig. 12. *M. formosana minor* STITZ ♂ × 1.3
 Fig. 13. *M. japonica japonica* MACLACHLAN. Terminal segments of abdomen of ♂. (Lateral view, much enlarged. Dry specimen.)
 Fig. 14. Ditto of ♀. (Lateral view, much enlarged. Alcoholic specimen.)
 Fig. 15. *M. japonica diminuta* MATSUMURA. Terminal segments of abdomen of ♂. (Lateral view, much enlarged. Dry specimen.)
 Fig. 16. *M. formosana* OKAMOTO. Terminal segments of abdomen of ♂. (Lateral view, much enlarged. Dry specimen.)
 Fig. 17. *Eumantispa harmandi* (NAVÁS). Terminal segments of abdomen of ♂. (Lateral view, much enlarged. Dry specimen.)
 Fig. 18. Ditto of ♀. (Lateral view, much enlarged. Alcoholic specimen.)
 Fig. 19. *Eum. taiwanensis* KUWAYAMA (n. sp.). Terminal segments of abdomen of ♂. (Lateral view, much enlarged. Dry specimen.)
 Fig. 20. *Euclinacia badia* OKAMOTO. Terminal segments of abdomen of ♀. (Lateral view, much enlarged. Alcoholic specimen.)
 Fig. 21. Ditto. (Posterior view, much enlarged. Alcoholic specimen.)
-



H. OKAMOTO et S. KUWAYAMA photo; S. KUWAYAMA del.