ODONATOLOGICAL ABSTRACTS

1972

(1289) KARAMAN, B., 1972. [Contribution to the knowledge of Odonata in the ecosystem of the Dojran Lake]. Mag. Thesis, Univ. Zagreb. (Croatian). – (*P.O.B. 138, YU-91001 Skopje*).
This is an unpublished thesis, submitted in fulfillment of the conditions for the title of "Magister of Science", hence the abstracter was unable to inspect the text. For the odon. fauna of the Dojran Lake, Macedonia, Yugoslavia cf. also *OA* No. 1276.

1973

(1290) KAPPES, W. & E. KAPPES, 1973. Beobachtungen von Frühjahrsodonaten im Seewinkel. Naturk. Mitt. DJN Hamburg 33 a: 1-2. – (*Auf den Wöörden 26, D-2000 Hamburg-67, GFR*).
A list of 15 spp., collected on the Austrian side of the Neusiedler See during May 12-25, 1973. (Cf. also *OA* Nos. 604, 1336).

(1291) PAVLYUK, R.S., 1973. The need for careful species identification of dragonfly larvae. Hydrobiol. J. 9 (4): 114-116. – (*Mus. Zool., Univ. Lvov, 4 Shcherbakov Str., USSR-290005 Lvov*).
This is an Engl. translation of the Russian paper listed in *OA* No. 645. (*Abstracter's note*: Hidrobiol. J. is the Engl.-language edition of the Gidrobiol. Zh., bimonthly of the Ukrainian Acad. Sci., published by the American Fisheries Soc., with the same issue dates as the original).

(1292) PINHEY, E.C.G. & F.C. DE MOOR, 1973. Entomology report. Bukwa R.S.E.S., pp. 32-39. – (*Natl Mus., P.O.B. 240, Bulawayo, Rhodesia*).
A brief general account, with a list of spp. of all orders collected in the Bukwa area, Rhodesia, during April-May, 1973. In all, 11 odon. spp. were recorded.

(1293) VIRKKI, N., 1973. Evolution of sperm cell number per bundle in insects. An. Esc. nacl Ci. Biol. Mexico 20 (1-4): 23-24. (With Spanish s.). – (*Agric. Exp. Stn, Univ. Puerto Rico, Rio Piedras, Puerto Rico 00928, USA*).
The spermatozoa of almost all insects are arranged in bundles. The number of spermatozoa per bundle (SB) is very constant for a sp. above the primitive Order Odon. SB is determined by the number of synchronized mitoses of the definitive spermatogonia enclosed in a goniocyst. The number of bundles produced is controlled by multiplication of germ cells prior to the definitive gonia. The number of testis follicles depends on the number of apical apparatuses formed. The total production of spermatozoa thus largely depends on the premeiotic cytology of the germ line. Specialized insects tend to have less SB than more primitive. It is possible that reduction of SB reflects a general reduction in sperm production, which in turn may limit genetic variability, sufficient to further the population's adaptation to a specialized niche.

1974

(1294) KEVAN, D.K. McE. & S.K. LEE, 1974. Atractomorpha sinensis sinensis Bolivar (Orthoptera: Pyrgomorphidae) and its nymphal stages. Oriental Insects 8 (3): 337-346. – *(Dept. Ent., McGill Univ., Macdonald Campus, Ste-Anne de-Bellevue, Quebec, H9X 3M1, CA).*
On p. 338 notes are given on the famous Chinese painting known in the literature under the name "Early Autumn". The picture was made about 1280 by Ch'ien Hsüan (1235-1290), and shows numerous insects, incl. a group of dragonflies, one of which is realistically masticating a chironomid midge on the wing. This is probably the first record of the feeding habits in Odon. The original painting is now in the Detroit Institute of Arts, USA. The first of several of its reproductions is that by B. March (1929, Bull. Detroit Inst. Arts 10/6: 76-79); an excellent colour reproduction appeared in the book: M.M. Sze, 1967, The Tao of painting: a study of the ritual disposition of Chinese painting. Princeton Univ.

(1295) PINHEY, E., 1974. Dragonfly collecting on Falcon College expeditions in the Okavango. Falcon 5 (3): 69-70. – *(Natl Mus., P.O.B. 240, Bulawayo, Rhodesia).*
This is a general odon. account of the 6 expeditions to Okavango, Botswana, carried out between 1968-1973. In all 82 spp. were collected in Botswana, but a list of them is not given here.

1975

(1296) ARAI, Y., 1975. The behaviour of mature individuals of Onychogomphus viridicostus (Oguma). Tombo 18 (1-4): 10-12. (Japanese, with Engl. s.). – *(215 Koizuka, Kumagayashi, Saitama, 360, JA).*
Observations on the reproductive behaviour, as carried out during 1969-1975 at 3 rivers near Tokyo, Japan, are brought on record.

(1297) ASAHINA, S., 1975. A revisional study of the genus Mnais (Odonata, Calopterygidae). VI. The type-specimens of Japanese Mnais species. Kontyu 43: 401-411. – *(Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 160, JA).*
Confirmation of the type-specimens of the Japanese Mnais "species and subspecies" is attempted. The type-species of the genus is "M. pruinosa Selys" of which 1 ♂ is described. Its supposed type-locality is Nagasaki, Japan, and a specimen in the Leyden Mus. was designated as lectotype by Lieftinck (1971. Tijdschr. v. Ent. 114: 65-139). The type-specimen of "M. strigata Hagen ♂" is supposed to be in the Hagen Collection in the Mus. Comp. Zool., Harvard Univ. USA, whereas its ♀ could not yet be confirmed. The lectotype of "M. costalis Selys" is now designated to be a ♂ in the Brussels Mus. The holo- and allotypes of "M. strigata nawai Yamamoto" are shown in this paper. (Author). (For Parts I-V, VII cf. *OA* 940, 941, 1161, 1162, 1242, 1298).

(1298) ASAHINA, S., 1975. A revisional study of the genus Mnais (Odonata, Calopterygidae). VII. A comparative redescription of three Japanese taxa. Tombo 18 (1-4): 27-41. – *(Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 160, JA).*
Based on reliable topotypical material the 3 named Japanese Mnais are redescribed and compared, viz. "M. pruinosa Selys" (incl. ♂ f. strigata) ♂, ♀, "M. costalis Selys" (incl. hyaline-winged ♂ form) ♂, ♀, and "M. strigata nawai Yamamoto" ♂, ♀. The "costalis" and "nawai" are much more allied than "pruinosa" and "nawai". The 3 taxa, however, should be included in a single specific category, when compared with the 3 representative spp. of continental Asia. (Author). (For Parts I-VI cf. *OA* Nos. 940, 941, 1161, 1162, 1242, 1297).

(1299) ASAHINA, S., 1975. [The 20th General Assembly]. Tombo 18 (1-4): 42. (Japanese). – *(Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 160, JA).*
A brief report on the Assembly of the Society of Odonatology, Tokyo, that has taken place on Sept. 26, 1975, at Matsudo,

Chiba. A group photograph of the 18 participants is added.

(1300) ASAHINA, S., 1975. Preliminary announcement. Tombo 18 (1-4): 42. (Japanese and Engl.). – (*Takadanobaba 4-4-24, Shinjuku-ku, Tokyo, 160, JA*).
The possibility is announced that the periodical, Tombo - Acta odonatologica, would cease its publication with the 20th volume (1977).

(1301) BALL, G.E., 1975. Walker, E.M. and P.S. Corbet, 1975. The Odonata of Canada and Alaska, Volume three, Part III, the Anisoptera. Quest. ent. 11 (4): 499-500. – (*Dept. Ent., Univ. Alberta, Edmonton, Alberta, CA*).
Extensive book notice on the item listed in *OA* No. 1194.

(1302) BELYSHEV, B.F., 1975. Nekotorye momenty v sovremennom napravlenii evolucii okraski strekoz Sibiri i sopredel'nyh zemel'. [Some aspects of the evolutionary trends in the coloration of the dragonflies of Siberia and adjacent territories]. Vopr. Biol. 5: 123-128. (Russian). – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
The trends in the development of body- and wing coloration are discussed. The main conclusions are that (1) ♀♀ are more conservative than ♂♂, and (2) there is a trend towards the hyalinization of wings, hence the temperate zone forms are less intensely coloured than those in the tropics and populations at the periphery of a species range less than those near the supposed centre of origin of the species concerned.

(1303) BELYSHEV, B.F., 1975. Poprygun-'ya? [The cricket?]. Krasnoe znamya No. 15826 (Sept. 24, 1975). (Russian). – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
A popular newspaper talk on dragonflies, inspired by A.I. Krylov's Russian translation of J. de la Fontaine's fable, "La cigale et la fourmi".

(1304) BUTLER, T., J.E. PETERSON & P.S. CORBET, 1975. An exceptionally early and informative arrival of adult Anax junius in Ontario (Odonata: Aeshnidae). Can. Ent. 107 (12): 1253-1254. – (*Ecole Secondaire Pédagogique, Dép. Spéciale Nyankunde, Bunia, Zaire*).
2 mature ♂ adults were seen at Kitchener, Ontario, Canada, exceptionally early in the spring (Apr. 4, 1974), before emergence had begun locally, and very soon after an episode of unseasonably warm weather which was associated with the arrival from Texas, USA, of a low-pressure system. (Authors).

(1305) CARFI, S., 1975. Libelulas colectadas en Cuba y en Cayo Avalos durante la "Expedición Científica Mares 1967". (Dragonflies collected in Cuba and Cayo Avalos during the "1967 Mares Scientific Expedition"). Redia 56: 13-18. (Spanish, with Engl. s.). – (*Ist. Zool., Univ. Firenze, Via Romana 17, I-50125 Firenze*).
An annotated list is given of 4 Zygoptera and 17 Anisoptera collected during Aug.-Sept., 1967 in Cuba and of 4 Anisoptera from the islet Cayo Avalos, Cuba Archipelago. None of these is new to the fauna of Cuba, but the 4 spp. of the Cayo Avalos are the first odon. records for the island. The material is in the collections of the Museo Zoologico dell'Università degli Studi, Firenze, Italy.

(1306) DUMONT, H.J., 1975. Agriocnemis sania Nielsen, 1959 (Odonata, Zygoptera) from Israel and Sinai, with a redescription of the species and distributional and ecological notes. Israel J. Zool. 23 [1974]: 125-134. – (*Inst. Zool., Univ. Ghent, Ledeganckstraat 35, B-9000 Ghent*).
In Israel and Sinai A. sania occurs and not A. pymaea (Rambur). A. sania was previously known only from the oasis of Gat (Libya), and was believed to be endemic to that area. Its original description is revised and taxonomic, ecological and biogeographical data are presented. (Author).

(1307) EDA, S., 1975. A pair of Sympetrum frequens just laying eggs by striking water-surface, October 10, 1975, at Matsumoto, Nagano Pref. Tombo 18 (1-4): 1. – (*Dept. Oral Pathol., Matsumoto Dental Coll., 1780 Gobara, Hirooka, Shiojiri, Nagano, 399-07, JA*).
A frontispiece photograph.

(1308) EDA, S., 1975. On the oviposition behaviour of the dragonflies of the genus Sympetrum. Tombo 18 (1-4): 2-9. (Japanese, with Engl. s.). – (*Dept. Oral Pathol., Matsumoto Dental Coll., 1780 Gobara, Hirooka, Shiojiri, Nagano, 399-07, JA*).
A review is given of the oviposition behaviour in 20 spp., based on literature records and own observations. The oviposition in Odon. may be classified into 8 types, of which the types IV (flying oviposition into mud), V (flying oviposition into water) and VI (non-contact flying oviposition) are met with in Sympetrum. It is suggested that IV and VI evolved from the basic type V.

(1309) EDA, S., 1975. A male of Sympetrum eroticum eroticum Selys with vestigial dark marking at the wing apices. Tombo 18 (1-4): 9-10. (Japanese, with Engl. s.). – (*Dept. Oral Pathol., Matsumoto Dental Coll., 1780 Gobara, Hirooka, Shiojiri, Nagano, 399-07, JA*).
The specimen, taken at Kirki, Saitama Pref., Japan (July 25, 1971) is described and illustrated.

(1310) EVANS, H.E. & R.W. MATTHEWS, 1975. The sand wasps of Australia. Sci. American 233 (6): 108-115. (*Dept. Ent., Colorado St. Univ., Fort Collins, Col., USA*).
An authoritative, popular account of the biology of the Australian representatives of the genus Bembix. While 20 out of 22 Australian spp. prey only upon Diptera, B. coonundura and B. variabilis hunt also Zygoptera. The former seems to prey only on Odon., while the diet of the latter varies in different regions. Thus, while it is a predator of flies throughout most of the continent, in parts of northern Australia, however, some populations of variabilis hunt Zygoptera, which suggest that the sp. is in evolutionary transition. (*Abstracter's note*: The colour photograph at the bottom of p. 110 shows a B. variabilis ♀ with a captured dragonfly, which is probably a ♂ Pseudagrion microcephalum).

(1311) GENSCH, W., 1975. Vierfleck (Libellula quadrimaculata). Tierkalender 1976. VEB Bild & Heimat, Reichenbach i. V., GDR. – (*Author's address unknown*).
A beautiful colour photograph (185 x 185 mm) (by R. Krause), illustrating the calendar page for Febr., is accompanied by a full-page popular text on dragonflies.

(1312) GLÖER, P. [Ed.], G. IHSSEN, O. OSTERMANN, H. STOBBE & W. WERNICKE, 1975. Red area book: Teufelsmoor. Naturk. Jb. DJN 1974-1975: 113-184. – (*Ringstrasse 122, D-2000 Hamburg 73, GFR*).
This monograph has appeared earlier in a book edition and is listed in *OA* No. 959. The 10 biologically interesting areas treated and the numbers of odon. spp. recorded, are: NSG-Breites Wasser (8), Seegrund (6), Ahrensfelder Moor (11), Altenbrücker Moor (12), Pferdeweidenplacken (2), Hamberger Moor (11), Öners Moor (3), Heilsmoor (7), NSG-Swatte Flag (4), NSG-Huvenhoopssee (3).

(1313) HALKKA, L. & O. HALKKA, 1975. Accumulation of gene products in the oocytes of the dragonfly Cordulia aenea L. I. The nematosomes. J. Cell Sci. 19 (1): 103-115. – (*Dept. Genetics, Univ. Helsinki, P. Rautatiekatu 13, SF-00100 Helsinki*).
The chromosomes of the active previtellogenic oocytes of C. aenea extrude into the cytoplasm a substance which is subsequently found there in the form of granulofibrillar masses. These nuclear extrusions evolve ultrastructurally into two components, nematosomes and dense masses. The nematosomes are later found transitorily adjacent to the mitochondria and undergo transformations that are synchronized with

changes in oocyte activity. It is suggested that the nematosomes are storage structures for long-lived informational RNA and that they may be widely distributed in various types of cells containing such RNA. (Authors).

(1314) HILSENHOFF, W.L., 1975. Aquatic insects of Wisconsin. Techn. Bull. Dept. Nat. Res. Madison 89: 1-52. – *(Dept. Ent., Univ. Wisconsin, Madison, Wisconsin 53706, USA).*
Odon. are treated on pp. 12-15. An illustrated key for larvae is given to families and genera known (or expected) to occur in Wisconsin, USA. A list of spp., actually present (or expected) in the State, references to the most recent keys for specific determination, and habitat notes on the family level, are included.

(1315) HUJER, H., 1975. Dokumentationen zur Funktionsstruktur der Energiden im Entwicklungsprozess der Eier der Libellen Platycnemis und Ischnura. Verh. dtsch. zool. Ges. 67 [1974]: 178-183. (With Engl. s.). – *(Fachber. Zool., Univ. Marburg, Ketzerbach 63, D-355 Marburg, GFR).*
The structure and function of energids in the eggs are described, and the energid motion and a generalized cleavage pattern in insect eggs are discussed.

(1316) INGRAM, B.R., 1975. Diapause termination in two species of damselflies. J. Insect Physiol. 21 (12): 1909-1916. – *(Dept. Zool., Clemson Univ., Clemson, South Carolina 29631, USA).*
Larvae of Enallagma hageni and E. aspersum, were collected in southwestern North Carolina, USA, and subjected to different combinations of daylength (SD, 11 hr day; LD, 14 hr day) and temperature to determine the factor critical in the termination of diapause. Diapausing larvae were collected in Sept. and 15 comparable groups of each species were given pretreatments (SD, 10°C; LD, 10°C; or SD, 21°C) for 2,4 or 8 weeks and then transferred to SD, 21°C or LD, 21°C until emergence. Control groups were maintained under both photoperiods at 21°C. Response times (days from collection to emergence) for both spp. showed that rapid development required transfer to LD, 21°C regardless of the type of pretreatment or length of exposure. Larvae transferred to LD, 21°C after exposure to any of the 3 types of pretreatment for equal lengths of time developed at similar rates. Pretreatments at 10°C, which were equally effective with SD or LD, stimulated subsequent rapid development at LD, 21°C to a greater extent than continuous exposure to LD, 21°C conditions, and the longer the exposure to 10°C, the faster the subsequent response. Pretreatments at SD, 21°C also resulted in rapid development, similar to that of larvae exposed to 10°C, upon transfer to LD, 21°C conditions. Long daylengths administered only during pretreatments did not effect rapid development, since all larvae responded slowly when transferred to SD, 21°C. Diapause termination, therefore, was affected by LD, 21°C conditions preceded by exposure to either low temperatures, during which the photoperiod was not important, or short daylengths at 21°C. (Author).

(1317) INOUE, K. & S. OBANA, 1975. A female specimen of Sympetrum kunckeli with reddish abdomen. Tombo 18 (1-4): 20. (Japanese, with Engl. s.). – *(5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA).*
The specimen, taken at Kawakamidaira bog, Takashima-gun, Shiga Pref., Japan, on Sept. 29, 1974, is described. The eggs originating from the same ♀, yielded adults of normal coloration.

(1318) JOHNSON, C., 1975. Variability in the damselfly, Lestes sigma Calvert (Zygoptera: Lestidae). Texas J. Sci. 26 (1-2): 165-170. – *(Dept. Zool., Univ. Florida, Gainesville, Fla 32611, USA).*
Structural variation occurs in the ♂ superior abdominal appendages of L. sigma that equals differences between lestid spp. The basal "tooth" exists as a distinct, pointed

tooth, or as a rounded lobe. The desirability for a functional interpretation of appendage structure prior to taxonomic treatment of such variation is stressed. The geographic distribution of L. sigma is reviewed.

(1319) JOHNSON, D.M., B.G. AKRE & P.H. CROWLEY, 1975. Modeling arthropod predation: wasteful killing by damselfly naiads. Ecology 56 (5): 1081-1093. – *(Dept. Biol., Rice Univ., Houston, Texas 77001, USA).*

Zygopteran larvae were fed Daphnia magna in laboratory predation studies. Anomalagrion hastatum predation rates were highest during the first 2 days of the penultimate instar and then declined until ecdysis. The functional response of final instar Ischnura ramburii was most sensitive to changes in Daphnia densities of 5-50/liter. Many more prey were killed than eaten in both studies; this wastefulness increased significantly as densities rose from 5 to 10/liter. Observations of feeding behavior revealed that zygopteran larvae frequently strike at and capture prey and then discard them uneaten or only partially eaten. This is presumed to be the proximate cause of wasteful killing. Photographic documentation of gut contents showed that during feeding the foregut often becomes full before the midgut, leading us to hypothesize that wasteful killing occurs when hunger in the midgut motivates capture, but fullness of the foregut precludes eating. When wasteful killing is a normal component of hunger-motivated feeding behavior, it has sometimes been explained by hypothesizing the existence of a hunger threshold which is higher for eating than for capture. A two-gut-compartment formulation of Holling's simulation model of invertebrate predation which accounts for dynamic characteristics of wasteful killing without hypothesizing an elevated hunger threshold for eating, is proposed (cf. Mem. ent. Soc. Can. 48, 1966). (Authors).

(1320) JURZITZA, G., 1975. Ein Beitrag zur Faunistik und Biologie der Odonaten von Chile. Stuttgart. Beitr. Naturk. (A) 280: 1-20. (With Engl. and Spanish s's.). – *(Bot. Inst. 1, Univ. Karlsruhe, Kaiserstr. 12, D-75 Karlsruhe, GFR).*

21 spp., collected from Febr. through March, 1974 at various localities in Chile are discussed in detail. Of particular value are detailed descriptions of their morphology, and often extensive notes on their habitats, biology and behaviour. The taxonomic relationships of the genus Antiagrion, and the status of the taxa A. antigone Ris, Oxyagrion rufulum (Hag.) and Sympetrum villosum Ris are thoroughly dealt with. *(Abstracter's note*: Although only about 50% of spp. hitherto recorded from Chile are treated, the paper will be absolutely indispensable to anyone working on the fauna of this region).

(1321) KALLAPUR, V.L. & C.J. GEORGE, 1975. Alpha-glycerophosphate dehydrogenase (insoluble) and lactic dehydrogenase activities in the skeletal muscle of two insects. Arch. int. Physiol. Biochim. 83 (2): 233-238. – *(Dept. Zool., Karnatak Univ., Hubli-Dharwar, Mysore, India).*

The flight muscle preparations of the odon. Pantala flavescens and the coleopt. Cybister confusus showed extremely low levels of lactic dehydrogenase activity and high levels of α-glycerophosphate dehydrogenase (insoluble) activity. The activities of the 2 enzymes in the leg muscle of the beetle were approximately the same (1:1), but lactic dehydrogenase activity was several times higher than that in flight muscles of both insects. Probably the flight muscles have a high energy demand during sustained activity, while the leg muscles of the beetle, which are involved in swimming activity, derive their energy predominantly through anaerobic glycolysis.

(1322) KIAUTA, B. & M.A.J.E. KIAUTA-BRINK, 1975. The chromosomes of the dragonfly, Sympecma annulata braueri (Yakobson & Bianki, 1905) from the Netherlands, with a note on the classification of the family

Lestidae (Odonata, Zygoptera). Genen Phaenen 18 (2-3): 39-48. – *(Dept. Anim. Cytogenet. & Cytotaxon., Univ. Utrecht, Padualaan 8, Utrecht, NL).*

It is considered that the correct name of the European Sympycna paedisca Brauer, 1882 is not Sympecma braueri (Yakobson & Bianki, 1905), but Sympecma annulata braueri (Yakobson & Bianki, 1905). The ♂ germ cell chromosomes of Dutch material are described and illustrated (2n ♂ = 25, n ♂ = 13, m). It is suggested that the high percentage of spermatogonial divisions found in the adults prior to hibernation, is due to the peculiar life history pattern (i.e. hibernation at the adult stage) of this species, and that the duration of spermatogonial divisions is conditioned in dragonflies in general by the longevity of the adult life and not by the length of the larval development or by the environmental temperatures prevailing during various ontogenetic stages. It is shown, on geographical grounds, that the Japanese species, described cytologically by Kichijo (1941, Nagasaki med. J. 19: 2035), under the name "Sympycna fusca Linden", is conspecific with S. annulata. The karyotypes of the Japanese and the Dutch populations are compared and found morphologically identical. The cytological conditions in the Lestidae are reviewed and it is concluded, that the karyotypic morphology, though peculiar on the family level (by the occurrence of an extra large autosome pair in most species) does not support the division into two subfamilies. (Authors).

(1323) KRISTENSEN, N.P., 1975. The phylogeny of hexapod "orders". A critical review of recent accounts. Z. zool. Syst. Evolutionsforsch. 13 (1): 1-44. (With German s.). – *(Zool. Mus., Univ. Copenhagen, Universitetsparken 15, Copenhagen, DK).*

The evidence for Hennig's (1969) hierarchical classification of the higher hexapodan taxa (here termed "orders") is reviewed and additional data are considered. The monophyly of the Hexapoda and the sister group relationship between Entognatha and Insecta (Archaeognatha + Zygentoma + Pterygota) are accepted. Manton's theory of an independent origin of Diplura, Protura, Collembola, Thysanura (s.l.) and Pterygota is found to be based on an unwarranted importance attached to autapomorphies and on inadequate considerations of those ancestral stages considered by Manton to be "functionally impossible". The monophyly of Hennig's taxon Dicondylia (Zygentoma + Pterygota) is accepted and substantiated by further evidence. A taxon constituted by the recent palaeopteran orders, Ephemeroptera and Odonata, is not accepted as monophyletic, the latter order being considered the sister group of the Neoptera. The phylogenetic interrelationships of the lower neopteran orders (Plecoptera + Paurometabola sensu Hennig) are considered entirely unclarified. Hennig's classification as well as the theories on supraordinal relationships by, e.g. Blackith & Blackith (1968), Giles (1963), Richards & Davies (1957), Ross (1965), Rahle (1970), Sharov (1968/71) and Wille (1960) are very weakly founded, but construction of an alternative classification is not attempted. The monophyletic nature of the order Blattopteroidea (Mantodea + Blattariae + Isoptera) is considered firmly established. The ground plan of the Phasmatodea is inadequately known. The current primary division of the order is questioned. The monophyly of the taxon "Eumetabola" (Paraneoptera + Holometabola) is substantiated only by its possession of a "jugal bar" (Hamilton, 1972). Sharov's (1966) account of the phylogenetic significance of embryonic growth patterns in the major pterygote division is discarded. Hennig's theory of the paraneopteran nature of the Zoraptera is preferred to theories of blattopteroid affinities of this order. Assumedly specific zorapteran-isopteran similarities are invalidated by those characters in the Zoraptera (corpotentorium, female subgenital plate) which show that this order could at most have been the sister-group of the Blattopteroidea as a whole. The monophyly of the entities

Psocodea (Psocoptera + Phthiraptera) and Condylognatha (Hemiptera + Thysanoptera) is accepted. It is likely that the Psocoptera is paraphyletic in terms of Phthiraptera. Hennig's subdivision of the Hemiptera: Heteropteroidea (including Coleorrhyncha), Auchenorrhyncha and Sternorrhyncha is accepted. Mickoleit's (1973) findings concerning the ovipositor structures provide the most weighty evidence for the monophyly of the Neuropteroidea (Megaloptera + Raphidioptera + Neuroptera) and for the relationship of this group to the Coleoptera. Following Kinzelbach (1971) the Strepsiptera is tentatively placed as the sister-group of the Coleoptera. Hennig's suggestion of a sister-group relationship between the Hymenoptera and the Mecopteroidea probably provides the best working hypothesis of the position of the former group. The Mecopteroidea and its 2 subgroups Amphiesmenoptera (Trichoptera + Lepidoptera) and Anthophora (Mecoptera + Siphonaptera + Diptera) are considered monophyletic entities. The arguments, mentioned by Hennig, against the inclusion of the Siphonaptera in the Mecopteroidea are discarded and evidence is provided for a sister-group relationship between this order and Mecoptera including Neomecoptera. The Zeugloptera are true Lepidoptera.

(1324) KUWADA, K. & S. ASAHINA, 1975. Orthetrum japonicum japonicum allied to its continental race, O.j. internum. Tombo 18 (1-4): 12. (Japanese with Engl. s.). – (*397-1, Higushiishii-cho, Matsuyama, 790, JA*).
2 ♀ of O.j.j. Uhler taken in June 1973 in the southern Ehime Pref., Shikoku, Japan, greatly resemble the continental O.j.i. McLachlan in heavily darkened body markings and crossed hindwing triangles. Among the 21 specimens taken at the same locality in May 1974 there were 2 with crossed hindwing triangles.

(1325) LAUGHLIN, S.B., 1975. Receptor and interneuron light-adaptation in the dragonfly visual system. Z. Naturforsch. 30 c: 306-308. – (*Dept. Neurobiol., Res. Sch. Biol. Sci., Austral. Natn. Univ., P.O.B. 475, Canberra City, A.C.T. 2601, AU*).
Intracellular recordings from the lamina of Hemicordulia tau show that the receptors and second-order interneurons of the dragonfly compound eye change their sensitivity in response to maintained illumination. Comparison of receptor with interneuron shows that neural mechanisms act to ensure that the modulation of interneuron membrane potential that is set up by contrast changes is independent of background intensity. (Author).

(1326) METZ, B.A., R. REIFENBERG, W. WERNICKE, R. PAPPE [Ed.], P. GLÖER & E. KAPPES, 1975. Red area book: Alte Elbe bei Bleckede. Naturk. Jb. DJN 1974-1975: 96-112. – (Address R. Pappe: *Meinedorfer Weg 54, D-2000 Hamburg-73, GFR*).
A general characterization is given of the area, situated in the district of Lüneburg, German Federal Republic. Among the lists of selected groups of flora and fauna, there is a list of Odon., containing 16 spp.

(1327) MIYAZAKI, T., 1975. First record of Stylogomphus suzukii in Chiba Prefecture. Tombo 18 (1-4): 25. (Japanese, with Engl. s.). – (*1-128, Seki-machi, Nerima-ku, Tokyo, 177, JA*).
A population (incl. exuviae) was discovered at Kanaya, Fattsu-shi, Mt. Nokogiri, Japan, on July 20, 1975.

(1328) NARAOKA, K., 1975. "Non-contact sitting oviposition" of Davidius moiwanus moiwanus. Tombo 18 (1-4): 26. (Japanese, with Engl. s.). – (*Murakami Apartment House, 252 Hiraoka, Shinjo, Aomori-shi, 030-02, JA*).
It was observed on June 8, 1975, at Tsuta, Aomori Pref., Japan. Having layed by "non-contact flying oviposition", the ♀ flew to a leaf and continued oviposition there. The eggs fell on wet moss or sand near the stream.

(1329) OBANA, S., 1975. Records of the rearing of several North Japanese Odonata. Tombo 18 (1-4): 17-20. (Japanese, with Engl. s.). – *(3-4-10, Kinryo-cho, Sakai, 590, JA).*).
The following spp. were bred from eggs (though some did not reach emergence): Platycnemis echigoana, Somatochlora arctica, S. graeseri aureola, S. japonica, S. uchidai, Epitheca b. sibirica, Leucorrhinia intermedia ijimai, Sympetrum danae, S.f. flaveolum, and S. risi yosico.

(1330) PELLERIN, P. & J.-G. PILON, 1975. Cycle biologique de Lestes eurinus Say (Odonata: Lestidae), méthode d'élevage en milieu conditionné. Naturaliste can. 102: 643-652. (With Engl. s.). – *(Dept. Biol., Univ. Montréal, C.P. 6128, Montréal-101, Québec, CA).*
A rearing technique which makes it possible to obtain the complete life-cycle, and to undertake growth studies on L. eurinus is described. The larvae are separated as soon as they hatch, and placed individually in Petri dishes. They are kept under constant temperature (20° or 25°C) and photoperiod (14 hrs). Details of the life-cycle obtained in the laboratory are complemented by field observations on the adult life. The research opportunities offered by this rearing method are discussed and suggestions are made which may improve its efficiency. (Authors).

(1331) PINHEY, E., 1975. Insects at the water's edge. Wild Rhodesia 8: 21-23. – *(Natl Mus., P.O.B. 240, Bulawayo, Rhodesia).*
A popular account, incl. references to Odon. *(Abstracter's note*: The author's initial "H" is erroneous).

(1332) PINHEY, E., 1975. Dragonflies: Falcon College Expedition. Falcon 5 (4): 63. – *(Natl Mus., P.O.B. 240, Bulawayo, Rhodesia).*
A note on some of the more interesting spp. (out of 42) collected during Dec. 1-14, 1974 at the Bubye R., Limpopo Confluence, Rhodesia.

(1333) RAI, T., 1975. The Odonata of the Shizen-Kyoikuen Forest. Tombo 18 (1-4): 23-25. (Japanese, with Engl. s.). – *(RN-34, 2-20, Higashi-yama, Meguro-ku, Tokyo, 153, JA).*
The National Park for Nature Study is attached to the National Science Museum of Tokyo, and is located near Meguro Station in the city of Tokyo, Japan. In 1952 its odon. fauna consisted of 29 spp. Between May 1974 - Sept. 1975, 24 spp. were recorded, 5 of which had not been recorded previously. On the other hand, 10 spp. of the 1952 survey were not found in the 1974-1975 period.

(1334) REHFELD, H., 1975. Uber ein konzentriertes Libellenvorkommen an den "Seerosenteichen" bei Quedlinburg. Naturk. Jber. Mus. Heineanum 10: 25-32. – *(D.-Erxleben Str. 5, DDR-43 Quedlinburg, GDR).*
During 44 visits from 1967 through 1973, 30 spp. were recorded at a small pool on the edge of the city of Quedlinburg, Nordharz, German Democratic Republic. Leucorrhinia dubia is recorded for the first time for the Nordharz, bringing the number of known odon. spp. of this area to 40. Notes of various field observations are also provided. (Cf. also *OA* No. 752).

(1335) ROENHILD, G., 1975. The damselflies of Montana. Montana St. Univ. Res. Rep. (Agr. Exp. Stn) 87: 1-53. – *(Biol. Dept., Montana St. Univ., Bozeman, Montana 59715, SUA).*
General biology of the group is considered and keys to adult and larval stages are given together with the State distribution maps. Argia fumipennis violacea and Coenagrion angulatum are recorded from Montana, USA, for the first time.

(1336) STOBBE, H., 1975. Libellenbeobachtungen am Neusiedler See, Burgenland – Österreich. Ergebnis zweier Exkursionen in den Seewinkel nebst einer Liste der im gleichen Zeitraum beobachteten Schmetterlingsarten. Naturk. Mitt. DJN Hamburg 37: 1-8. – *(Ahrensburger Platz 4, D-2000 Hamburg-67, GFR).*

Annotated list of 30 spp. collected in May and Aug., 1975 on the Austrian side of the Neusiedler See. Brief notes on the localities visited are also given, and a phenological review is presented of the 39 spp. recorded at the lake since 1971 by the members of the [West] German Federation of Nature Friends (DJN). (cf. also *OA* Nos. 604, 1290).

(1337) STOBBE, H., 1975. Red area book: Lottbekstau. Ein Naherholungsgebiet am Stadtrand Hamburgs. Naturk. Jb. DJN 1974-1975: 84-95. – (*Ahrensburger Platz 4, D-2000 Hamburg-67, GFR*).
Ecology description and lists of selected groups of plants and animals are given of the Lottbek Barrage area (surface 15 ha approx., incl. 1.5 ha water), situated NE of Hamburg, on the Schleswig-Holstein border, German Federal Republic. The odon. fauna is discussed in some detail. It includes 19 autochthonous and 6 incidental immigrant spp.

(1338) SVIHLA, A., 1975. Additional notes on the abnormal oviposition by Pantala flavescens. Tombo 18 (1-4): 26. – (*1465 Verbena Drive, Palm Springs, California 92262, USA*).
In Burma it has been observed that pairs of P. flavescens in copula frequently oviposited on the hard, shiny, smooth surface of bitumen roads, apparently confusing the roads with stream surfaces. A similar behaviour of this sp. has been noticed also in India.

(1339) SVIHLA, A., 1975. Another locality of the larvae of Tanypteryx hageni Selys in Washington. Tombo 18 (1-4): 43-44. – (*1465 Verbena Drive, Palm Springs, California 92262, USA*).
The new locality is situated on a southward sloping exposure along the Tye River Road, King County, Washington, USA, at an elevation of 2500 ft approx. The topography and morphology of the burrows and the activity of the larvae are described.

(1340) SVIHLA, A., 1975. Adverse factors affecting the distribution of Tanypteryx hageni Selys. Tombo 18 (1-4): 44-45. – (*1465 Verbena Drive, Palm Springs, California 92262, USA*).
The attention is drawn to the destructive influence of human activities on populations of T. hageni in the U.S.A.

(1341) TABARU, N., 1975. The larval development of Rhipidolestes aculeata aculeata in Kyushu. Tombo 18 (1-4): 13-16. (Japanese, with Engl s.). – (*1029 Shiromotocho, Hitoyoshi, Kumamoto, 868, JA*).
A detailed description of the larval habitats, life history and larval morphology of this megapodagrionid sp. is presented, and accompanied by photographs of all instars (13).
It is based on field- and laboratory observations. The former were carried out in Kuma-gun mountains, Kumamoto Pref., Japan.

(1342) THEISCHINGER, G., 1975. Rhabdiopteryx christinae, n. sp., eine neue Steinfliege aus Spanien (Plecoptera, Taeniopterygidae). Z. ArbGem. öst. Ent. 27 (1-2): 25-30. (With Engl. s.). – (*Biol. Abt. II, Oberoesterreich. Landesmus., Museumstr. 14, A-4010 Linz*).
The new stonefly sp. is described from a rivulet, NW of Ciudad Encantada, Spain. In the stream larvan Pyrrhosoma nymphula and Aeshna cyanea were also recorded.

(1343) THEISCHINGER, G., 1975. Ein "Dreigespann" von Petalura gigantea Leach. Tombo 18 (1-4): 45. (With Engl. s.). – (*Biol. Abt. II, Oberoesterreich. Landesmus., Museumstr. 14, A-4010 Linz*).
The observation of a triple-connection (type A of Eda) is described. This is the first record of a triple connection in Petaluridae. (Author).

(1344) TOMBO. ACTA ODONATOLOGICA. Published by the Society of Odonatology, Tokyo. Vol. 18, Nos. 1-4 (dated December 31, 1975). – (*c/o Dr. S. Asahina, Taka-*

danobaba 4-4-24, Shinjuku-ku, Tokyo, 160, JA).

Eda, S.: Sympetrum frequens laying eggs [Frontispiece photograph]; – *Eda, S.*: On the oviposition behaviour of the dragonflies of the genus Sympetrum; – *Eda, S.*: A male of Sympetrum eroticum eroticum Selys with vestigial dark marking at the wing apices; – *Arai, Y.*: The behaviour of mature individuals of Onychogomphus viridicostus (Oguma); – *Kuwada, K. & S. Asahina*: Orthetrum japonicum japonicum allied to its continental race, O.j. internum; – *Tabaru, N.*: The larval development of Rhipidolestes aculeata aculeata in Kyushu; – *Obana, S.*: Records of the rearing of several North Japanese Odonata; – *Inoue, K. & S. Obana*: A female specimen of Sympetrum kunckeli with reddish abdomen; – *Yamaguchi, M.*: The odonate fauna established at an artificially prepared pond in Heirinji Temple Forest; – *Rai, T.*: The Odonata of the Shizen-Kyoikuen Forest; – *Miyazaki, T.*: First record of Stylogomphus suzukii in Chiba Prefecture; – *Naraoka, K.*: "Non-contact sitting-oviposition" of Davidius moiwanus moiwanus; – *Svihla, A.*: Additional notes on the abnormal oviposition by Pantala flavescens; – *Asahina, S.*: A revisional study of the genus Mnais (Odonata, Calopterygidae). VII. A comparative redescription of three Japanese taxa; – *Asahina, S.*: The 20th General Assembly; – *Asahina, S.*: Preliminary announcement; – *Svihla, A.*: Another locality of the larvae of Tanypteryx hageni Selys in Washington; – *Svihla, A.*: Adverse factors affecting the distribution of Tanypteryx hageni Selys; – *Theischinger, G.*: Ein "Dreigespann" von Petalura gigantea Leach. (*Abstracter's notes*: (1) For the abstracts of papers and addresses of the authors cf. *OA* Nos. 1296, 1298-1300, 1307-1309, 1317, 1324, 1327-1329, 1333, 1338-1341, 1343, 1346; – (2) All back issues of the journal (Vols. 1-18) are still available at the price of ¥ 1500.– per volume, postage extra).

(1345) WAAGE, J.K., 1975. Reproductive isolation and the potential for character displacement in the damselflies, Calopteryx maculata and C. aequabilis (Odonata: Calopterygidae). Syst. Zool. 24 (1): 24-36. – (*Div. Biol. & Med. Sci., Brown Univ., Providence, Rhode Island 02912, USA*).

Potential reproductive isolating mechanisms between sympatric C. maculata (Beauvois) and C. aequabilis Say are examined and evidence is presented for the reinforcement of species discrimination during pair formation and for a selective basis for charges in ♀ wing pigmentation in the context of reproductive isolation between these spp. The spp. are sympatric across the NE USA and SE Canada. In the area of sympatry C. aequabilis shows nearly complete ecological and temporal overlap with C. maculata. Mechanical barriers to interspecific copulations are apparently absent and no hybrids are known despite several observed interspecific copulations. Visual discrimination based on ♀ wing pigmentation is identified as a major component in the reproductive isolation between C. maculata and C. aequabilis. C. maculata ♂♂ discriminate between their ♀♀ and C. aequabilis ♀♀ by responding to the ♀♀ with the darker of 2 alternative wing colors. Differences in wing pigmentation between sexes and among Calopteryx spp. are accentuated and displayed during pair formation and courtship. There is experimental evidence for the reinforcement of C. maculata ♂ species discrimination ability in the area of sympatry with C. aequabilis. Experiments also indicate a selective disadvantage against dark winged sympatric C. aequabilis ♀♀. Coupled with the fact that sympatric C. aequabilis ♀♀ have more lightly pigmented wings than allopatric ones, this finding provides a potential example of character displacement in the context of reproductive isolation between these spp.

(1346) YAMAGUCHI, M., 1975. The odonate fauna established at an artificially prepared pond in Heirinji Temple Forest. Tombo 18 (1-4): 21-22. (Japanese, with Engl. s.). – (*2-13, Kasuga-cho, Nerima-ku, Tokyo, 176, JA*).

The pond (3000 m^2 approx.) was dug out in the Heirinji Nature Monumental Park, 25 km NW of Tokyo, Japan, in 1973. Between Apr.-Sept., 1974, 21 spp. were recorded, at least 10 of which are considered to breed in the pool. A tabular review of the records is provided.

1976

(1347) BELLE, J., 1976. Notes on Phyllocycla elongata (Selys in Selys & Hagen, 1858) (Odonata: Gomphidae). Ent. Ber., Amsterdam 36 (2): 31-32. – *(Onder de Beumkes 35, Velp-6200, NL).*
Some characters of 1 of the 2 ♂ from Guadalajara, Mexico, referred to P. elongata by Calvert (1905, Biol, cent.-am., Neuroptera), are compared with those of P. breviphylla Belle. (Author).

(1348) VERON, J.E.N., 1976. Responses of Odonata chromatophores to environmental stimuli. J. Insect Physiol. 22 (1): 19-30. – *(Austral. Inst. Marine Sci., P.O.B. 1104, Townsville, Queensland 4811, AU).*
Responses to change in temperature and light intensity were studied in Ischnura heterosticta, Austrolestes annulosus and A. leda, using time-lapse photography. In each sp. responses to temperature are dependent on both the instantaneous temperature and the direction of temperature change. At temperatures below those which produce unstable colour phases, the change to dark phase takes about 9 hr and is constant in rate. The reverse change is directly temperature dependent and can be much more rapid. Responses to change in light intensity are attributable to the heating effect of light rather than to true light sensitivity. All colour changes show wide individual variation in both rate and amount. They are slightly affected by temperature acclimation but are unaffected by prevailing weather, time of year, geographic location or age. (Author).