ODONATOLOGICAL ABSTRACTS

1971

(289) CHAISEMARTIN, C. & L. MOUZAT, 1971. Variations écophénotypiques de l'homéostasie chez les insectes: ampleur des mécanismes régulateurs chez quelques formes dulçaquicoles. C.R. Séances Soc. Biol. Fil. 165: 2167-2171. – (*Lab. Biol. anim., UER Sci. Exactes et Nat., Limoges, France*).

The range of regulatory mechanisms of ecophenotypic variation in homeostasis was studied in several freshwater insect orders (Trichoptera, Megaloptera, Heteroptera, Coleoptera), including the representatives of odon. genera Libellula and Sympetrum. Determination of Na^+, K^+, Ca^{2+}, Mg^{2+}, Cl^-, HCO_3^-, PO_4^{3-} and proteins in the haemolymph were made. The phylogenetically least advanced groups had a high level of Na^+ and Cl^- in the blood. The restoration of haemolymph ionic balance following haemorrhage was studied in L. depressa and in Agabus sp. (Col.) at 4°C over a 10-day period. Evidence was found for rapid Na^+ mobilisation and a slower replacement of K^+. The levels of Ca^{2+} and Mg^{2+} were relatively stable. Homeostasis appeared to be best regulated in the spp. inhabiting stagnant water, Sympetrum sp. and Sialis sp. (Megal.).

(290) DEJOUX, C., L. LAUZANNE & C. LEVEQUE, 1971. Prospection hydrobiologique du Lac de Léré (Tchad) et des mares avoisinantes. IV. Faune benthique. Cah. ORSTOM, sér. Hydrobiol. 5 (2): 179-188. – (*Centre ORSTOM, B.P. 65. Fort-Lamy, Repub. Chad*).

During a hydrobiological exploration of the Lac de Léré and neighbouring pools, Republic of Chad, Africa, no Odon. were found in bottom samples of the lake, but from the pools round the edge of it 4 spp. were recovered, viz. Pseudagrion nubicum, Lestes sp., Macromia nyanzana and Diplacodes lefebvrei. For the list of the odon. fauna of Chad reference is made to C. Dejoux, 1968, Contribution à l'étude des insectes aquatiques du Tchad. Catalogue des Chironomidae, Chaoboridae, Odonates, Trichoptères, Hemiptères, Ephéméroptères, Cah. ORSTOM, sér. Hydrobiol. 2 (2): 52-78.

(291) HAMILTON, K. G.A., 1971. The paranotal theory of development of wings from notal lobes. J. Kansas Ent. Soc. 44: 421-433. – (*Dept. Ent., Univ. Georgia, Athens, Ga. 30601, USA*).

The paranotal theory of wing origin receives support from morphological studies on Thysanura and fossil insects. It is proposed that the first winged insects, the Archaeoptera, had wings that resembled notal lobes in many respects. Studies of recent Palaeoptera offer insights into the origin and development of the axillary sclerites and basal plates involved in the articulation of the wing. 6 separate sclerites arranged in 2 longitudinal rows of 3 were probably the basic configuration of the structures. Their subsequent modifications in Odon. and Neoptera are noted. Wingfolding probably evolved from the flexion folds between the 2 rows of

sclerites. 2 major groups of neopterous orders, Pliconeoptera and Planoneoptera, are distinguished on the basis of evidence from a brief phylogenetic analysis. Pliconeoptera corresponds to Polyneoptera minus Plecoptera, and Planoneoptera comprises all other Neoptera.

1972

(292) AUSTRALIAN NATIONAL INSECT COLLECTION. 1972. Published by Div. Ent., C.S.I.R.O., Canberra. 22 pp. – *(P.O.B. 1700, Canberra City, A.C.T. 2601, AU).*
This is the largest and most representative insect collection of Australia and is at present the responsibility of the Division of Entomology of the Commonwealth Scientific and Industrial Research Organization, located in the Division's headquarters in Canberra. The Curator of Odon. is Dr. J.A.L. Watson. The coverage of the Australian odon. spp. is almost complete; some material from N. Africa, N. America, Indo-Malayan region and New Guinea is also included. There are few primary types, but many paratypes. The former include some from Tillyard, Fraser and Watson. At present the odon. collection contains also about 30 undescribed spp.

(293) BELYSHEV, B.F., 1972. Delimitation line between Oriental and Australian faunistic areas in Meridional Kingdom on the ground of dragonfly distribution (Odonata, Insecta). Izv. sib. Otdel. Akad. Nauk SSSR, ser biol., 2 (10): 94-97. (Russian, with Engl. s.). – *(Biol. Inst., Siberian Branch USSR Akad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
The odon. faunas of Australia, New Guinea and Indonesia are briefly analyzed. A demarcation line through the Torres Strait and the Timor Sea, running perpendicularly to Wallace's and Weber's lines, and separating Australia from the other faunal regions, is proposed.

(294) BELYSHEV, B.F., 1972. Morfologia lichinki Somatochlora alpestris Selys i opredelitel'naia tablica lichinok etogo roda. (Larval morphology of Somatochlora alpestris, with a key to the larvae of the genus). In: A.J. Cherepanov (Ed.), The Fauna and Ecology of Arthropoda from Siberia, pp. 43-45. Nauka, Novosibirsk. (Russian). – *(Biol. Inst., Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
This is the first description of the larval stage of S. alpestris in the Russian literature. It is based on a series of exuviae, the provenience of which is not stated. A key to the ultimate stage of the 8 USSR spp. of this genus is added, viz. S. sahlbergi, arctica, alpestris, flavomaculata, graeseri, uchidai, metallica and viridiaenea.

(295) BELYSHEV, B.F., 1972. O geograficheskoj izmenchivosti okraski golarkticheskih strekoz v Evrazii. (On the geographic variation in the colour pattern in Eurasian dragonflies). In: A.J. Cherepanov (Ed.), The Fauna and Ecology of Arthropoda from Siberia, pp. 45-47. Nauka, Novosibirsk. (Russian). – *(Biol. Inst., Siberian Branch USSR Acad. Sci., Ul. Frunse 11, Novosibirsk-91, USSR).*
From West to East in northern Eurasia the yellow spots found in adult dragonflies more or less decrease in size. The phenomenon is demonstrated in a number of examples from the families Gomphidae, Aeshnidae, Corduliidae and Libellulidae.

(296) BICK, G.H. & L.E. HORNUFF, 1972. Odonata collected in Wyoming, South Dakota and Nebraska. Proc. ent. Soc. Wash. 74 (1): 1-8. – *(Dept. Biol., Saint Mary's Coll., Notre Dame, Indiana 46556, USA).*
20 taxa are reported for the first time for Wyoming, 9 for S. Dakota, and 2 for Nebraska, USA. Habitat data emphasizing altitude, hot springs and bogs are given for 57 spp. collected in Wyoming. 12 spp. were collected above 8000 ft., 17 at hot springs, and 10 were closely associated with bogs. (Authors).

(297) CHARLET, M., 1972. Etude histologique de la pars intercerebralis de la larve d'Aeschna cyanea Müll. (Insecte, Odonate). C.R. Acad. Sc. Paris (D) 275: 1047-1050, 1 pl. – *(Lab. Biol. Gén., Univ. Louis Pasteur, 12 rue de l'Université, F-67 Strasbourg).*
The pars intercerebralis cells may be divided into 4 different types. In addition there are small neuroblasts, that control the growth of the pars.

(298) CONSIGLIO, C., R. ARGANO & L. BOITANI, 1972. Ecological niches in two communities of adult Odonata. Abstr. XIVth Int. Congr. Ent., Canberra, p. 193. – *(Ist. Zool., Univ. Roma, Città Universitaria, I-00100 Roma)*.
Field research carried out during 3 years tried to demonstrate the validity of the principle of competitive exclusion in 2 adult odon. communities. The 15 spp. found to be regularly present and breeding at 2 natural ponds nr. Rome, Italy, were checked by the following ecological features: (1) seasonal periodicity, (2) diurnal periodicity, (3) site of mating pair formation, (4) site and modality of oviposition, (5) territoriality. The best ecological differences were found in the 1st, 3rd and 4th of these features. Combining them it was found that no 2 spp. have the same ecological niche, except that the 3 Sympetrum spp. could not be thoroughly investigated. It was also found that the existence of different sites of pair formation works as a pre-mating mechanism for interspecific reproductive isolation between Coenagrion puella and C. scitulum and seems to exist together with mechanical isolation (Verbatim).

(299) DEFOSSEZ, A. & F. SCHALLER, 1972. Inhibition de la métamorphose de l'appareil copulateur mâle de larves d'Aeschna cyanea Müll. (Insecte, Odonate) privées de leurs glandes de mue. C.R. Acad. Sc. Paris (D) 275: 971-974, 1 pl. – *(Lab. Biol. Anim., Univ. Sci. et Techn. Lille, B.P. 36, F-59650 Villeneuve d'Ascq)*.
There is hardly a trace of development of the copulatory apparatus in larvae deprived of ventral glands. The phenomenon is due to the early interruption of mitotic activity, cuticular shedding and morphogenetic movements of the epidermis. The lack of ecdysone responsible for the arrest of these processes cannot prevent the continuation of secretion of endocuticle on the surface of the epidermal anlagen.

(300) DUMONT, H., 1972. Societas Internationalis Odonatologica [et la revue] Odonatologica. Bull. Ann. Soc. R. Belg. Ent. 108: 23. – *(Inst. Zool., Univ. Gent, Ledeganckstr 35, B-9000 Gent)*.
A note on the foundation of the Society and its journal, Odonatologica.

(301) DUMONT, H., 1972. (Announcement of the foundation of the journal Odonatologica). Bull. Cercle Lepid. Belg. 1 (10): 1. (French and Dutch). – *(Inst. Zool., Univ. Gent, Ledeganckstr. 35, B-9000 Gent)*.
A brief note in the minutes of the October 7, 1972 meeting of the Belgian Lepidopterologists' Circle. Information sheets on S.I.O. were appended to the issue of the journal.

(302) EDA, S., 1972. (Some odonate records from Chiba Prefecture). Proc. Chiba ent. Soc. 3: 2-6. (Japanese). – *(2-7-5-208 Sodegaura, Narashino-shi, Chiba Pref., 275, JA)*.
An annotated list is given of 21 spp. collected at various localities in Chiba Prefecture, Japan during 1967 through 1971. Interesting are records of Copera tokyoensis, Cercion plagiosum and Aeschnophlebia anisoptera. (Author).

(303) EGUCHI, E. & T.H. WATERMAN, 1972. Comparative studies on rhabdom of arthropod compound eye. Abstr. XIVth Int. Congr. Ent., Canberra, p. 143. – *(Biol. Dept., Yokohama Univ., Mutsuura, Kanazawa-ku, Yokohama, 236, JA)*.
The fine structures of rhabdoms, especially the directional arrangements of their microvilli in an ommatidium were studied with the electron microscope in representatives of several insect orders, including the dragonfly, Anax parthenope, and compared to those of some crustaceans.

(304) FURNEAUX, P.J.S. & A.L. MACKAY, 1972. Crystalline protein in the insect egg shells. J. Ultrastruct. Res. 38: 343-359. – *(Milstead Lab. Chemical Res., Sittingbourne Laboratories, Sittingbourne, Kent, UK)*.
In a survey of nearly 50 spp. of 6 orders, incl. Odon. (Calopteryx splendens), crystalline material was found in the chorion. Chemical analyses indicated it is mostly protein. It is proposed that the crystallites are constructed from units joined together into strips and that the simplest building block is

a pair of strips. Layers in the plane of the shell with a period of about 5 nm are another feature common to most of the material, including Calopteryx. There is insufficient information available so far to permit reconstruction in any detail. An electron microscope photograph (160.000 x) of the transverse section of a part of the endochorion of Calopteryx is added.

(305) GEIJSKES, D.C., 1972. A new species of Gynothemis and its larva (Odonata, Libellulidae). Notes on Odonata of Surinam XII. Zool. Meded., Leiden 47: 401-409. – (*Hofdijck 15, Oegstgeest nr. Leiden, NL*).
G. uniseta sp. n. (♂ ♀, ♂ exuvia) from various localities in Surinam (♂ holotype: Stoelmans Island, Lawa River; ♀ allotype: Camp 3, Wilhelmina Mts, 19 km N. of Lucie River) is described and illustrated. Type material is in the Nat. Hist. Mus., Leiden. This is the fourth known sp. of the genus and the first from the northern part of S. America. In addition, this is the first description of a larva of a member of the genus. It shows not only a relation with the Dythemis-Macrothemis group, but also with larvae of the other genera of the tribe, especially Scapanea.

(306) GOTO, J., 1972. (A new record of Sympetrum baccha matutinum from Miyagi Prefecture). Nature and Insects 7 (6): 29. (Japanese). – (*1-19-37 Miyagino, Sendai-shi, Miyagi Pref., JA*).
A ♀ specimen was taken at Sendai City, Japan, on Sept. 5, 1971.

(307) GRACILE. (Newsletter of Odonatology). Published by the Kansai Tombo Group, Osaka. No. 12 (dated December, 1971; issued October, 1972), No. 13 (dated May, 1972; issued October, 1972). (Japanese). – (*c/o K. Tani, 129 Jizocho, Nara, 630, JA*).
(No. 12): *Inoue, K.*: Review of Japanese dragonflies. Pt. 3. Families Epiophlebiidae, Petaluridae, Cordulegasteridae, Corduliidae and Macromiidae; – *Matsumoto, K.*: Spring observations on dragonflies of Aonogahara; – *Hiura, I.*: Dragonfly survey of the Awaji island; – *Hiura, I.*: Report on dragonfly survey of Shigaraki; – *Hiura, I.*: Spring observations on dragonflies at Toyooka, Kumihama and Kinosaki; – *Matsumoto, K.*: Report on dragonfly surveys in Fukuchiyama and South Tamba; – *Tani, K.*: Dragonfly survey of Ashyu; – *Kimura, T.*: Dragonfly observations in Hikone; – *Obana, S.*: Dragonfly observations in Yogo and Anegawa; – *Miyatake, Y.*: Dragonfly observations in Fukuchiyama; – *Wakisaka, K.*: Dragonfly observations in Obama; – *Kinugasa, H.*: Kumihama and Kinosaki dragonflies in autumn; – *Inoue, K.*: Three days odonatological trip to Hokkaido; – *Obana, S.*: Reports on the 17th, 18th, 19th and 20th meetings of the Kansai Tombo Group; – *Wakisaka, K. & K. Tani*: Annual Meeting of the Society of Odonatology, Tokyo.
(No. 13): *Kuwahara, H.*: Notes from a dragonfly collecting trip to the Ryukyu Archipelago; – *Inoue, K.*: Davidius moiwanus ssp. in Okayama Prefecture; – *Matsumoto, K.*: New records of Trigomphus melampus; – *Nagase, K.*: A new record of Macromia daimoji; – *Matsumoto, K.* : Some records of Somatochlora viridiaenea atrovirens; – *Miyazaki, T.*: First record of Sympetrum cordulegaster from Izumo, Shimane Prefecture; – *Obana, S.*: Reports on the 21st and 22nd meetings of the Kansai Tombo Group. (For abstracts of papers and addresses of the authors cf. *OA* Nos. 310-315, 320-322, 327-330, 333-334, 337, 339-341, 355, 360-361).
(*Abstracter's note*: the papers by Hiura, Kimura, Kinugasa, Matsumoto, Miyatake, Obana, Tani and Wakisaka, published in No. 12, are partial reports on a larger program, carried out since several years by the members of the Kansai Tombo Group, and aiming at a complete survey of the odon. fauna of Kansai District [Fukui, Shiga, Mie, Kyoto, Nara, Osaka, Wakayama and Hyogo], Japan).

(308) HARRISON, A.D. & K.H. BARNARD, 1972. The stream fauna of an isolated mountain massif: Table Mountain, Cape Town, South Africa. Trans. roy. Soc. S. Afr. 40 (3): 135-153. – (*Dept. Biol., Univ. Waterloo, Waterloo, Ont., CA*).

An account is presented of the stream fauna of Table Mountain, South African Republic. The analysis is based on intensive sampling, during all months of the year, in a selected stream, supplemented by collections from all the main streams on the mountain. An annotated faunal list includes records from published literature; Odon. are represented by 20 spp. of the families Synlestidae (2), Protoneuridae (1), Coenagrionidae (2), Gomphidae (2), Aeshnidae (3) and Libellulidae (10). It is pointed out that Table Mt., with the rest of the Cape Peninsula Range, is virtually an island as far as the mountain stream fauna is concerned. This fauna is compared with that of the mainland mountains and reasons are advanced for its paucity and lack of endemicity.

(309) HEYMER, A., 1972. Verhaltensstudien an Prachtlibellen. Beiträge zur Ethologie und Evolution der Calopterygidae Selys, 1850 (Odonata: Zygoptera). Fortschr. Verhaltensf. 11. Parey, Berlin. 100 pp. (Engl. s.: Behaviour and evolution of Calopterygidae; Résumé fr.: Comportement et évolution des Calopterygidae). (Date of publication November 1972, and not 1973 as stated on the cover). – (Author's address: *Lab. d'Ecol. Gén., Mus. Natl d'Hist. Nat., 4 av. du Petit Château, F-91 Brunoy* ; Publisher's address: *Parey Publ. House, Lindenstr. 44-47, Berlin 61, West Berlin*).

The first part of the booklet is a slightly modified German translation of the paper abstracted in *OA* No. 251, with addition of a number of previously unpublished illustrations, including a colour plate of the development of wing coloration during the maturation phases of Calopteryx haemorrhoidalis. The second part deals with reproductive behaviour, ritualised behaviour patterns, field experiments on colour and Gestalt perception and with the systematic position of the family within the order. The spp. studied are the W. European Calopteryx haemorrhoidalis, splendens, virgo and xanthostoma. In all of them there is a specific prelude to courtship, which is coupled with display of the egg-laying site. In association with this, the coloration of the ventral aspect of the last three abdominal segments of the ♂♂ has assumed a visual signal role.

In haemorrhoidalis, the prelude consists of a circular dance, which is performed by the ♂ and ♀ together above the water surface of the egg-laying site within the territory. The subsequent courtship flight and the landing of the ♂ upon the ♀ are similar in all European spp. The ♂ lands on the wing-tips of the ♀, runs rapidly along the leading edges of the wings and then anchors his abdominal pincers in the prothoracic recesses of the ♀. Transfer of sperm by the ♂ from his genital pore to the copulation organ always takes place after attachment of the pincers. Mating then follows ("wheel posture"), taking approximately 85-90 sec. in all spp. studied. After completion of the copula, the partners separate rapidly. The ♀ exhibits a post-copulatory posture. Egg-deposition can occur with or without submersion. During egg-laying, which takes place within the territory at the egg-deposition site determined by the ♂, the ♀ is attentively watched and protected by the ♂. The ♀ is watched in the sense that she is brought back by the ♂ if she attempts to fly away, and the ♂ protects her in the sense that he immediately drives off any reproductively motivated ♂ which approaches, so that egg-laying proceeds without disruption. ♂♂ are capable of mating with several ♀♀ in brief succession. The ♀♀ then lay their eggs together in the same territory with the ♂ watching over all of them. "Abdominal up-and-down movement", which still serves wing-grooming in the primitive Lestidae, has lost its original significance in the Calopterygidae. The simple up-and-down movement has developed into a rhythmic oscillation, which plays an integral part in the use of the luminous coloration of the ventral aspect of the last three abdominal segments as a signal in the ♂♂. It has thus become a ritualised behaviour pattern. In the ♀♀, the intention movement for take-off has been ritualised as a defensive pattern. The visual effect is emphasized by the fluorescent wing markings. The last 3 ♂ abd. segments exhibit conspicuous coloration on the ventral surface

("tail-lights"): white in splendens, pink in virgo, yellow in xanthostoma, and carmine in haemorrhoidalis. When certain positions are adopted, these tail-lights are displayed and have a signal function. Their operation in connection with the prelude to mating behaviour suggests that they are incorporated into the "♂schema" of the ♀. Field investigations using various dummies have shown that the Calopterygidae can distinguish colours and are capable of Gestalt perception. Individuals or partners do not seem to be mnemotactically fixed, since experiments have shown that ♂♂ do not individually recognize ♀♀ with which they have just mated. In this case, the behaviour of the ♂♂ is motivation-dependent. Behavioural characters, combined with morphological peculiarities, suggest a special systematic position of the family. Consideration of palaeontological evidence indicates that the large groups of the living Odon. underwent separation at a relatively early stage.

(310) HIURA, I., 1972. (Dragonfly survey of the Awaji island). Gracile 12: 4, 15-16. (Japanese). – (*Osaka Municipal Nat. Hist. Mus., Utsubo-Nakadori, Nishi-ku, Osaka, 550, JA*).
On May 16, 1971, 19 spp. were recorded at the Awaji island, Hyogo Pref., Japan. The records are analyzed in an appended table. (Cf. Abstracter's note in *OA* No. 307).

(311) HIURA, I., 1972. (Report on dragonfly survey of Shigaraki). Gracile 12: 17-18. (Japanese). – (*Osaka Municipal Nat. Hist. Mus., Utsubo-Nakadori, Nishi-ku, Osaka, 550, JA*).
On May 23, 1971, 16 spp. were recorded at Shigaraki, Shiga Pref., Japan. The records are analyzed in an appended table. (Cf. Abstracter's note in *OA* No. 307).

(312) HIURA, I., 1972. (Spring observations on dragonflies at Toyooka, Kumihama and Kinosaki). Gracile 12: 19-21. (Japanese). – (*Osaka Municipal Nat. Hist. Mus., Utsubo-Nakadori, Nishi-ku, Osaka, 550, JA*).
On May 29-30, 1971, 23 spp. were collected at Toyooka and Kinosaki, Hyogo Pref., and at Kumihama, Kyoto Pref., Japan. The list includes Cercion sieboldii, Tanypteryx preyeri, Trigomphus melampus and Oligoaeschna preyeri. The records of the latter 2 spp. represent the northernmost Japanese localities known. (Cf. Abstracter's note in *OA* No. 307).

(313) INOUE, K., 1972. (Review of Japanese Dragonflies. Pt. 3. Families Epiophlebiidae, Petaluridae, Cordulegasteridae, Corduliidae and Macromiidae). Gracile 12: 1-4, 5-14. (Japanese). – (*4-5-9 Fuminosato, Abeno-ku, Osaka, 545, JA*).
A brief characterization of the main structural features of the 5 family taxa is given. Macromiidae are treated as an independent family, peculiar in several structural characters, notably in the location of the triangle and in the thoracic pattern. It is suggested that a gomphid like pattern of thorax and abdomen represents the basic type in Anisoptera, from which the "aeshnid type" (Petaluridae, Cordulegasteridae, Aeshnidae, Corduliidae) and a "macromiid type" (Epiophlebiidae, Chlorogomphinae, Macromiidae) have developed. (Author).

(314) INOUE, K., 1972. (Three days odonatological trip to Hokkaido). Gracile 12: 30-31. (Japanese). – (*4-5-9 Fuminosato, Abeno-ku, Osaka, 545, JA*).
Annotated list of 21 spp., collected on August 8-10, 1971 at Kushiro, Akan and Lake Shikotsu in Hokkaido, Japan. More interesting records are Nehalennia speciosa, Somatochlora greseri aureola, S. japonica and S. danae. (Author).

(315) INOUE, K., 1972. (Davidius moiwanus ssp. in Okayama Prefecture). Gracile 13: 8-9. (Japanese). – (*4-5-9 Fuminosato, Abeno-ku, Osaka, 545, JA*).
On June 6, 1971, 10 specimens were taken at Okutsu-cho, Okayama Pref., Japan. This is the westernmost locality so far known. (Author).

(316) ISHIDA, S., 1972. Dragonflies of the Ryukyus. Bull. Jap. Ent. Acad. 7 (1): 1-15. (Engl., with some passages in text in Japanese). – (*2-8, Okinoshima-cho, Yokkaichi, Mie Pref., JA*).
A list is presented of 54 spp. collected from

1965 through 1971 in the Ryukyu islands, Japan. Two of these are new, viz. Chlorogomphus iriomotensis sp. n. (♂ holotype: Kanpira, Iriomote-jima, 29-5-1971, ♀ allotype, same locality, 20-5-1963) and Jagoria kunigamensis sp. n. (♂ holotype: Ryukyu Univ. Forest, Yona, Okinawa-Honto, 22-5-1970). Descriptions are accompanied by photographs of specimens and by drawings of the ♂genitalia; the type material is in author's collection. C. iriomotensis appears closely allied to C. risi and to C. brunneus. From the latter it can be separated by the following features: pterothorax lacking stripes of each side of dorsal carina, inferior appendage curved upwards and sharply pointed at the apex. J. kunigamiensis is allied to J. pryeri and less so to J. pyanan. From the former it is distinct in lacking the yellow patch on the interocellar tubercle and the spine at the ventral side of the superior appendage, and the less conspicuous yellow stripe and patch on pterothorax and abdomen. Compared to pyanan, it has somewhat smaller body size, frons not tinged with brown, and lateral lobe of labium entirely blackened.

(317) K.S.K., 1972. Odonatologica. Biol. Abstr. 54 (7): 37051. – *(Bio-Sciences Information Service, 2100 Arch Str., Philadelphia, Penn. 19103, USA).*
A brief review of the aims and publication program of the journal of the Societas Internationalis Odonatologica.

(318) KIAUTA, B., 1972. Mechanisms of karyotypic evolution in dragonflies. Abstr. XIVth Int. Congr. Ent., Canberra, p. 107. – *(Inst. Genet., Univ. Utrecht, Opaalweg 20, Utrecht, NL).*
The approx. 450 spp. studied cytologically, representing 19 families, give some insight into the mechanisms that may have played a role in karyotypic evolution and furnish additional evidence on the phylogenetic affinities between higher taxa. The evolutionary trends are most easily recognizable in the variation of chromosome number (n ♂= 3-30), DNA content of the complement, and sex determining mechanism. Phylogenetic advancement and structural specialization generally seem to be accompanied by a gradual increase of chromosome number. The latter is characteristic on the family level. This kind of transformation does not affect the original sex determining mechanism (XO/XX). Fusions of two or more chromosomes are characteristic of some genera of different families, especially in the Gomphidae. They may involve the sex chromosome, in which case the original mode of sex determination is replaced by the neo-XY/XX type. (Verbatim).

(319) KIAUTA, B. & G. JURZITZA, 1972. Erstes Europäisches Symposium für Odonatologie und Gründung der "Societas Internationalis Odonatologica". Beitr. naturk. Forsch. SüdwDtl. 31: 185. – *(Inst. Genet., Univ. Utrecht, Opaalweg 20, Utrecht, NL).*
A brief note on the Symposium and on the foundation of S.I.O. and its journal Odonatologica, with addresses of the Society's three representatives in the German Federal Republic.

(320) KIMURA, T., 1972. (Dragonfly observations in Hikone). Gracile 12: 25-26. (Japanese). – *(708-1 Hanwacho, Izumi City, Osaka, JA).*
On August 8, 1971, 22 spp. were collected at Hikone, Shiga Pref., Japan. The records are analyzed in an appended table. (Cf. Abstracter's note in *OA* No. 307).

(321) KINUGASA, H., 1972. (Kumihama and Kinosaki dragonflies in autumn). Gracile 12: 28-30. (Japanese). – *(27 Tomie, Hatto-cho, Yazu-gun, Tottori Pref., 680-06, JA).*
On October 24, 1971, 18 spp. were collected at Kumihama, Kyoto Pref., and Kinosaki, Hyogo Pref., Japan, including several specimens of both sexes of Sympetrum cordulegaster and larvae of Aeschnophlebia anisoptera. S. cordulegaster has not been previously recorded from the two prefectures. (Cf. Abstracter's note in *OA* No. 307).

(322) KUWAHARA, K., 1972. (Notes from a dragonfly collecting trip to the Ryukyu Archipelago). Gracile 13: 1-7. (Japanese). – *(4-16-17 Fuminosato, Abeno-ku, Osaka, 545, JA).*

An account is presented of the spp. collected from July through early August, 1969 at the following Ryukyu islands: Okinawa-honto, Ishigakai, Yonakuni, Hateruma, Taketomi and Iriomote. Some of the more interesting records are Psolodesmus mandarinus kuroiwae, Coeliccia flavicauda masakii, Leptogomphus yayeyamensis, Macromidia ishidai and Rhyothemis variegata imperatrix.

(323) LAUGHLIN, S., 1972. The integrative properties of second-order visual units in the dragonfly. Abstr. XIVth Int. Congr. Ent., Canberra, p. 150. – *(Dept. Neurobiol., Res. School Biol. Sci., Australian Natn. Univ., Canberra, A.C.T., AU).*
Odon. compound eyes, with their ordered system of parallel inputs, constitute a favourable system for the study of visual integration. Stable intracellular recordings have been obtained from monopolar axons (second order) leaving the lamina (first optic neuropile). Their response to light is a graded hyperpolarisation of up to 20 mV and their field of view corresponds to that of a single ommatidium. (Verbatim).

(324) LIEFTINCK, M.A., 1972. New taxa in the Papusian genus Palaiargia Foerster, with a key to the identification of species (Odonata, Coenagrionidae). Dtsch. Ent. Z. (N.F.) 19 (1-3): 245-256. – *(Nwe Veenendaalseweg 224, Rhenen, NL).*
P. ernstmayri sp. n. (♂ ♀) from W. New Guinea (holotype in the Mus. f. Naturkunde, Berlin; paratypes in the Bishop Mus., Honolulu and Nat. Hist. Mus., Leiden), and P. carnifex praeclara ssp. n. (♂ subad.) from N.E. New Guinea (holotype in the Nat. Hist. Mus., Leiden; paratype in the Bishop Mus., Honolulu) are described and illustrated. A key to ♂♂ of 19 out of 20 known spp. of the genus is added. P. myzomela Lieft. had to be omitted since it is known from the ♀ only.

(325) MATHUR, B.N., 1972. The central nervous system of Crocothemis servilia erythraea (Brullé) (Odonata, Libellulidae). Ent. Mo. Mag. 108 (1292-1294): 40-45. – *(Dept. Zool., Govt Coll., Ajmer, India).*
The central nervous system of adult C. servilia erythraea is described and illustrated. The brain has a bilobed structure. The main nerves originating from it are the optic and antennary labrofrontal nerves, the tritocerebral commissure and nervi corporis cardiaci. The suboesophageal ganglion supplies nerves to the mandibles, maxillae, labium, salivary glands and hypopharynx. There are three thoracic ganglia, the main nerves innervating the muscles of legs and wings of the corresponding segments. There are eight abdominal ganglia. The first abdominal ganglion is fused with the metathoracic ganglion. The eighth abdominal ganglion is the largest. The median nerve is present throughout the ventral nerve cord. (Author).

(326) MATHUR, B.N., 1972. Stomodeal nervous system of Crocothemis servilia erythraea (Brullé) (Odonata). Dt. ent. Z. 19: 1-6. – *(Dept. Zool., Govt Coll., Ajmer, India).*
The stomodeal nervous system of C. servilia erythraea is described in detail for the first time. The frontal ganglion is small and situated very close to the brain. It is connected to the latter by a pair of lateral frontal ganglion connectives and a median connecting nerve. The presence of a connecting nerve is shown for the first time among Odon. The corpora cardiaca (CC) are small, fused posteriorly with each other and connected with the brain by 2 pairs of nervi CC. The hypercerebral ganglion is small, little elongated and connected laterally with the CC. It continues posteriorly into a median gastric nerve which ends in a single ingluvial ganglion. The corpora allata (CA) are large and situated anterior to the brain and suboesophageal ganglion. They are connected posteriorly with the CA by a pair of nervi CA and with each other by the allatal nerve. The anterior position of the CA is unique in Crocothemis and in insects.

(327) MATSUMOTO, K., 1972. (Spring observations on dragonflies of Aonogahara). Gracile 12: 4. (Japanese). – *(2-5 Hanayama-cho, Nagata-ku, Kobe, 653, JA).*
On April 25, 1971 6 spp. were collected at Aonogahara, Hyogo Pref., Japan, including Trigomphus citimus tabei, Libellula angelina

and larvae of Aeschnophlebia anisoptera. From the fact that numerous larvae of Tramea virginia were observed at the same locality in autumn, 1970, while none was found in spring, it is concluded that this tropical sp. is unable to complete the larval development at the latitude of Aonogahara. (Cf. Abstracter's note in *OA* No. 307).

(328) MATSUMOTO, K., 1972. (Report on dragonfly surveys in Fukuchiyama and South Tamba). Gracile 12: 22-23. (Japanese). – (*2-5 Hanayama-cho, Nagataku, Kobe, 653, JA*).
On June 20, 1971, 19 spp. were collected at Fukuchiyama and South Tamba, Kyoto Pref., Japan; 8 of these in larval stage. (Cf. Abstracter's note in *OA* No. 307).

(329) MATSUMOTO, K., 1972. (New records of Trigomphus melampus. Gracile 13: 10-11. (Japanese). – (*2-5 Hanayama-cho, Nagataku, Kobe, 653, JA*).
Three new localities, all from Hyogo Pref., Japan, are brought on record. The sp. was collected there on May 21-22, 1971.

(330) MATSUMOTO, K., 1972. (Some records of Somatochlora viridiaenea atrovirens). Gracile 13: 12-13. (Japanese). – (*2-5 Hanayama-cho, Nagata-ku, Kobe, 653, JA*).
On July 18, 1971, larvae and adults were collected at Mt. Kongodoji, Hyogo Pref., Japan.

(331) MIELEWCZYK, S., 1972. The First European Symposium on Odonatology, Gent, October 22-23, 1971. Przegl. zool. 16 (3): 371-372. (Polish, with Engl. translation of the title). – (*Inst. Zool., P.A.N., ul. Swierczewskiego 19, Poznán, PO*).
A detailed account of the Symposium, based on unpublished Symposium documents, and report on its results, with particular reference to the foundation of the international odonatological society, S.I.O., and its journal, Odonatologica. The importance of the latter two organs for contacts among odonatologists and for publication of technical papers is stressed. A reproduction of the Symposium Emblem is added.

(332) MILL, P.J., 1972. Societas Internationalis Odonatologica. Entomol. 105: 205. (Engl.) – (*Inst. Zool., Univ. Leeds, Leeds LS2: 9 JT, UK*).
Announcement of the foundation of the international odonatological society and its journal Odonatologica, with brief characterization of the journal and with data on membership registration and subscription.

(333) MIYATAKE, Y., 1972. (Dragonfly observations in Fukuchiyama). Gracile 12: 27-28. (Japanese). – (*Utsubo Park, Nishi-ku, Osaka, 550, JA*).
On October 3, 1971, 26 spp. were collected in Fukuchiyama, Kyoto Pref., Japan. (Cf. Abstracter's note in *OA* No. 307).

(334) MIYAZAKI, T., 1972. (First record of Sympetrum cordulegaster from Izumo, Shimane Prefecture). Gracile 13: 13. (Japanese). – (*1-128 Seki-cho, Nerima-ku, Tokyo, 177, JA*).
On October 15, 1971, the sp. was taken at the Izumo-taisha shrine.

(335) MOKRUSHOV, P.A., 1972. Visual stimuli in the behaviour of dragonflies. I. Hunting and settling in Libellula quadrimaculata L. Vest. zool., Kiev 4: 46-51. (Russian, with Engl. s.). – (*Inst. Zool., Acad. Sci. Ukrain. SSR, Ul. Lenina 15, 252000 Kiev, USSR*).
Visual stimuli eliciting prey hunting and settling responses were studied in field tests. Small balls were presented on a fishing line as models of prey. White and black targets of angular size greater than 5° on a contrasting background were noticed, although large targets (exceeding 6 mm) and models composed of small targets, 10-20 mm apart, were usually rejected. At the moment of seizure the angular diameter of a target was usually less than 5°. Sticks of various forms and patterns, and disks were offered for settling. Vertical light-coloured sticks and light dots on disks were preferred. Vertical lines crossing a horizontal line, oblique lines and close parallel lines all inhibited the settling response. Physiological mechanisms are discussed. Lateral inhibition between neighbouring receptor elements is assumed. Furthermore, some form of mutual inhibition is thought to occur within the central nervous

system.

(336) MORITA, M., 1972. (Five dragonflies from Kakogawa-shi). Gekkan Mushi 11: 37. (Japanese). – (*43-19 Nakajima benzaimae, Iho-cho, Takasago-shi, Hyogo Pref., JA*).
A record of Lestes japonica, L. sponsa, Libellula angelina, Sympetrum gracile and S. maculatum, taken in 1971 at Kakogawa City, Hyogo Prefecture, Japan.

(337) NAGASE, K., 1972. (A new record of Macromia daimoji). Gracile 13: 12. (Japanese). – (*Sanrakuso, 548, Abiko-cho, Sumiyoshi-ku, Osaka, 558, JA*).
On June 1, 1971, numerous larvae were obtained in the Kizu River, Kyoto Pref., Japan.

(338) NORBERG, R.A., 1972. The pterostigma of insect wings an inertial regulator of wing pitch. J. comp. Physiol. 81: 9-22. – (*Dept. Zool., Univ. Göteborg, Fack, S-40033 Göteborg-33*).
The pterostigma of insect wings usually is a pigmented spot close to the fore edge far out on the wing, having a greater mass than an equally large wing portion in the adjacent wing region. It is common in Odon., Neuroptera, Psocoptera, Hemiptera, and Hymenoptera. The position of the spanwise torsion axis of the wings, the mass distribution of the wings, and the position of the chordwise centre of mass in chordwise wing strips were determined in Aeshna grandis, A. juncea, Somatochlora metallica and Sympetrum danae. In the spp. studied, the torsion axis of the wing lies ahead of the chordwise centre of mass of the wing except at the pterostigma. A wing having its mass axis behind its torsion axis is very susceptible to self-excited coupled flapping and feathering vibrations, making gliding flight above a critical speed impossible. Due to unfavourable, inertial, wing pitching tendencies, a still lower speed limit is set to active flight. Due to its mass contribution and favourable location, the pterostigma tends to raise these speed limits by causing favourable, inertial, pitching moments during the acceleration phases of wing flapping. The favourable pitching moment of the pterostigma is proportional to the distance from the wing base to the pterostigma, and to the distance of the pterostigma ahead of the wing's spanwise torsion axis. The pterostigma usually has an optimal position at the fore edge of the wing near the wing tip, just where the wing curves backwards. Further optimization of pterostigma mass localization has been obtained in different ways in various insects, involving both pterostigma position and form. The function of the pterostigma of raising the critical gliding speed, at which self-exciting vibrations set in, was demonstrated in dragonflies. Although contributing only 0.1% (one pterostigma) of the total dragonflies weight, it raised the critical speed by 10-25% in one species. By passive, inertial, pitch angle control, the pterostigma probably makes the wing beat more efficient in slow and hovering flight of small insects, while its raising of the critical flight speeds probably is of more importance to larger insects. The ability of active pitch angle control in many insects does not detract from the value of the pterostigma, since it contributes passively, without power expenditure, towards an efficient wing stroke.

(339) OBANA, S., 1972 (Dragonfly observations in Yogo and Anegawa). Gracile 12: 26-27. (Japanese). – (*3-4-10 Kinryo-cho, Sakai, Osaka Pref., JA*).
On September 12, 1971 and September 24, 1971, 21 and 22 spp. were collected at Yogo and Anegawa respectively. Both localities are situated in Shiga Pref., Japan. (Cf. Abstracter's note in *OA* No. 307).

(340) OBANA, S., 1972. (Reports on the 17th, 18th, 19th and 20th meetings of the Kansai Tombo Group). Gracile 12: 31-36. (Japanese). – (*3-4-10 Kinryo-cho, Sakai, Osaka Pref., JA*).
The meetings were held at the Osaka Natural History Museum, on December 27, 1970, February 7, March 28, and December 19, 1971, and were attended by 19-25 members. The 13 papers read were devoted mostly to topics of local odonatological interest, save for one on the fauna of Brasil, and one on

the world distribution of Epiophlebiidae and Petaluridae.

(341) OBANA, S., 1972. (Reports on the 21st and 22nd meetings of the Kansai Tombo Group). Gracile 13: 13-14. (Japanese). – (*3-4-10 Kinryo-cho, Sakai, Osaka Pref., JA*).
The meetings were held at the Osaka Natural History Museum, on February 6, and April 2, 1972 and were attended by 22 and 27 members respectively. There were read 3 papers on the Japanese fauna and one on 46 spp. collected by one of the members (H. Kuwahara) in Malaya and Borneo. The project for the 1972 odon. survey of the Kansai District has also been discussed. (Cf. Abstracter's note in *OA* No. 307).

(342) OLESEN, J., 1972. The hydraulic mechanism of labial extension and jet propulsion in dragonfly nymphs. J. comp. Physiol. 81: 53-55. – (*Ndr. Standvej 26, DK-3000 Helsinger*).
The pressure waves responsible for the labial extension and jet propulsion in dragonfly nymphs are produced by the contraction of several muscles on both sides of the abdominal diaphragm, as demonstrated on the bottom-living larvae of Cordulia aenea and Sympetrum sp. The duration and intensity of muscular activity differ in the two acts. Recordings of thoracic pressure and activity of the right anterior dorsoventral muscle of the fourth abdominal segment in both prey capture with labial extension and in jet propulsion are presented in a figure.

(343) PAVLYUTIK, R.S., 1972. Novye vidy dopolnitel'nyh hoziaev trematod roda Gorgodera Looss, 1901. (New species of the supplementary hosts of the trematode genus Gorgodera Looss, 1901). Gidrobiol. Zh., Kiev 8 (3): 105-107. (Russian). – (*Dept. Invertebr. Zool., Univ. Lvov, 4 Shcherbakov Str., 290005 Lvov, USSR*).
12500 larval and adult odon. specimens of 55 spp., collected in the western provinces of Ukraine, USSR, were examined for the presence of Gorgodera metacercariae. The latter were found in 291 specimens, referable to 22 odon. spp. A tabular review of distribution and intensity of infestation is added. Spp. breading in small, warmed up pools and in temporary ponds show a higher degree of infestation than those breeding in larger basins.

(344) PINNA, G., 1972. The dawn of life. Orbis, London. 128 pp. (Original Italian edition by Istituto Geografico De Agostini, Novara. 1972). – (*Mus. Civ. Stor. Nat., Corso Venezia 55, I-20121 Milano*).
A popular book on animal fossils. On pp. 3 and 64 there appear colour photographs of adult Cymatophlebia longialata (Upper Jurassic, Solnhofen, G.F.R.) and of the larva of Libellula doris (Miocene, Vittoria d'Alba, Cuneo, Italy) respectively.

(345) RAABE, M., N. BAUDRY, J.-P. GRILLOT & A. PROVANSAL, 1972. The perisympathetic organs in insects. Abstr. XIVth Int. Congr. Ent., Canberra, pp. 131-132. – (*Equipe d. Neuroendocrinologie d. Insectes, Lab. Zool., Univ. Paris, F-75 Paris*).
Segmentally arranged neurohemal structures called the perisympathetic organs, are present in all hitherto investigated insect orders, including Odon. They are always associated with the ventral sympathetic nervous system, but their aspect and location are not constant. Their histological and ultrastructural aspect is typical for neurohemal organs. The secretory products stored in the perisympathetic organs belong mostly to the C type and originate in neurosecretory cells located in the ventral ganglia. They are basic proteins containing indolic and pyrrolic groups. The experimental data suggest that the perisympathetic organs are not involved in the control of colour change, oviposition and blood trehalose level, but regulate heart beat, diuresis and tanning.

(346) ROSENBERG, D., 1972. A chironomid (Diptera) larva attached to a libellulid (Odonata) larva, Quaest. ent. 8: 3-4. – (*Dept. Ent., Univ. Alberta, Edmonton 7, Alta., CA*).
A larva of Paratanytarsus sp. (Chironomidae) was found attached to the prothorax of a larva of Sympetrum sp. (Libellulidae). The association was probably accidental, since it occurred only once in the several hundred

Sympetrum larvae from the surroundings of Edmonton, Canada, examined. It is suggested that such associations may represent an early stage in the development of phoresis.

(347) RUBTSOV, I.A. & R.S. PAVLYUTIK, 1972. Mermithids (Nematoda, Mermithidae) – parasites of dragonflies in the western region of the Ukraine. Vest. zool., Kiev 5: 34-42. (Russian, with Engl. s.) – (*Zool. Inst., Acad. Sci. USSR, 1 University Quay, 199164 Leningrad, USSR*).
24 mermithid larvae, referable to 5 spp. (4 spp. n. and 1 not further identified), were found in 10400 odon. adults, originating from the provinces of Lvov and Volyn, USSR.

(348) SAWCHYN, W.W., 1972. Environmental controls in the seasonal succession and synchronization of development in some pond species of damselflies (Odonata: Zygoptera). Thesis, Univ. Saskatchewan, 203 pp. – (*Dept. Biol., Univ. Saskatchewan, Saskatoon, CA*). – Microfilm (US $ 4.–, or £2.–) and xerox copy (US $ 10.–, or £5.–) available (refer to Order No. 72-23, 475) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others).
(Verbatim abstract from Diss. Abstr. 33, 3 [1972]: 1146-B): Environmental factors which control seasonal succession and synchronization of development in seven species of ponddwelling Zygoptera were investigated. A three phase succession was observed. Three species of Coenagrionidae, Coenagrion angulatum, C. resolutum and Enallagma boreale which overwintered as nymphs, emerged simultaneously and synchronously commencing during the last week of May. They were followed by Lestes disjunctus, L. unguiculatus and L. dryas in late June and early July, then by L. congener near mid July. Synchronization of development in the coenagrionid species is produced by a temperature and photoperiod influenced diapause in the penultimate and final instars, by differences in thermal growth coefficients in different instars during spring development, and by a threshold temperature for emergence higher than that for nymphal development. Members of the second group overwinter as eggs in late stages of embryonic development, and are prevented from hatching in the fall by a diapause whose development is accelerated first by low temperature, then by long photoperiod. Absence of suitable temperatures in the winter prevents post-diapause development. Further synchronization is obtained through simultaneous wetting which initiates development in the spring. Finally, L. congener overwinters in the preblastokinesis stage of embryonic development. Diapause development is accelerated by low temperature; however, no effect of photoperiod was observed. Winter conditions prevent hatching when diapause is terminated. Hatching is synchronized by diapause, by simultaneous wetting of the eggs and by differential embryonic development and hatching temperatures in the spring. Rapid nymphal development in the latter two groups sustains the developmental synchrony which was established at the time of hatching. Seasonal succession was discussed in relation to the factors which control hatching and nymphal development in the three species types.

(349) SCHALLER, F., 1972. Rôle de l'ecdysone dans la régénération de l'épithélium mésentérique des Insectes Odonates. Arch. Zool. exp. gén. 112 (1971): 695-704. – (*Lab. Biol. Gén., Univ. Louis Pasteur, 12 rue de l'Université, F-67 Strasbourg*).
Two different aspects are involved in this problem. The first one concerns the fate of regenerative cells with regard to their imaginal differentiation during metamorphosis. The development of last instar larvae deprived of their ecdysone source by means of ventral gland extirpation is interrupted and therefore the metamorphosis cannot occur. The midgut epithelium renewal is going on in permanent larvae, although moderately. The nidi of regenerative cells in such larvae however show the same cellular

density as the controls in the beginning of their intermoult. At no time a shedding of the larval mid-gut epithelium can be observed. Therefore ecdysone can be regarded as responsible for activation of regenerative cells in order to form the imaginal epithelium. The second aspect concerns the regeneration of mid-gut epithelium during larval intermoult. The ventral gland extirpation on a penultimate instar larva that stops the moulting process results in a decreasing of the nidi's activity. Implantation of active ventral glands in permanent larvae that allows resumption of their development, should be effective on regenerative cell activity. In fact the activation of the nidi is almost instantaneous, as is proved by the doubling of the number of cell divisions within twenty four hours after ventral gland implantation. The mid-gut regenerative cells are therefore especially sensitive to the supply of ecdysone, the activity of which is reacting upon DNA-synthesis in nuclei. (Author).

(350) SCHALLER, F. & M. MOUZE, 1972. Croissance et métamorphose oculaires de larves d'Aeschna cyanea Müll. (Insecte, Odonate) privées d'ecdysone. Gen. Comp. Endocrinol. 18 (3): 162. – (*Lab. Biol. Gén., Univ. Louis Pasteur, 12 rue de l'Université, F-67 Strasbourg*).

The continuation of ocular growth observed in larvae whose moulting process was stopped by removal of the ventral glands, is due to maintaining of mitotic activity and cell differentiation of both budding zone of the eye (ZAO) and outer growing zone (MAE) in the underlying optic lobe. The extent of ocular areas of these so called permanent larvae exceeds the limits observed in controls of penultimate instar (PUS), but does not reach the degree attained in the ultimate instar larvae (US) at the end of metamorphosis. The lack of ecdysone, exclusively responsible for this difference, that is due to an interruption of epidermal processes concerning moulting as well as metamorphosis, can not prevent the continuation of mitotic and differentiation processes in ZAO and MAE. Although they are extensive in PUS permanent larvae, due to their long duration, these processes keep a larval character with regard to the eyes. In the US permanent larvae, on the other hand, they lead to an exhaustion of ZAO and MAE also during a normal metamorphosis. It seems proved, therefore, that ocular growth that can occur without intervention of ecdysone, is controlled by means of juvenile hormone. (Authors).

(351) SENDA, Y., 1972. (A new record of Sinogomphus flavolimbatus from Miyagi Prefecture). Nature and Insects 7 (6): 29. (Japanese). – (*143 Itsukita, Minamitsuda, Kimosawa-machi, Kinosawa-gun, Iwate Pref., JA*).
A ♀ specimen was taken at Miyagi-machi, Japan, on July 21, 1971.

(352) SHIBATA, Y., 1972. (A new record of Enallagma deserti circulatum from Gifu Prefecture). Nature and Insects 7 (6): 29. (Japanese). – (*2-32 Ohiracho, Seki-shi, Gifu Pref., JA*).
4 ♂ and 2 ♀ were taken at Takane-mura, Japan, on Aug. 7, 1971.

(353) SNYDER, A.W. & C. PASK, 1972. A theory for changes in spectral sensitivity induced by off axis light. J. Comp. Physiol. 79: 423-427. – (*Dept. Appl. Math., Res. Sch. Phys. Sci., Inst. Adv. Stud., Australian Natl Univ., P.O.B. 4, Canberra, ACT, 2600, AU*).
The spectral sensitivity $\alpha(\lambda)$ of the photopigment contained within a photoreceptor is not directly related to the receptor cell spectral sensitivity $S(\lambda)$ measurements. Instead, both $S(\lambda)$ and the diffraction properties of the photoreceptor must be known to find $\alpha(\lambda)$. Changes in spectral sensitivity of visual receptors in Aeshna sp. (1971. Z. vergl. Physiol. 71: 201-218), due to off axis light, could be caused by the diffraction properties of the rhabdom. (Cf. *OA* No. 38).

(354) SOLON, B.M. & K.W. STEWART, 1972. Dispersal of algae and protozoa via the alimentary tracts of selected aquatic insects. Environ. Ent. 1 (3): 309-314. – (*Dept. Biol., Union Coll., Cranford, N.J. 07016, USA*).
The passage of viable algae and protozoa through digestive tracts of field-collected herbivorous (Coleoptera; Hydroptilidae.

Denton, Texas, USA; late summer through early fall, 1968-1969) and carnivorous (Odon.; ponds nr. Lake Taxoma, Oklahoma, USA; summer 1966) insects is demonstrated. 32 genera of viable algae and protozoa were identified from 36 cultures inoculated with hindguts of 4 spp. of Hydroptilidae; 86% of the cultures yielded organisms. 19 genera of algae and protozoa were identified from 107 cultures inoculated with faeces of 11 spp. of Odon. (Celithemis eponina, Dromogomphus spoliatus, Dythemis fugax, Erythemis simplicicollis, Libellula luctuosa, L. pulchella, Pachydiplax longipennis, Perithemis tenera, Plathemis lydia, Tramea lacerata, T. onusta); 65% of the cultures yielded organisms. Among the dragonflies studied, E. simplicicollis carried the greatest number of different algae and protozoa (5 green algae, 3 blue green algae, 1 diatom, 2 protozoans, some fungal spores). The results indicate that herbivorous aquatic beetles are more important than carnivorous Odon. in dispersal of algae and protozoa by passive internal transport. The results are ecologically significant since aquatic insects periodically disperse, carrying a variety of aquatic microorganisms adapted for alimentary survival during overland transport. Not only internal transport of spores, cysts and resistant structures, but also transport of vegetative algal cells is demonstrated.

(355) TANI, K., 1972. (Dragonfly survey of Ashyu). Gracile 12: 23-25. (Japanese). – (*129 Jizocho, Nara City, Nara Pref., 630, JA*).
On July 11-12, 1971, 22 spp. were collected at Ashyu, Kyoto Pref., Japan, including Platycnemis foliacea sasakii, Davidius moiwanus ssp., Anisogomphus maackii and Somatochlora viridiaenea. The records are analyzed in an appended table. (Cf. Abstracter's note in *OA* No. 307).

(356) TESTARD, P., 1972. Observations sur l'activité reproductrice d'une population de Sympetrum striolatum Charpentier dans le Sud de l'Espagne (Odon. Libellulidae). Bull. Soc. ent. Fr. 77: 118-122. – (*Lab. Zool., Ecole normale supérieure, Univ. Paris, 46 rue d'Ulm, F-75 Paris V^e*).
In the northernmost part of the Marismas of the Guadalquivir, southern Spain, 114 odon. specimens, referable to Lestes sp., Sympecma fusca, Orthetrum chrysostigma, Sympetrum fonscolombei, S. sanguineum and S. striolatum (61 ♂, 37 ♀) were observed or captured and field observations on the reproductive behaviour of the latter were made in the period December 13-18, 1971. S. striolatum was on wings between 11^{30} and 16^{25} hrs, while reproductive behaviour was taking place between 12^{40} and 15^{30} hrs. The observations on the activity were parallelized with data on temperature and intensity of solar illumination. The behaviour of this "late" population differed from that of the same sp. in summer by a prolonged duration of some phases of reproductive behaviour and by a greater number of deposited fertilized eggs per ♀. The biological significance of the phenomenon is discussed.

(357) THINES, G. & R. TERCAFS, 1972. Atlas de la vie souterraine. Les animaux cavernicoles. Boubée, Paris. 161 pp. – (*Lab. Psychol. Expér. et Comp., Univ. Louvain, Belgium*).
On page 65 reference is made to Odon., that are incidental trogloxenes and only seldom found in caves. There are no bibliographic references and no specific names are mentioned. A beautiful colour photograph of Calopteryx sp. appears on the cover of the book. (*Abstracter's note*: Dragonflies are omitted from most lists and catalogues of cave fauna. It seems useful, therefore, to give here a few known references to the odon. records from caves, viz. Telebasis ? salva: J.R. Redell, 1970. Texas J. Sci. 22: 47-65; – Lestes virens: H. Strouhal, 1939. Folia zool. hydrobiol. 9: 247-290; Arch. Naturgesch., N. F., 9: 372-435; – Heliaeschna longfieldae: C. Longfield, 1936. Trans. R. ent. Soc. Lond. 85: 467-498; R.M. Gambles, 1967. Entomol. 100: 196-201; – Hemicordulia australasiae: B.M. May, 1963. Trans. R. Soc. N.Z., Zool., 3: 181-204; – not identified: S. Negrea & A. Negrea, 1968. Lucr. Inst. speol. E. Racovita 7: 79-148).

(358) TROTTIER, R., 1972. Effect of temperature and humidity on the emergence and ecdysis of Anax junius Drury (Odonata: Aeshnidae). Diss. Abstr. 32 (12: 7094-B). – (*Research Station, Canada Dept. Agric., Vineland, Ont., CA*).

(The following is the verbatim text of the abstract of a University of Toronto thesis, which appeared in 1970 and the photocopy of which can be obtained from the National Library of Canada, Ottawa, Ontario, K1A ON4, Canada): The effect of water temperature on the rate of development of A. junius and the effect of air temperature and humidity on its emergence from the water and final ecdysis were studied in the field and in the laboratory. Field studies, at a eutrophic pond near Toronto, showed that in Canada populations of A. junius are not only maintained by migrants each year, but also by residents. Two distinct populations were found, a summer (non-resident) population which developed from oviposition to emergence in approximately three months from June to September, and an overwintering (resident) population which overwintered as half grown larvae and developed in approximately 11 months from mid-July of one calendar year to the end of June of the next year. The former population was larger and comprised approximately 48% males and the latter was smaller and comprised approximately 41% males. A threshold temperature of development of 8.7° ± 0.1°C. was determined for the development of final instar larvae of the summer population. The rate of development of final instar larvae, reared at constant temperature, was similar to that of the entire summer aquatic stages which developed in fluctuating temperature. An average of 1332 degree-days ±1% was required for development from the onset of oviposition to the onset of emergence of the summer population ; whereas 20.5% more degree-days were required for the development of the overwintering population, employing the threshold temperature of 8.7°C. as determined for the summer population. The temporal patterns of emergence for each emerging population were close to those of a normal distribution. Fluctuations in daily numbers emerging were related to changes in water temperature, depending on the state of development and size of the larval population. The emergence of A. junius occurred normally after sunset. The onset of emergence after sunset was affected independently by water temperature and air temperature; low water temperature and high air temperature delayed the onset of emergence. In the field, the net vertical distance travelled above the water surface, before ecdysis, was positively correlated with air temperature. In the laboratory, the vertical distance travelled above the water surface was greatest when air and water temperature were approximately the same. The average speed of climbing to the first resting position above the water surface was faster at high than low water temperature, but the average speed of climbing from there to the final position, where ecdysis occurred, was reduced due to the effects of air temperature and humidity. Air temperatures below 12.6°C. were found to retard ecdysis, and the larvae returned to the water and emerged early in the daytime the following day, thus shifting the final process of emergence and ecdysis from nocturnal to diurnal. The duration of ecdysis was shorter at high than low air temperatures, and only the first three stages, as arbitrarily defined, were longer at low than high relative humidity; stage 4 shortened with low relative humidity. There is evidence from the study that A. junius, emerging from the water, is affected at first by the temperature acquired when submerged, but becomes gradually and cumulatively affected by air temperature and humidity while climbing to the ecdysial position and moulting. (Cf. also *OA* No. 128).

(359) VERON, J.E.N., 1972. The chromatophores of some Australian Odonata. Abstr. XIVth Int. Congr. Ent., Canberra, p. 128. – (*Dept. Marine Biol., School Biol. Sci., James Cook Univ. North Queensland, P.O.B. 999, Townsville, N. Queensland, AU*).

Physiological colour change in Austrolestes

annulosus and Ischnura heterosticta, from a bright Tyndall blue to a deep purple, is effected by the migration of dark ommochrome vesicles in hypodermal chromatophores. Both the ommochrome vesicles and the Tyndall blue granules migrate through an agranular endoplasmic reticulum network. This migration occurs only in response to temperature change. In these respects, the chromatophores are very similar to the primary and secondary pigment cells of the eye. (Verbatim).

(360) WAKISAKA, K., 1972. (Dragonfly observations in Obama). Gracile 12: 28. (Japanese). – (*Higashi 4-97, Nagaicho, Sumiyoshiku, Osaka, JA*).

On October 10, 1971, the author collected 13 spp. in Obama, Fukui Pref., Japan. (Cf. Abstracter's note in *OA* No. 307).

(361) WAKISAKA, K. & K. TANI, 1972. (Annual meeting of the Society of Odonatology, Tokyo). Gracile 12: 36-37. (Japanese). – (*Higashi 4-97, Nagaicho, Sumiyoshiku, Osaka, JA*).

The meeting was held at Suita near Osaka, on November 15, 1971 and was attended by 32 members. (Cf. also *OA* Nos. 137 and 236).