# ODONATOLOGICAL ABSTRACTS

## 1971

(1487) GACHET, M., 1971. Étude des fluctuations de la faune ripicole macroscopique d'un étang astatique de la région grenobloise. Trav. Lab. Hydrobiol. Grenoble 62 [1970]: 17-57. – (*Lab. Zool., Domaine Universitaire, F-38 Saint-Martin-d'Hères*).
Coenagrion puella is the only odon. sp. listed for the Brié Marsh, Grenoble, France, the shore macrofauna of which has been studied.

## 1972

(1488) LAHIRI, A.R., T.R. MITRA & D.N. RAY CHAUDHURI, 1972. Female Crocothemis indica Sahni (Odonata: Libellulidae). Bull. Ent., Delhi 11 (2): 182. – (*Eastern Reg. Stn, Zool. Surv. India, Risa Colony, Shillong-3, India.*)
The ♀ is described here for the first time. (For the original and additional descriptions and figures of this sp. cf. the references given in *OA* No. 1351.) – (*Abstracter's note*: The journal issue is dated December 1970, but has appeared in May 1972, according to the date printed on the cover.

## 1973

(1489) JUNGEN, H. & H. BURLA, 1973. Insekten der Schweiz. Zool. Mus. Univ. Zürich, IV + 28 pp. – Price: sFr. 2.–. – (*Zool. Mus., Univ. Zürich, Künstlergasse 16, CH-8006 Zürich.*)
This is a popular, well illustrated guide through the entomological collections of the Museum of Zoology of the University of Zürich, Switzerland. One chapter is devoted to Odon. The status of the Swiss fauna is given as 74 known spp. (cf. also *OA* No. 1148). Of particular interest is a note on an anomalously coloured ♂ Calopteryx virgo ("Blauflügel-Prachtlibelle") in the collections of the Museum.

(1490) MACAN, T.T., 1973. Ponds and lakes. Allen & Unwin, London. 148 pp. – (*Dept. Zool. & Microbiol., Ohio Univ., Zool. Bldg. Athens, Ohio 45701, USA.*)
The original idea behind the series of which this book is the first was to provide teachers who were about to take a class to a field centre, and teach a subject which they did not know well, with the necessary information and some ideas for projects. The cycle of matter is described and in chapter three there is an account of the ways in which organisms can be classified. Life history is one and therefore the Odonata are prominent, for their life histories are varied and well-known, thanks to the work of Corbet and others. An account of methods leads to a description of the pond community, illustrated by some of the work in Hodson's Tarn where Odonata are numerous. In a chapter on individual ecological factors the important work of Zahner features. Odonata are mentioned in the chapter in which the regulation of numbers is explained and also in the one on production where the work of J.H. Lawton is mentioned. (Author.)

(1491) SLÁDEČEK, V., 1973. System of water quality from the biological point of view. Ergebn. Limnol. 7, 218 pp. – (*Dept. Water Technol., Trojanova 13, CZ-120 00 Praha-2.*)
The monograph is presenting general considerations on the saprobe system. References to Odon. are made in appropriate places and 13 European spp. are listed in the Appendix.

(1492) ZIMMERMANN, W., 1973. Folker Winkelmann: Sympetrum vulgatum (Heidelibelle). Ent. Ber., Berlin 1973: 124. – (*Museum der Natur, Parkallee 15, DDR-58 Gotha, GDR.*)
A book review of the volume listed in *OA* No. 614.

## 1974

(1493) KANGUR, M. & Ō. TŌLP, 1974. Nutrition of fish in Lake Vortsjärv. Gidrobiol. Issled., Tartu 6: 138-162, tabs. 1-4 excl. (Russian, with Engl. s.). – (*Inst. Zool. & Bot., Estonian Acad. Sci., 21 Vanemuyze Str., USSR-202400 Tartu*).
Larval odon. were found in the digestive tracts of ruff, roach and perch, captured during autumn in the littoral zone of the Vortsjärv Lake, (Russian: Vyrtsyarv), Estonia, USSR. The following data are given for each fish sp.: (1) size group and its mean length (in mm), (2) percentage and (3) numbers of fish with odon. larvae in digestive tracts.

(1494) MARTIN, W.J. & J.B. GENTRY, 1974. Effect of thermal stress on dragonfly nymphs. *In*: J.W. Gibbons & R.R. Sharitz, Eds., Thermal ecology, pp. 133-145. USAEC Symp. CONF-730505, National Technical Information Service, Springfield, Va. – (*Savannah River Ecol. Lab., Aiken, South Carolina 29801, USA*).
Larvae of Libellula spp. were collected from a thermally stressed stream and a natural (control) stream and tested for critical thermal maximum (CTM) and lethal temperature (LT) after acclimation for more than 24 hr at 15, 20, 25, 30, and 35°C. In winter the water temperatures at the collection sites ranged from 30 to 33°C in the thermal stream, and 5 to 12°C in the natural stream. Correlations were observed between CTM, LT, and body length at the different acclimation temperatures. The LT at 15°C for larvae from the thermal stream was 43.8°C; it increased at a constant rate to 47.7°C at 30°C, but there was no significant increase at 35°C. For larvae from the control stream, the LT at 15°C was 42.8°C; it declined to 42.1°C at 25°C and then increased rapidly to 45.5°C at 35°C. Larvae collected from the thermal effluent stream were larger than those from the natural stream. Larvae react to thermal stress through both short-term physiological adjustments and long-term evolutionary responses at the population level. (Authors). (For other papers on the subject cf. *OA* Nos. 1470, 1500, 1525, 1546).

(1495) STAL'MAKOVA, G.A., 1974. Bentos ozer razlichnyh landshaftov Kol'skogo poluostrova. [Lake benthos of various landscapes of the Kola Peninsula]. *In*: Ozera razlichnyh landshaftov Kol'skogo poluostrova. II. Gidrohimiya i gidrobiologiya. Nauka, Leningrad, pp. 180-212. (Russian). – (*Inst. Limnol., USSR Acad. Sci., 4 Petrovskaya Quay, USSR-197046 Leningrad*).
Lestes sponsa and Aeschna squamata (spelled erroneously as "squamosa") are the only odon. spp. recorded for the Kola Peninsula, USSR.

(1496) YOUSUF, M. & M. YUNUS, 1974. A new subfamily, Kuldanagasterinae of the family Cordulegasteridae (Odonata: Anisoptera) from Pakistan. Pakistan J. Zool. 6 (1-2): 141-146. – (*Dept. Ent., Univ. Agric., Lyallpur, Pakistan*).
Kuldanagaster pakistanica gen. n., sp. n. is described and illustrated on the basis of a single ♂ from Kuldana, Murree Hills, (alt. 6909 ft., 24-7-1965), Pakistan. The holotype is in the Ent. Mus., Univ., Agric., Lyallpur, Pakistan. The classification of the family is reconsidered and a new subfamily

is erected for the new genus. A key to the subfamilies of Cordulegasteridae is also provided. (Cf. also *OA* No. 1511).

(1497) ZUBTZOVSKI, N.E., 1974. On methods in studies on nutrition of insect eating nestlings. Ekologiya 1974 (6): 85-87. (Russian, with Engl. translation of the title). – *(Ilmen' State Nature Reserve, USSR-456300, Chelyabinsk Province, Miass.)*
The paper reports on a method of the study of diet in insectivorous bird nestlings. Odon. adults constitute 20.2% of the total diet of nestlings of Sylvia borin.

## 1975

(1498) CHAISEMARTIN, C., 1975. Effets des chromates ($K_2CrO_4$) sur le métabolisme respiratoire et la balance hydro-minérale tissulaire chez deux larves-nymphes du macrobenthos dulçaquicole. C.R. Sean. Soc. Biol. Fil. 169 (2): 384-390. (With Engl. s.). – *(Lab. Biol. anim., U.E.R. des Sciences, Limoges, France).*
Toxic effects of hexavalent Cr compounds (chromates, pollutants) and information on their mechanisms of action on larvae of Ephemeroptera (Ecdyonurus sp.) and Odon. (Sympetrum sp.) were studied. Studies of $O_2$ consumption were conducted to elucidate some of the interactions among respiration, osmoregulation and chromate toxicity. The death rate increased with increasing concentration. The time mortality curve is a repeating pattern of a slow rate followed by an increasing rate of mortality. At 0.05 ppm Cr, the high density increased the mortality rate. Between 0.05-0.1 ppm, a threshold is reached where any further decrease in density does not increase the chances of survival. Metabolic rate, which affects the response of animals to toxic substances, is in turn affected by animal density. Especially with Ecdyonurus, the area of concentrations between 0.05-0.1 ppm of $Cr^{6+}$ is a threshold at which the physiological responses of the animals undergo a change.

(1499) DÉVAI, G., 1975. Die Libellen-(Odonata)-Fauna der toten Flussarme der Bodrog bei Sárospatak. Teil IV. Die Vegetation des Bodrog-Flutgebietes bei Sárospatak und Végarpó. Acta biol. debrecina 12: 91-100. (With Engl. and Hungarian s's). – *(Zool. Inst., Kossuth Univ., HU-4010 Debrecen-10).*
An account is given of the vegetation in the flood area of the River Bodrog, near Sárospatak and Vegardo, NE Hungary. The vegetation is discussed from a zoo-ecological point of view (viz. by locating releves on patches of plant cover containing fairly homogeneous odon. faunas). Reed vegetation is represented in the backwater of the River Bodrog by Trapetum natantis and in the canal "Fuzeser" by a complex of different communities (Hydrochari-Stratiotetum, Myriophyllo-Potametum natantis, Trapetum natantis). Banks of both water bodies are covered by stands of Scirpo-Phragmitetum medioeuropaeum sparganietosum and schoenoplectetosum, Caricetum gracilis, etc. Agrostetum albae hungaricum and Alopecuretum pratensis are characteristic of lower and higher parts of the meadow zone of the flood area, respectively. Along the dam, Salix alba-Populus alba woods (with a rich bush strata) can be found. Near the dam, many pits are full of marshy and ruderal communities of variable composition. (For the references to Pts. I-III of this series cf. *OA* No. 1018).

(1500) GENTRY, J.B., C.T. GARTEN Jr., F.G. HOWELL & M.H. SMITH, 1975. Thermal ecology of dragonflies in habitats receiving reactor effluent. *In*: Environmental effects of cooling systems at nuclear power plants. IAEA-SM-187/12, pp. 563-574. International Atomic Energy Agency, Vienna (Wien). – *(Savannah River Ecol. Lab., Aiken, South Carolina 29801, USA).*
On the Savannah River Plant, southeastern USA, both the numbers of individuals and the spp. of odon. larvae are reduced when thermal effluent from a nuclear reactor is received by a stream or pond. Surviving genera belong to the Libellulinae. Mortality

is complete for the remaining families and subfamilies. Some spp. are probably eliminated by the direct effects of increased water temperature. Others are reduced in numbers, or eliminated indirectly owing to habitat alterations. Larvae in the thermal effluent stream and ponds survive extended periods in relatively constant water temperatures interrupted by short periods of sudden temperature changes and water-level fluctuations. Larvae from thermally stressed streams have a higher thermal tolerance than those from natural streams. Higher thermal tolerance is reflected by a significantly higher critical thermal maximum (CTM) and a higher lethal temperature (LT) at different acclimation temperatures. Acclimation temperature, habitat and body size are significant variables in determining thermal tolerances of larvae from natural and heated aquatic environments. High acclimation temperatures lead to higher thermal preferences while lower acclimation temperatures encourage ambulations through a wider range of temperatures. Mechanisms permitting the survival of dragonfly populations under thermally stressed conditions may include both physiological acclimatization to higher temperatures and directional selection for higher thermal tolerance. (Authors). – (For other papers on the subject cf. *OA* Nos. 1470, 1494, 1525, 1546).

(1501) HAMMOND, P.M., 1975. Seventeenth century British Coleoptera from the collection of Leonard Plunkenet (1642-1706). Ent. Gaz. 26 (4): 261-268. – (*Dept. Ent., Brit. Mus. Nat. Hist., Cromwell Rd., London SW7 5BD, UK*).
Contemporary manuscripts have recently been associated with a single volume of over 1000 pressed arthropods, including Orthoptera, Dermaptera, Odonata, Hemiptera, Megaloptera, Neuroptera, Diptera, Hymenoptera, Arachnida, Isopoda, etc. A single manuscript sheet in Plunkenet's own hand lists the number in each category of a contemporary classification scheme. A notebook contains about 440 notes on arthropods observed or collected between May 1696 and May 1697 in the general area of London; some of the more distinctive specimens in Plunkenet's collection are consistent with his notes. The 272 beetles have been identified and are catalogued as 106 spp. in 22 families, all occurring in Britain today. Most are conspicuous, common and widespread in southern England.

(1502) KEIRANS, J.E., 1975. Records of phoretic attachment of Mallophaga (Insecta: Phthiraptera) on insects other than Hippoboscidae. J. med. Ent. 12 (4): 476. – (*Rocky Mountain Lab., Natl. Inst. Allergy Infect. Dis., Natl. Inst. Health, Publ. Health Serv., Hamilton, 59840, USA*).
Records of Mallophaga phoretic on Siphonaptera, Diptera (other than Hippoboscidae), Odon., Hymenoptera and Lepidoptera are listed.

(1503) KROTOV, A.I., A.F. BEKHLI & Z.G. VOROB'EVA, 1975. Toxicity of phenasal sodium salt for some pulmonate mollusks as compared to phenasal. Med. Parazitol. Parazit Bolezn. 44 (3): 310-312. (Russian, with Engl. s.). – (*E.I. Martsinovskii Inst. Med. Parasitol. Trop. Med., Minist. Health USSR, Moscow, USSR*).
Toxicity of phenasal and some of its inorganic salts was determined in the pulmonate Coretus corneus. Na, K and Li salts were most toxic. C. corneus, Biomphalaria alexandrina and Australorbis glabratus (parasite vectors) died in Na salt solutions ($1 \times 10^{-6}$) much sooner than in phenasal solutions. Na salts are also more toxic for fish. Daphnia, Cyclops and larvae of aquatic insects had low sensitivity to these substances. Calopteryx sp. is the only dragonfly sp. mentioned. It is recommended that phenasal Na salt be used for trials as a molluscicide.

(1504) LEGRAND, J., 1975. Contribution à la faune du Gabon. Odonates: 1re note. Ann. Soc. ent. Fr. (N.S.) 11 (4): 679-696. (With Engl. s.). – (*Lab. Ent., Mus. natl. Hist. nat., 45 rue Buffon, F-75005, Paris*).

A review is given of 65 spp. collected by various collectors during the last 10 yrs in Gabon. The Gomphidae are worked on by R. Cammaerts (Lab. Biol. anim., Univ. Bruxelles, av. F.D. Roosevelt 50, B-1050 Bruxelles), hence they are omitted in the present paper. In all, 21 Zygoptera and 19 Anisoptera are new to the fauna of Gabon. Among these, Macromia bicristulata sp.n. is described and illustrated (♂ holotype, ♀ allotype: Mézalé, Gabon, Oct. 25 and Nov. 3, 1973 resp.).

(1505) LIM, R.P. & J.I. FURTADO, 1975. Population changes in the aquatic fauna inhabiting the bladderwort, Utricularia flexuosa Vahl., in a tropical swamp, Tasek Bera, Malaysia. Verh. int. Ver. Limnol. 19 (2): 1390-1397. – *(Dept. Biol., Univ. Waterloo, Waterloo, Ont., CA).*

Utricularia flexuosa provides an excellent habitat for a rich and diversified aquatic fauna in Tasek Bera. In the present study, it was found that crustaceans, fish, odonate larvae and dipteran larvae predominated in the associated biota. The seasonal fluctuations in the Utricularia mat, and the populations of the biota associated with it, were obviously affected by the monsoons which occurred twice during the year. Large portions of the mats were washed away at the beginning of each monsoon and only when the bladderwort re-established itself during the dry season did the periphyton and debris accumulate. They then provided the substrate for a detritivorous and herbivorous micro-fauna, which in turn provided the substrate for a carnivorous macrofauna. This community proved a concentrated food source for larger transient grazers and predators, especially fish.

(1506) LODOS, N., 1975. Türkiye entomolojisi (genel, uygulamah ve faunistik). Cilt I. [Turkish entomology (general, applied and faunistic). Part I.] Ege Üniversitesi Ziraat Fakültesi Yayinlari (Izmir), No. 282, V + 182, 1 fldg. pl. (Turkish). – *(Author's address unknown*; probably: *Dept. Ent., Univ. Izmir, Izmir, Turkey).*

This is the first volume of a treatise on entomology in Turkey, and comprises an introduction and two main sections. The first contains a general review of the systematics of insects and related arthropods and the reproduction, biology, feeding habits and control of insects, the latter including cultural, mechanical, physical, quarantine, biological, chemical and integrated methods; directions for the application of particular chemicals are given, and the interaction of insecticides with one another in mixed formulations or with environmental factors, the risks and damage caused by insecticide applications, the use of alternative compounds to replace those that have been banned or become unsuitable, the role of economic thresholds, and the use of non-toxic repellents, attractants, anti-feedants and pheromones are discussed. In the second section of the paper a key is given to all the orders of insects found in Turkey and notes are given on the morphology, distribution, food-plants, economic importance, life-history and control of Thysanura, Diplura, Protura, Collembola, Ephemeroptera, Odonata, Plecoptera, Grylloblattodea, Orthoptera, Phasmida, Dictyoptera and Dermaptera, with particular emphasis on locusts and grasshoppers.

(1507) MAKI, A.W., L. GEISSEL & H.E. JOHNSON, 1975. Comparative toxicity of larval lampricide (TFM; 3-trifluoromethyl-4-nitrophenol) to selected benthic macroinvertebrates. J. Fish. Res. Board Can. 32 (8): 1455-1459. (With Fr. s.). – *(Environ. Water Qual. Res. Dept., Ivorydale Tech. Cent., Procter & Gamble Co., Cincinnati, Ohio 45217, USA).*

The acute toxicity of larval lampricide to 35 spp. of benthic macroinvertebrates was determined in 96 h flow-through tests. The 96 h LC50 values from 2.1 mg for blackfly larvae, Simulium pugetense, to values in excess of 38.0 mg/l for spp. with heavy exoskeletons: crayfish (Orconectes propinquus), dobsonfly larvae (Chauliodes sp.), and larvae of Ophiogomphus sp. Younger

individuals of the clam (Ligumia sp.) and the mayfly larva (Ephemerella cornuta) were 1.5-2 times more sensitive than larger individuals of the same species. Early emergence of adults and increased locomotor activity were observed among some organisms exposed to sublethal concentrations.

(1508) SHALAPENOK, E.S. & L.V. KAMLYUK, 1975. [Size-weight characteristics of larvae of some species of dragonflies]. Biol. Nauki, Mosc. 18 (9): 128-130. (Russian). – *(Dept. Invert. Zool., Fac. Biol., Byelorussian St. Univ., USSR-220080 Minsk, Byelorussian SSR).*

The relationship between body length and larval weight of 4 spp. of Anisoptera, Aeshna grandis, A. juncea, Libellula quadrimaculata and Sympetrum vulgatum, and 5 spp. of Zygoptera, Erythromma najas, Ischnura elegans, Enallagma cyathigerum, Enallagma sp. and Coenagrion concinum, was studied. A high degree of correlation of weight and length was noted; the correlation coefficient varied from 0.810-0.994.

(1509) TARANOVA, V.M., 1975. On the fauna of dragonflies (Odonata) of the Rybinskoye Reservoir and adjacent water-bodies. Biol. vnutrennih vod 26: 45-47. (Russian, with Engl. translation of the title). – *(Inst. Inland Water Biol., USSR-152742 Borok, Yaroslavl Prov.).*

A list is given of 26 spp., 9 of which are new to the Province of Yaroslavl, USSR. Some life history notes are added.

(1510) THAKARE, V.K., S.K. RAINA, S. REWATKAR & V. RAGHAKUMAR, 1975. Qualitative studies on the free amino acids and sex differences in the haemolymph of the dragonfly, Pantala flavescens (Odonata: Libellulidae). J. anim. Morph. Physiol. 22 (1): 16-22. – *(Post-Grad. Dept. Zool., Univ. Nagpur, Amravati Rd., Nagpur-440010, India).*

The free amino acids and their sex differences in the hemolymph of P. flavescens were studied qualitatively. Sixteen amino acids have been identified in the hemolymph. β-Alanine concentration is higher in males than in females. Arginine, leucine, isoleucine and glutamic acid are more positive to ninhydrin in females than in males. Methionine concentration is lower than the other amino acids in males but is comparatively high in the females. Cystine and cysteine are not detectable.

(1511) YOUSUF, M. & M. YUNUS, 1975. Taxonomic status and redescription of Cordulegaster brevistigma (Selys) (Anisoptera: Odonata). Pakistan J. Zool. 7 (1): 100-101. – *(Dept. Ent., Univ. Agric., Lyallpur, Pakistan).*

Fraser (1929, Mem. Ind. Mus. 9: 69-167, pls. 9-12) split the sp. C. brevistigma into 2 infraspecific taxa, vis. C b. brevistigma (Selys, 1854) and C. b. folia Fraser, 1929. These sspp. are considered variations of the same sp., hence cannot be given separate status. The ♂ of C. brevistigma is redescribed and compared to Kuldanogaster pakistanica Yousuf & Yunus, 1974 (cf. *OA* No. 1496).

(1512) YOUSUF, M. & M. YUNUS, 1975. New distribution records and amended characters of Anax parthenope Selys and Hemianax ephippiger (Burmeister) (Anisoptera: Odonata). Pakistan J. Zool. 7 (1): 102-103. – *(Dept. Ent., Univ. Agric., Lyallpur, Pakistan).*

Amended descriptions of A. parthenope and H. ephippiger are given. New Pakistani distribution records include Chaman, Jamshoro, Tandojam and Lyallpur for the former, and Karachi and Tandojam for the latter.

(1513) ZIMBALEVSKAYA, L.N., 1975. Variability of size of freshwater phytophilic invertebrates as a manifestation of the structure of their associations. Dokl. Akad. Nauk SSSR 223 (3): 731-733. (Russian, with Engl. translation of the title). – *(Inst. Hydrobiol., Ukrain. Acad. Sci., 44 Vladimirskaya Str., USSR-252003 Kiev).*

Body sizes of specimens in populations of

different spp. belonging to the same association vary in such a way that they never overlap with other spp. of the same ecological and trophical group in this association. This is a manifestation of an association structure which permits to avoid competition among populations of different spp. In an association studied by the author the larval Erythromma najas coexisted with other predators, viz. Herpobdella octoculata (Hirudinea) and Cyrnus flavidus (Trichoptera). At 2 different moments their weights (in mg) were: E.N.: 9.0 ± 0.6 (40.0 ± 7.0), – H.o.: 4.2 ± 0.4 (13.0 ± 1.2), – C.f.: 2.9 ± 0.4 (9.0 ± 0.5).

(1514) ZIMMERMANN, W., 1975. Über eine interessante Libellengesellschaft im zentralen Thüringer Becken. Ent. Nachr. 19 (10): 149-155. (With Engl. and Russian s's.). – (*Museum der Natur, Parkallee 15, DDR-58 Gotha, GDR*).
The Coenagrion ornatum-mercuriale coenosis (sensu Jacob, 1969. Faun. Abh. Mus. Tierk. Dresden 2: 197-239) from the Haslever Ried, nr. Gebesee, Erfurt country, central Thuringian Plain, German Democratic Republic, is described, with special reference to field observations on C. mercuriale, O. coerulescens and O. brunneum. (For further data on the Thuringian odon. fauna cf. *OA* Nos. 766, 1392).

## 1976

(1515) ANDRIES, J.C., 1976. Variations ultrastructurales au sein des cellules épithéliales mésentériques d'Aeshna cyanea (Insecte, Odonate) en fonction de la prise de nourriture. Cytobiologie 13 (3): 451-468. (With Engl. s.). – (*Lab. Biol. anim., Univ. Sci. & Techn., B.P. 36, F-59650 Villeneuve d'Ascq*).
Ultrastructural modifications of the midgut cells during the digestion in A. cyanea were studied. The entry of food in the midgut induces some morphological modifications in mesenteric cell organelles suggesting that these are involved in the transfer of nutrient molecules from the lumen of the insect gut to the haemolymph: (1) The smooth endoplasmic reticulum is represented by saccules localized against the apical plasma membrane and by dilated vesicles containing a fluffy material; – (2) Such a fluffy material is also observed in the rough endoplasmic reticulum cisternae and in the dilated intercellular spaces of the basal region of the mesenteric cells; – (3) Small smooth vesicles originating from the rough endoplasmic reticulum gather and constitute buds which are released in the intercellular spaces; – (4) Lipid droplets appear first inside lamellar stacks situated at the cell apex, then they are present in large numbers in the basal region of the cell where they later appear to be replaced by glycogen islets; – (5) The dense granules abundant at the apex of the midgut cells of fasting larvae release their material in the lumen after penetration of the food. The dictyosomes, active in digesting animals, produce numerous dense granules whose number becomes optimal again 24 h after meal intake. (Author).

(1516) ASAHINA, S., 1976. Notes on Chinese Odonata. V. Some Odonata from Hunan and Hupeh Provinces. Kontyû 44 (1): 1-12. – (*Takadanobaba 4-4-24, Shinjaku-ku, Tokyo, 160, JA*).
2 small collections from the 2 central Chinese provinces were examined. 27 spp. are listed and special attention is being payed to Nihonogomphus lieftincki Chao, Stylurus gideon (Needham), Trigomphus beatus Chao and Indolestes peregrinus (Ris). It is shown that the latter is specifically distinct from the Ceylonese Indolestes gracilis (Selys & Hagen). – (For Pt. IV cf. *OA* No. 732; Pts. I-III appeared in Kontyû 34 [1966]: 131-135, 37 [1969]: 192-201, 38 [1970]: 198-204).

(1517) BELYSHEV, B.F., 1976. Kakaya strannaya zhizn'. [What a strange life]. Vecherniy Novosibirsk, No. 5659, dated Aug. 11, 1976. – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).

A popular daily newspaper talk on the life history of a dragonfly.

(1518) BELYSHEV, B.F., 1976. Odonatofauna (Insecta, Odonata) SSSR i territorial'noe raspredelenie ee komponentov. [The odonate fauna (Insecta, Odonata) of the USSR and the territorial distribution of its components]. Fauna Sibiri 18: 134-150. (Russian). – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
A tabular review is given of the 159 spp. and 79 sspp. (referable to 2 suborders, 10 families and 50 genera) known to occur on the USSR territory, with annotations as to their distribution within the 6 main faunal regions of the USSR (Siberian, Euro-Siberian, European, Mongolo-Kazakhian, Mediterranean, East Asiatic).

(1519) BELYSHEV, B.F. & Yu.P. KORSHUNOV, 1976. Novye materialy k poznaniyu odonatofauny (Insecta, Odonata) Zapolyarnoy Sibiri. [New materials to the knowledge of the odonate fauna (Insecta, Odonata) of Transpolar Siberia]. Fauna Sibiri 18: 151-156. (Russian). – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
6 spp. are recorded for the first time from the Southern Yamal, USSR, and Somatochlora sahlbergi is redescribed and illustrated.

(1520) BELYSHEV, B.F., G.S. ZOLOTARENKO & A.G. VELIZHANIN, 1976. Odonatofauna Yuzhnyh Kuril'skih ostrovov i nekotorye voprosy ee struktury i formirovaniya. [The Odonate fauna of the Southern Kurile Islands and some problems of its structure and origin]. Fauna Sibiri 18: 165-174. (Russian). – (*Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
16 spp. are listed for the Southern Kuriles, USSR, incl. Enallagma belyshevi Harit., Aeshna crenata and Somatochlora viridiaenea. As new is described Sympetrum striolatum kurilis ssp. m. (♂ holotype, ♂, ♀ paratypes: Kunashir Island, Aug. 11, 1968; all deposited in the Zool. Mus., Biol. Inst., Siberian Sect. Acad. Sci. USSR, Novosibirsk). Structure and origin of the fauna are briefly discussed and a comparison is made of the faunas of Iturup, Kunashir, Hokkaido and Sakhalin.

(1521) BELYSHEV, N.B. & B.F. BELYSHEV, 1976. A peculiar transmigration of Odonata via Irkutsk. Problemy Ekologii 1976 (4): 137-138. (Russian, with Engl. s.). – (Address second author: *Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).
A detailed account is given of the Sympetrum vulgatum – S. danae migration, that took place in Irkutsk, Siberia, USSR, on Sept. 13, 1968.

(1522) CLASSEY, E.W., 1976. Eric Gardner, an appreciation. Ent. Gaz. 27 (3): 140, pl. 7. – (*Park Rd., Faringdon, Oxon. SN7 7DR, UK*).
A brief biographic note on the well-known odonatologist, A.E. Gardner (born: May 22, 1913; deceased: Feb. 11, 1976, Banstead, England), accompanied by a full-page photograph (not a portrait). – (*Abstracter's note*: For a comprehensive appreciation of his odonatological work and for his odonatological bibliography cf. Odonatologica 5: 387-390; 1976).

(1523) CORDULIA. Cahier d'amateurs. Published by the Collège Bourget, Rigaud, Quebec, Canada; edited by R. Hutchinson & A. Larochelle, Collège Bourget. Vol. 2, No. 2 (June 1976), No. 3 (Sept. 1976). (French and Engl., all larger papers with s's in both languages). – Annual subscription for 1976 (4 issues): Can $ 2.– (Canada, USA), Can $ 3.– (others). – (*c/o R. Hutchinson, Collège Bourget, C.P. 1000, Rigaud, Que., CA*).
(No. 2): *Hutchinson, R.*: Catalogue des Odonates du Québec (Deuxième partie); – *Gagnon, P.* (7 rue Verdun, Lévis, Que., CA): Troisième station de Somatochlora tenebrosa Say au Québec; – *Hutchinson,*

*R.*: Quelques données préliminaires sur les dortoirs de libellules (Première partie); – *Hutchinson, R.*: Disparition de populations de libellules causée par un changement de niveau des eaux; – *Annonces* (incl. the address of the odon. collection of the late Prof. A. Robert, i.e. Dép. Sci. biol., Univ. Montréal, C.P. 6128, Montréal-101, Qué., CA. – cf. also *OA* No. 1407); – *Publications sur les odonates* (containing brief French abstracts of 10 papers).
(No. 3): *Hutchinson, R.*: Quelques données préliminaires sur les dortoirs de libellules (Seconde partie); – *Hutchinson, R.*: La récolte d'odonates dans leurs dortoirs; – *Gagnon, P.* (7 rue Verdun, Lévis, Qué., CA): Gomphidae (Odonata) de la région de St.-Nérée, comté de Bellachasse, Québec; – *Hutchinson, R.*: Liste de contrôle préliminaire des odonates de la région de Port-au-Saumon, Comté de Charlevoix, Québec; – *Hutchinson, R.*: Notes de chasse et observations sur une population d'Argia moesta Hagen; – *Breton, R.* (55 rue Champagnat, Lévis, Qué., CA): Récolte de larves d'Anax junius Drury et éclosion en aquarium; – *Breton, R.* (address as above): Observations et notes sur des larves d'Agrion; – *Breton, R.* (address as above): Récolte de la larve de Gomphus scudderi Selys à St.-Nérée; – *Annonces*; – *Publications sur les odonates* (containing brief French abstracts of 8 papers).

(1524) DURDEN, L.A., 1976. A journey to the Okefenokee Swamps in S.E. Georgia, USA. Bull. amat. Ent. Soc. 35 (312): 138-140. – (*3 Woodside Av., Esher, Surrey, UK*).
On p. 139 reference is made to field observations on the predation and voracity of Anisoptera. An anisopteran was seen devouring a zygopteran almost twice its own size. The species names are not mentioned.

(1525) GARTEN, C.T., Jr. & J.B. GENTRY, 1976. Thermal tolerance of dragonfly nymphs. II. Comparison of nymphs from control and thermally altered environments. Physiol. Zool. 49 (2): 206-213. – (*Savannah River Ecol. Lab., Aiken, South Carolina 29801, USA*).
Larvae were collected from ponds and streams thermally altered by reactor cooling water and from control ponds and streams. The critical thermal maxima of 7 spp. were estimated at acclimation temperatures of 12, 16, 20, 24, 28, and 32°C. Within each environment, spp. with greater mean body length exhibited a higher thermal tolerance than smaller spp. Species differences in critical thermal maximum (CTM) were statistically significant within each environment examined, but these differences were trivial relative to the much greater influence of acclimation temperature. Mean CTM was significantly regressed against acclimation temperature in each sp. Larvae from a thermally elevated pond exhibited a greater increase in CTM per degree rise in acclimation temperature than those from other habitats. Mean thermal tolerances of larvae from the four environments increased in the following order: control stream, control pond, thermal stream, and thermal pond. (Authors). – (For Pt. I cf. *OA* No. 1546; – for other papers on the subject cf. *OA* Nos. 1470, 1494, 1500).

(1526) GRILLOT, J.-P., 1976. Les organes périsympathiques des Insectes. Essai sur leur évolution, données structurales et physiologiques chez les Coléoptères et les Diptères. Annls Sci. nat. (Zool.) (XII) 18: 311-365. (With Engl. s.). – (*Lab. Zool., Univ. P. & M. Curie, 7 Quai Saint-Bernard, F-75005 Paris*).
The perisympathetic organs, metameric neurohaemal organs associated with the ventral nervous cord, have been studied in 24 coleopteran and in 8 dipteran genera. In addition, various types of perisympathetic organs occurring in insects are classified and a tentative reconstruction is given of their evolution in the class. It is concluded that a parallel can be drawn between the evolution of these organs and the phylogeny of the class. Odon. are considered at the appropriate places. (Cf. also *OA* Nos. 19, 345, 434, 440).

(1527) GUTENMANN, W.H., C.A. BACHE, W.D.

YOUNGS & D.J. LISK, 1976. Selenium in fly ash. Science 191 (4230): 966-967. – *(Pestic. Residue Lab., Dept. Food Sci., Cornell Univ., Ithaca, NY 14853, USA).*
Se, at concentrations exceeding 200 ppm (dry weight), was found in white sweet clover (Melilotus alba) voluntarily growing on beds of fly ash in central New York State, USA. Guinea pigs fed such clover concentrated Se in their tissues. The contents of the honey stomachs of bees foraging on this seleniferous clover contained negligible Se. Mature vegetables cultured on 10% (by weight) fly ash-amended soil absorbed up to 1 ppm of Se. Fly ashes from 21 states contained total Se contents of 1.2-16.5 ppm. Cabbage grown on soil containing 10% (by weight) of these fly ashes absorbed Se (up to 3.7 ppm) in direct proportion (correlation coefficient r = .89) to the Se concentration in the respective fly ash. Water, aquatic weeds, algae, dragonfly larvae, polliwogs, and tissues of bullheads and muskrats from a fly ash-contaminated pond contained concentrations of Se markedly elevated over those of controls.

(1528) HÄMÄLÄINEN, M., 1976. Odonatologica. Journal of the Societas Internationalis Odonatologica S.I.O. Ann. Ent. Fenn. 42 (2): 111. (Finnish). – *(Dept. Pest Investig., Agric. Res. Centre, SF-01300 Vantaa-30, Finland).*
A notice on the journal, with a brief review of the contents of volumes I-IV.

(1529) HANSON, T.V., 1976. Notes on Brazilian insects. Bull. amat. Ent. Soc. 35 (312): 135-138. – *(Flat 6, 34 Cambridge Park, Twickenham, Middx. TW1 2JS, UK).*
Incidental field notes, related to habitat and behavior, are given for a not further identified Mecistogaster sp., abundant from Aug. through Oct. in heavy forest on the borders of Para River, 30 mi of Belem, Brazil.

(1530) HARITONOV, A.[YU.], 1976. Strekozy: ot paleozoya do nashih dney. [Dragonflies: from the Paleozoic to our times]. Za nauku v Sibiri, Novosibirsk No. 23 (754): 6, dated June 3, 1976. – *(Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk).*
This is a popular general depiction of the order, by an active Russian odonatologist.

(1531) HARITONOV, A.YU., 1976. Taxonomic position of little-known species from the group Agrion concinnum Ioh. (Odonata, Insecta). New little-known Spec. sib. Fauna 10: 52-56. (Russian, with Engl. s.). – *(Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk).*
The status of the Siberian, USSR, members of the Coenagrion concinnum complex is revised. C. convalescens (Bart.) is considered as a ssp. of C. concinnum, whereas C. amurense (Bart., 1956) is synonymised with C. concinnum bartenevi (Belyshev, 1955). The nominate form and the 2 sspp. are illustrated and a key is produced to the adults of the 3 Siberian taxa. Their distribution is as follows: c. concinnum: northern Siberia from the Urals to Kamchatka; – c. convalescens: Primor'e; – c. bartenevi: southern Siberia from the Urals to the Priamur.

(1532) HARITONOV, A.YU., 1976. Fauna strekoz (Insecta, Odonata) Urala i vostochnogo Priural'ya. [Dragonfly fauna (Insecta, Odonata) of the Ural Mts. and the southeastern Priural region]. Fauna Sibiri 18: 157-161. (Russian). – *(Biol. Inst., Siberian Section Acad. Sci. USSR. Ul. Frunse 11, USSR-630091 Novosibirsk).*
A tabular review is given of 57 spp. known to occur in this territory, USSR. It is based on own observations and on earlier published literature records.

(1533) HARITONOV, A.YU., 1976. K voprosu o razryve arealov u nekotoryh vidov strekoz (Insecta, Odonata) v rayone Turgayskoy Lozhbiny. [On the problem of the disjunct ranges in some dragonfly species (Insecta, Odonata) in the Turgay Basin]. Fauna Sibiri 18: 162-164. (Russian). – *(Biol. Inst., Siberian Sect. Acad. Sci. USSR, Ul. Frunse*

*11, USSR-630091 Novosibirsk).*
The faunistic inventarisation in the Tobol River Valley, USSR., has shown a distributional disjunction of some spp. in southeastern Siberia and the Turgay Basin. An attempt is made to explain the phenomenon on the basis of the paleogeographic data available.

(1534) HASHIMOTO, H., 1976. Non-biting midges of marine habitats (Diptera: Chironomidae). *In*: L. Cheng. Ed., Marine insects, pp. 377-414. Elsevier, Amsterdam-Oxford-New York. – (*Gen. Education Dept., Shizuoka Univ., Shizuoka, JA*).
In Seto, Japan, adults of Pantala flavescens often swarm in the rocky shore. Their gut contents have been examined by M. Tokunaga (1931. Feeding habit of dragonfly Pantala flavescens and its ecological meaning. Trans. Kansai ent. Soc. 2: 56-58 [Japanese]), who found, next to other food items, also marine chironomids of the genera Plunio and Telmatogeton. Generally it is considered that the marine chironomids are protected against such predators as Odon. and birds, since they swarm close to their breeding grounds, are small-bodied, and have a very short adult life.

(1535) HIGLER, L.W.G., 1976. Observations of the macrofauna of a Dutch ditch. Hydrobiol. Bull., Amsterdam 10 (1): 66-73. – (*State Inst. Nature Management, "Broekhuizen", Leersum, Utrecht prov., NL*).
An account is given of the macrofauna recorded during Aug. 18-28, 1975, in a ditch in the peaty area of Tienhoven, the Netherlands. The prevailing question of the research, whether the dimensions of the ditch influence the composition of the biocenosis, could be answered affirmatively. Among the extensive odon. material collected, only 2 spp. were identified down to the sp. level.

(1536) HIURA, I., 1976. [A large scale migration of Sympetrum frequens in Osaka]. Nature Study 22 (8): 3-6. (Japanese). – (*Osaka Mus. Nat. Hist., Nagai Park, Higashinagai-cho, Higashisumiyoshi-ku, Osaka, 546, JA*).
The migration was observed at various places in Osaka Prefecture, Japan, on Sept. 1, 3, 5 and 7, 1976. Due to the numerous phone messages and letters sent by incidental local observers to various radio stations, newspapers and to the Osaka Museum of Natural History, the course of the migration became fairly well known. The specimens captured were all in teneral condition. (For a description of the migration cf. *OA* No. 1537).

(1537) HIURA, I., 1976. [A large scale migration of Sympetrum frequens in Osaka Pt. 2]. Nature Study 22 (9): 2-4. (Japanese). – (*Osaka Mus. Nat. Hist., Nagai Park, Higashinagai-cho, Higashisumiyoshi-ku, Osaka, 546, JA*).
The migratory flight referred to in *OA* No. 1536 commenced in the fields on the southeastern outskirts of Osaka City, reached the urbanized area of the city, turning finally to the East, and ended in the hilly region in that area. The observation records are plotted on 2 maps. – (*Abstracter's note*: In Japan S. frequens is well known for its regular long distance migrations: from plains to the mountains in July, and in the opposite direction in Sept. It is for the first time, however, that the exact course and development of the migration could be followed in detail).

(1538) HUTCHINSON, R., 1976. Capture et observation du vol de Basiaeschna janata Say. Fabreries 2 (5): 67-68. – (*Collège Bourget, C.P. 1000, Rigaud, Qué., CA*).
The flight behaviour of ♂ is described from observations in June 1975 in Quebec, Canada.

(1539) HUTCHINSON, R., 1976. La chasse aux libellules. , Les Feuillets du Club (Les Éditions des Jeunes Naturalistes, Montréal), No. 78, 4 pp. – (*Collège Bourget, C.P. 1000, Rigaud, Qué., CA*).
This leaflet was prepared with the intention to help young naturalists interested in dragonflies. Attention is drawn to the

necessity to acquire a workable knowledge of odon. ecology and behaviour, and to get acquainted with the material necessary for field work. (Author). – (*Abstracter's note*: This and the other 2 papers in this series, listed in *OA* Nos. 1540 and 1541, could be used to much advantage by any French reading young dragonfly students in Europe and elsewhere. Address of the Publishers: Les Cercles des Jeunes Naturalistes, 455 rue Saint-Jean, Montréal, Qué., H2Y 2R5, Canada).

(1540) HUTCHINSON, R., 1976. Récolte et conservation des libellules adultes. Les Feuillets du Club (Les Éditions des Jeunes Naturalistes, Montréal), No. 79, 4 pp. – (*Collège Bourget, C.P. 1000 Rigaud, Qué., CA*).
This is the second leaflet prepared for young naturalists interested in dragonflies of the Quebec prov., Canada. It presents information on the collecting kit and materials for the imagos, stressing the idea that young dragonfly workers should aim at accumulating field observations rather than at building large local collections, since the latter would lead to the depleting of the populations in the collecting areas. The slogan should be that "the best collections are those which tell a story". (Author). – (For other papers in this series cf. *OA* Nos. 1539, 1541).

(1541) HUTCHINSON, R., 1976. Récolte et conservation des larves de libellules. Les Feuillets du Club (Les Éditions des Jeunes Naturalistes, Montréal), No. 81, 4 pp. – (*Collège Bourget, C.P. 1000, Rigaud, Qué., CA*).
The third in the series, the leaflet presents information on the knowledge young naturalists should acquire before starting to work on the larval dragonflies. Very little has been done so far in Quebec, Canada, on the study of the odon. larval stages, and it is hoped that the interest in this subject will be aroused by the publication of the present leaflet. (Author). – (For other papers in this series cf. *OA* Nos. 1539, 1540).

(1542) KANSAI RESEARCH GROUP OF ODONATOLOGY (Ed.: I. Hiura), 1976. Dragonfly fauna of the Kinki District, Central Japan. Part 3: Libellulidae. Spec. Pubs Osaka Mus. Nat. Hist. 8: 55-82. (Japanese, with Engl. translation of the title). – (*c/o Mr. I. Hiura, Osaka Mus. Nat. Hist., Nagai Park, Higashinagai-cho, Higashisumiyoshi-ku, Osaka, 546, JA*).
This is the third part of a series on the odon. fauna of the Kinki District, Japan (cf. Abstracter's note in *OA* No. 307). The paper deals with 17 libellulide spp., while the other taxa of the family will be subject of another publication. The collection data are given for Sympetrum depressiusculum and S. cordulegaster, and histograms of seasonal occurrence are presented for 9 spp. (For Pts. I and II cf. *OA* Nos. 786 and 1178 resp.; – cf. also *OA* No. 1431).

(1543) KRYSAN, J.L., 1976. The early embryology of Diabrotica undecimpunctata howardi (Coleoptera: Chrysomelidae). J. Morphol. 149 (1): 121-138. – (*Northern Grain Insects Res. Lab., ARS, USDA, Brookings, 57006, USA*).
Early embryogenesis is described. This sp. has a pattern of amnion formation that is different from most Coleoptera, but is shared with a few other chrysomelids, some Isoptera and some Odon.

(1544) MACAN, T.T., 1976. The colonization of squares of plastic suspended in midwater. Freshwater Biol. 6: 33-40. – (*Dept. Zool. & Microbiol., Ohio Univ., Zool. Bldg., Athens, Ohio 54701, USA*).
A flat substratum hung in midwater is colonized rapidly by a number of spp. normally found in vegetation. Some have been recorded consistently, a greater number occasionally, but only a few have not been recorded at all. It seems likely that the identity of the plant cover has less influence on the structure of a community than some have thought. A comparison of flat sheet, pleated sheet and artificial Littorella suspended in midwater of the Hudson's Tarn, Westmoreland, England, allows cer-

tain statements and deductions. As far as Odon. are concerned, Enallagma cyathigerum larvae are more numerous on artificial Littorella, since their natural habitat is within the vegetation cover. It is concluded that flat plastic sheets hanging in the illuminated zone would improve the production of fish a little, pleating the sheets would improve it a little more, and best results would come from hanging something with a greater resemblance to natural vegetation.

(1545) MACHADO, A., 1976. Catalogo preliminare de la bibliografia entomologica Canaria. – Preliminary catalogue of the entomological bibliography of the Canaries. Dept. Zool. Cienc. marinas, Fac. Ciencias, Univ. de la Laguna, Tenerife. X + 47 pp. Bilingual: Spanish-Engl., save for the "Prologue"). – (*Dept. Zool., Univ. de la Laguna, Tenerife, Canary Islands, Spain*).
The exhaustive bibliographic list includes also a number of titles on the Odon. of the Canary Islands, Spain (e.g. Gardner, Valle).

(1546) MARTIN, W.J., C.T. GARTEN, Jr. & J.B. GENTRY, 1976. Thermal tolerances of dragonfly nymphs. I. Sources of variation in estimating critical thermal maximum. Physiol. Zool. 49 (2): 200-205. – (*Savannah River Ecol. Lab., Aiken, South Carolina 29801, USA*).
Thermal tolerance was determined for Libellula auripennis from a thermal effluent stream, and Macromia illinoiensis from a thermal recovery stream. Tolerances were measured at acclimation temperatures of 16, 24, and 32°C under different laboratory conditions. The major source of variation in thermal tolerance was acclimation temperature, which accounted for approximately one-third of the overall variation. Body size, investigator, rate of heating, species, time of day, and number of individuals per test flask had significant effects on thermal tolerance. Aeration of the test water was not a significant variable. Increasing acclimation temperature increased thermal tolerance in both spp. Libellula larvae acclimated at 16 and 24°C exhibited a daily cycle in thermal tolerance with a peak during mid-afternoon (1400-1600 h). Libellula larvae acclimated at 32°C, and Macromia larvae at all acclimation temperatures exhibited no daily cycle in thermal tolerance. (Authors). – (For Pt. II cf. *OA* No. 1525; – for other papers on the subject cf. *OA* Nos. 1470, 1494, 1500).

(1547) MATHAVAN, S., 1976. Satiation time and predatory behaviour of the dragonfly nymph Mesogomphus lineatus. Hydrobiologia 50 (1): 55-64. – (*Zool. Dept., Arulmingu Palaniandavar Arts Coll., Palni-624602, Tamil Nadu, India*).
The larvae of M. lineatus were satiated predating 21 larvae of Culex fatigans in 50 min.; number of attacks and predatory efficiency decreased precipitously from 2 attacks/min and 70% during the first 10 min. of feeding to 0.04 attack/min and 0.01% efficiency respectively during the sixth 10 min. interval. The odon. larvae fed after 6, 12, 18, 24, 36 or 42 hrs. of deprivation consumed 4, 13, 15, 20, 21 or 21 mosquito larvae; apparently, the maximum appetite returned after about 36 hrs. of deprivation. Satiation time, which was 50 min. at the density of 15 larvae/aquarium, decreased to 30 min. in aquaria containing 200 mosquito larvae. The number of prey consumed increased with increasing numbers of C. fatigans and Anopheles stephansi larvae and pupae of C. fatigans offered. Dragonflies consumed equal weight (but different numbers) of Culex and Anopheles larvae at all tested prey densities and preferred Culex over Anopheles. Comparative analyses suggest that Odon. deserve serious consideration as larvivorous predators. (Author).

(1548) MELIK-PASHAEVA, A., 1976. Zhivye iskopaemye. Izvestiya Moskve, No. 141 (18289), dated June 15, 1976. – (*Author's address unknown*).
A book review of the volume listed in *OA* No. 1418.

(1549) MOKRUSHOV, P.A. & L.I. FRANTSEVICH, 1976. Visual stimuli in behaviour of dragonflies. III. Choice of a settling place in Erythromma najas. Vest. zool., Kiev 1976 (4): 20-24. (Russian, with Engl. s.). – *(Inst. Zool., Acad. Sci. Ukrain. SSR, Ul. Lenina 15, USSR-252000 Kiev-30).*

The ♂♂ of E. najas are waiting for ♀♀ sitting on the leaves of water lilies. This peculiarity of the behaviour permits presenting them with plane surfaces and geometric figures for settling. The painted surfaces were ranged according to decreasing attractiveness as follows: yellow, orange, white, green, azure, blue, black. Presumably the choice of colour is ruled by the relation: maximum of long-wave rays – minimum of short-wave rays. The figures with convex edges were more attractive than dentated ones. Stochastic patterns with different statistical parameters were equally attractive. (Authors). – (For Pts. I, II, cf. *OA* Nos. 335, 671).

(1550) MOKRUSHOV, P.A. & L.I. FRANTSEVICH, 1976. Visual interneurons sensitive to target size and direction of movement in dragonflies (genus Sympetrum). Zh. evol. Biol. Fiziol. 12 (4): 341-346. (Russian, with Engl. s.). – *(Inst. Zool., Acad. Sci. Ukrain. SSR, Ul. Lenina 15, USSR-252000 Kiev-30).*

Experiments have been performed on S. vulgatum, S. flaveolum, S. sanguineum and S. danae. A pair of neurons was found in the thoracic ganglia and connectives, which has symmetrical contralateral receptive fields. These neurons are selectively sensitive to swift upward motion of a target of 3-10° in size. The receptive field, 120 x 25° in size, is oriented horizontally from the medial rim of the eye. The center of sensitivity has the following polar coordinates: 15° laterally from the medial plane and 20° above the equatorial one. The relation of detecting properties of the observed neurones to key stimuli which trigger hunting behavior is discussed. It is suggested that filtration of single and small optic stimuli by specialized detector neurons results not from the processes in the own receptive field of the neuron, but from the interaction with other neurons which are sensitive to motion of large objects and complex patterns. (Authors).

(1551) MOUZE, M., 1976. Étude expérimentale du contrôle exercé par l'oeil sur la croissance du lobe optique chez la larve d'Aeschna cyanea Mull (Insecte, Odonate). Bull. Soc. zool. Fr. 101 (1): 152-153. – *(Inst. Biol. anim., Univ. Sci. Techn. Lille-I, B.P. 36, F-59650 Villeneuve d'Asq).*

In young larvae the region that generates new ommatidia was extirpated and replaced by a layer of occipital tegument which prevents regeneration. In this way no new post-retinal fibres are able to enter the lobe below the level of the operation. Simultaneously, 3H-thymidine was injected into the larva which allows to distinguish between ganglionic regions formed before and after the operation. Three or four instars later, shortly before fixation, colchicin was injected into the larva in order to determine the mitotic index in the external growth mass of the operated eye and in that of the other eye used as a control. (1) The results indicate that the reduction of the external growth mass of the optic lobe is an indirect effect of the operation, it is not caused by the absence of post-retinal fibres; – (2) the most peripheral optic ganglion, the lamina, shows a marked reduction in volume below the operated region of the eye. This proves that by lack of contact with young post-retinal fibres, almost all newly-formed ganglionic cells degenerate; – (3) this reduction of volume also affects the 2nd optic ganglion (medulla), though slighter.

(1552) NARAOKA, H., 1976. Size variations of some species of Agrionidae (Odonata) of Japan. New Entomol. 25 (2): 27-38. – (Japanese, with Engl. s., tabs., and figure captions). – *(2 Murakami Apartm. House, 252 Hiraoka, Shinjo, Aomori-shi, 030-02, JA).*

A biometric analysis is presented of the size variation of specimens of different seasonal

populations of 10 spp. of the Japanese Platycnemididae and Coenagrionidae, referable to 6 genera.

(1553) NECK, R.W., 1976. Aberrant reproductive behaviour patterns of dragonflies in human-impacted habitats (Odonata: Libellulidae). Ent. News 87 (5-6): 181-183. – *(Texas Parks and Wildlife Dept., John H. Reagan Bldg., Austin, Texas 78701, USA).*
Aberrant ♂ territorial and ♀ ovipositing behaviour of Libellula croceipennis is described. As it appears from the observations, the aberrant results occur as finely-tuned adaptations, which evolved under natural conditions, but are utilized in unnatural conditions.

(1554) PRETSCHER, P., 1976. Hinweise zur Gestaltung eines Libellengewässers. Natur und Landschaft 51 (9): 249-251. – *(Inst. Naturschutz & Tierökol., Bundesforschungsanstalt f. Naturschutz u. Landschaftsökol., Heerstr. 110, D-5300 Bonn-Bad Godesberg-1, GFR).*
Technical and biological instructions are given for the setting up of an artificial dragonfly pool under central European conditions. The succession of the development of vegetation and the odon. fauna in such a pool in Germany are described, and a list is presented of the essential ecological requirements of 24 central European stagnicolous spp. of 5 families.

(1555) RAINEY, R.C., [Ed.], 1976. Insect flight. Symposia R. ent. Soc. London. Vol. 7, XI + 287 pp. Blackwell Sci. Publs, Oxford - London - Edinburgh - Melbourne. – *(c/o Royal Ent. Soc., 41 Queen's Gate, London SW7, UK).*
The volume contains 12 papers, organized into 2 sections, viz. "The mechanisms of insect flight" (1-4), and "The flying insect and its environment" (5-12). In most of them more or less numerous references are made also to Odon. The titles are: (1) J.W.S. Pringle: The muscles and sense organs involved in insect flight: – (2) B. Mulloney: Control of flight and related behaviour by the central nervous system of insects; – (3) W. Nachtigall: Wing movements and the generation of aerodynamic forces by some medium-sized insects; – (4) T. Weis-Fogh: Energetics and aerodynamics of flapping flight: a synthesis; – (5) R.C. Rainey: Flight behaviour and features of the atmospheric environment; – (6) E. Betts: Forecasting infestations of tropical migrant pests: the Desert Locust and the African Armyworm; – (7) R.J.V. Joyce: Insect flight in relation to problems of pest control; – (8) G.W. Schaefer: Radar observations of insect flight; – (9) M. Lindauer: Foraging and homing flight of the honeybee: some general problems of orientation; – (10) C.G. Johnson: Lability of the flight system; a context for functional adaptation; – (11) R.J. Wootton: The fossil record and insect flight; – (12) V.B. Wigglesworth: The evolution of insect flight. – (For an abstract of paper No. 11, cf. *OA* No. 1569).

(1556) ROE, R.M. & C.W. CLIFFORD, 1976. Freeze-drying of spiders and immature insects using commercial equipment. Ann. ent. Soc. Am. 69 (3): 497-499. – *(Dept. Zool. Physiol., Louisiana State Univ., Baton Rouge, La 70803, USA).*
Spiders from 6 families and immature representatives of 4 insect orders, incl. Odon., were successfully freeze-dried with commercial equipment. Vacuum pressure, heat sink temperature and area, specimen temperature, and distance of specimen from the heat sink affected efficiency of freeze-drying. The time necessary for drying of a specimen varied with species and was not related to specimen size. Color preservation in all cases was superior to preservation in fluids; body distortions were minimal.

(1557) ROSATI, F., G. SELMI & M. MAZZINI, 1976. Comparative observations on the mitochondrial derivatives of insect sperm. J. submicrosc. Cytol. 8 (1): 51-67. (With Ital. s.). – *(Ist. Zool., Univ. Siena, Siena, Italy).*
Mitochondrial derivatives of Calopteryx

haemorrhoidalis, Libellula depressa, and representatives of Hemiptera, Blattodea, Coleoptera and Diptera sperm tail were studied. Comparison of the different pterygote orders shows that reorganization of the internal membranes constantly leads to a helicoidal arrangement with coils about 320 Å thick and 100-110 Å apart. Inside the mitochondrial derivatives, Odonata excepted, proteinaceous filaments are progressively present. The association of these filaments generates a structure for which a 3-dimensional model is suggested. These transformed mitochondrial derivatives probably allow the axoneme to move in particular ways.

(1558) SADZIKOWSKI, M.P. & D.C. WALLACE, 1976. A comparison of the food habits of size classes of three sunfishes, Lepomis macrochirus Rafinesque, L. gibbosus (Linnaeus) and L. cyanellus Rafinesque. Am. midl. Nat. 95 (1): 220-225. – (*Anaerobe Lab., Virginia Polytech. Inst., State Univ., Blacksburg, Va. 24061, USA*).
The study was based on material from the interconnected First and Second Sister lakes, Washtenaw Co., Michigan, USA. Throughout their life plant material and Odon. are important food sources of L. macrochirus and L. cyanellus. Adult L. gibbosus made much greater use of gastropods, and L. cyanellus much less use of chironomids than did the other 2 spp. The pharyngeal tooth morphology and mouth size of these spp. appear to be related to these differences in food habits.

(1559) SARAI, D.S., 1976. Total and fecal bacteria in some aquatic and other insects. Environ. Ent. 5 (2): 365-366. – (*Water & Wastewater Techn. Sch., Neosho, MO 64850, USA*).
Total coliform and fecal coliform bacteria are used as indicators of fecal contamination in water. Both fecal and non-fecal coliforms form total coliforms or the coliform group. They are aerobic and facultatively anaerobic, non-spore forming, gram negative bacilli which ferment lactose to produce gas at 35°C within 48 hours. Bacteria which may meet these criteria are: Escherichia coli (Migula), E. aurescens (Parr). E. freundii (Braak), E. intermedia (Werkman & Gillan), Aerobacter aerogenes (Kruse), and A. cloacae (Jordan). – 17 insect spp., referable to 9 orders, incl. the odon. Argia sp. and Ophiogomphus sp., were tested. The method is described in detail. The results of the membrane filter technique for total and fecal coliforms are tabulated. In the intestine of Ophiogomphus sp. the number of total coliforms amounted to 6,000.000/g, and that of the fecal coliforms to 1,800.000/g. In the abdomen of Argia sp. 2,000/g of total coliforms were counted, whereas no fecal coliforms were detected in this sp. For sake of comparison it should be mentioned that the minimum number of total coliforms was found in the intestine of the orthopteran Hippiscus rugosus (Scudder) (1200/g), and the maximum in the same organ of Gryllus assimilis luctuosus Serv. (28,000.000/g). While the minimum number, 600/g of fecal coliforms was also found in the former sp., Ophiogomphus sp. had the maximum of these.

(1560) SHEPARD, L.J. & P.E. LUTZ, 1976. Larval responses of Plathemis lydia Drury to experimental photoperiods and temperatures (Odonata: Anisoptera). Am. midl. Nat. 95 (1): 120-130. – (*Dept. Biol., Univ. N. Carolina, Greensboro, Greensboro, NC 27412, USA*).
To investigate the separate and combined roles of photoperiod and temperature in seasonal regulation in an odonate sp., experiments were undertaken to measure the growth rate of P. lydia larvae when maintained to emergence under constant experimental conditions of light and temperature. Final-instar larvae were collected from Sept. 1969-May 1970, and were maintained under 8 experimental conditions: 2 photoperiods (11 and 14 h) at each of 4 temperatures (15°, 20°, 25° and 30°C). Growth rates were quantitatively measured by the number of days intervening from the time

of installation to emergence. Comparative statistics indicated that the longer photoperiod stimulated growth rate whereas the shorter photoperiod was inhibitory. Higher temperatures were stimulatory and lower temperatures were inhibitory to growth rates. The degree of these effects varied with the season of the year; larvae collected later in the study period emerged more rapidly than larvae collected earlier and maintained under identical conditions. This photoperiodic effect may be a primary stimulus for larval metamorphosis at the outset of the reproductive period in the spring. Temperature exerted a marked influence on growth rates at 20°C when contrasted with those of 15°C, giving evidence that temperature constitutes an important factor in seasonal regulation of the life cycle.

(1561) STARK, W., 1976. Zur Erforschungsstand der Libellen in der Steiermark. Ber. Arbeitsgem. ökol. Ent. Graz 7: 31-33. (With Engl. s.). – (*Goethestr. 28, A-8010 Graz*).
Literature on the odon. fauna of the province of Styria, Austria, is traced from 1761 to the present, and the status of the Styrian fauna is given as 63 known spp. (74 for Austria). A few of the bibliographic references are partly or entirely related to the former Habsburg province of Lower Styria, at present a part of Slovenia, Yugoslavia.

(1562) STORER, R.W., 1976. The behavior and relationships of the least grebe. Trans. San Diego Soc. nat Hist. 18 (6): 113-125. (With Spanish s.). – (*Bird Div., Mus. Zool., Univ. Michigan, Ann Arbor, Mich. 48109, USA*).
The least grebe, Tachybaptus dominicus, is widely distributed in the warm parts of the New World. It feeds on a wide variety of animals, incl. dragonflies and ants.

(1563) STRUB, O.R. & I. SIEGENTHALER, 1976. Das Libellenjahr. Stämpfli, Bern, 80 pp. 71 col. ill. incl. – Price: sFr 26.–. (*Filmstudio 2S, Seestr. 26 J, CH-3601 Thun-1*).
This is a popular booklet published for the Natural History Society of Thun, Switzerland, The 2 authors (O.R.S. text, I.S. photographs) produced a volume that should certainly not be missed in any odonatological library. It is based of field observations made in the surroundings on Thun, Kanton Bern, Switzerland (24 spp.). Through their original and refreshing approach – a narrative of the natural history of the order in perspective of dragonfly life through the 4 seasons – the authors succeeded to compile a well balanced, rounded off picture of the order, in which hardly any aspect of dragonfly biology was neglected. In spite of the numerous colour photographs of exceptional quality (25 of which are full-page illustrations), the book should not be considered simply as another dragonfly album, but rather as a popular introduction to the order, which will be certainly used to advantage by young dragonfly admirers on one hand, and in which the established worker will experience much joy and satisfaction on the other. The text is full of (indirect) suggestions for young workers, while the phenological table appended will be of interest to anyone interested in the odon. ecology of the Swiss lowlands. – (*Abstracter's note*: The book cannot be used for identification purposes, but supplements excellently the well-known German language works by P.-A. Robert and H. Schiemenz. The few minor errors that slipped into the text, do not affect the general value of the volume. Among these, the attentive reader will certainly notice the use of the Calopteryx-Agrion nomenclature, the spelling of Aeshna, omission of the reference to Anisozygoptera on p. 11, and the erroneous identification of Libellula fulva ♂ on p. 62 as Orthetrum brunneum).

(1564) TOMKIES, M. 1976. De roofridder van de insektenwereld. [The robber baron of the insect world]. Het Beste uit Reader's Digest, Amsterdam 20 (231): 129-131, 135, 139-140, 143. (Dutch). – (*c/o The Editors, Reader's Digest, Assumburg 73-75,*

*Amsterdam-Buitenveldert, NL*).
A popular narrative on dragonflies, giving a balanced and pleasantly readable account of their natural history, with references to their role in literature, figurative arts, music and in relation to other "anthropogenic" aspects. It is interesting that one of the earliest French experimental aircraft models has been given the name "Demoiselle" – the common folk term for dragonflies in France.

(1565) UTZERI, C. & C. BELFIORE, 1976. Selysiothemis nigra (van der Linden) in Italia (Odonata, Macrodiplactidae). Fragm. Entomol. 12 (2): 169-172. (With Engl. s.). – (*Inst. Zool., Univ. Roma, Città Universitaria, I-00100 Roma*).
A review is given of the hitherto published records and of own observations on this sp. in Italy, and its distribution in the Italian territory is discussed. At least at 3 localities it breeds with certainty. A brief ecological description is given of 2 of these.

(1566) VEUGER, J. & J. VEENSTRA, 1976. Verslag van het WIH$^2$-werkgroepkamp in de Mariapeel van 5 t/m 12 augustus 1975. [Report of the workshop of the Entomology-Hydrobiology-Herpetology Section of the Dutch Christian-Catholic Youth Federation of Nature Friends (CKJN) held in the Mariapeel, during August 5-12, 1975]. Anax 8 (2): 3-25. (Dutch). – (*De Brouwketel, P.O.B. 8, Angeren, Gelderland, NL*).
During the Workshop an inventarisation has been made of various insect orders in the Mariapeel marshes. Noord Limburg prov., Netherlands. The odon. fauna is dealt with in detail, and a list is given of all hitherto recorded spp. in the Peel area (31 spp., 46% of the total fauna of the Netherlands), 8 of which are new to the Peel region. – (*Abstracter's note*: The journal issue appeared in Sept., 1976 and is marked erroneously as Vol. 8, No. 1).

(1567) WILLIAMS, C.E., 1976. Neurocordulia (Platycordulia) xanthosoma (Williamson) in Texas. Great Lakes Ent. 9 (1): 63-73. – (*704 Foster Str., Marlin, Texas 76661, USA*).
This little known, crepuscular sp. was studied and observed in the field from June, 1971 through Dec., 1975. Notes are given on the life history, habits and habitats of the adult, and the larval habitat is described. It was believed to be a stream sp. in this area, however in Dec. 1975, 23 live larvae were collected from a small cove in Lake Waco, nr. Waco, Texas, USA. The larvae were mostly under the loose bank and in holes and crevices of sunken logs. In May 1975 copulation and emergence were photographed on an island of the lake. Adults of both sexes congregate at dawn and dusk in feeding flights over the streams and the cove of Lake Waco. 8 photographs and a map showing collection sites are reproduced. (Author).

(1568) WIRTH, W.W. & N.C. RATANAWORABHAN, 1976. A new species of parasitic midge (Forcipomyia (Pterobosca)) from Aldabra with descriptions of its presumed larva and pupa and systematic notes on the subgenera of Forcipomyia (Ceratopogonidae). Syst. Ent. 1 (3): 241-245. – (*Syst. Ent. Lab., US Natl. Mus., Washington 20560, USA*).
F. (P.) hutsoni sp. n., ex Odon., Aldabra Atoll, Indian Ocean, is described and illustrated. Immature stages are associated with Pandanus leaf axils and are the first to be described for Pterobosca. Characters of the 3 stages show that Pterobosca spp. are most closely related to the subgenera Phytohelea, Trichohelea and Rhynchoforcipomyia. The subgenera Thyridomyia, Synthyridomyia and probably Blantonia comprise a 2nd section of the genus, while Lasiohelea forms a 3rd and intermediate section.

(1569) WOOTTON, R.J., 1976. The fossil record and insect flight. *In*: R.C. Rainey, Ed., Insect flight. Symposia R. ent. Soc. London 7: 235-254. – (*Dept. Biol. Sci., Univ. Exeter, Exeter, UK*).
The palaeontological evidence, slender as it

is, seems to favour the existence in the Devonian of small insects, whose initially protective thoracic paranota became enlarged in association with their value first as parachutes, in delaying descent; next as gliding surfaces; then as steering vanes, as they developed the ability slightly to pronate, supinate, elevate and depress the pads by the action of the pleural leg muscles; and ultimately, in the case of the meso and metathoracic lobes, as flapping aerofoils, powered mainly by bifunctional leg muscles including those operating in Blattodea and perhaps supplemented by others now retained only in Odon. This is the classical view, and differs little from that of Forbes. – As the wings and prothoracic paranota became membranous they were supported by branching blood-filled tubes, the veins, linked by a network of finer veins. It is probable that the membranes were from the first stiffened by fluting, with alternate vein stems occupying ridges and troughs in the basal parts of the wings. It may be that of known wings those of Triplosoba and the Syntonopteridae are closest to the ancestral pattern, but whether the fluting extended throughout the archetypal wing is still doubtful. – Equally uncertain is the position of the first wings, both in flight and at rest. Apparent homologues of the flexor muscle have been reported in both Ephemeroptera and Odon.; but it is hard to believe that the neopterous condition was present from the first. Yet the resting position of the wings found in palaeodictyopteroids and anisopterous Odon. renders these latter insects so wholly dependent on aerial locomotion that it seems very improbable in early, weakly-flying insects. A more feasible alternative is that adopted by Ephemeroptera, whose wings are held above the body at rest, but partly remoted. – The position of the wing pads of Palaeozoic larvae lends weight to Sharov's proposal that insect wings were at first posterolaterally directed; but they may have been flexible enough at the base to allow promotion to the perpendicular position in flight. From this condition true neopterous folding could readily have evolved by refinement of the axillary sclerites and musculature. – Neoptera, with the development of the expanded anal hind-wing lobe may from the first have relied mainly on steady-state aerodynamics and flights of relatively short duration. In contrast several lines of Palaeoptera, notably among odonatoids and palaeodictyopteroids, seem to have exploited "flip" mechanisms to a considerable extent, in association with finely-controlled manoeuvrable flight, although flight patterns were diverse in both groups. In the Palaeodictyoptera prothoracic paranotal lobes were retained probably as accessory control surfaces. Their persistence in Protorthoptera and Blattodea seems rather to have been due to continued exploitation of their larval protective function. – In understanding the early evolution of insect flight information is badly needed in two main areas. The first is palaeontological: we have as yet no direct knowledge of Devonian and lower Carboniferous insects. The second is the significance in flight of some of the visible characters of relevant extinct and extant insects; particularly the mode of operation of fluted wings, and of homonomous wings, both linked and unlinked, in a variety of forms. Until these are resolved the possibly crucial importance of the recent and fossil Ephemeroptera is unknown. Their mosaic of archaic and specialized characters makes it particularly hard to decide whether we are seeing in the nuptial dance a reflection of the flight of the first winged insects, or a wholly apomorphic pattern. (Author).

(1570) YASUE, Y., 1976. Occurrences of the Indian fritillary, Argyreus hyperbius L. and sympetrinid dragonfly, Diplacodes bipunctatus (Br.) in the New Guinea Central Highlands, West Irian. Proc. ann. Meeting Chugoku Sect. Japan. Soc. appl. Ent. Zool. & ent. Soc. Japan, Yamaguchi City, pp. 1-6 (sep.). (Japanese, with Engl. translation of the title). – (*Lab. Ent., Ohara Inst. Agric. Biol., Okayama Univ., Chuo 2-30-1, Kurashiki, 710, JA*).

A rich population of D. bipunctata was found in January 1974 at some ponds in Homejo, New Guinea Central Highlands, West Irian, Indonesia (alt. 1750 m). The sp. is known from the Pacific islands east of Weber's line, reaching up to the Bonim Islands in the North. This is the third record from New Guinea; the first being that of L.J. Toxopeus in 1938.

(1571) ZAYANCHKAUSKAS, P. & A. STANIONYTE, 1976. B.F. Belyshev. Strekozy Sibirii. Tom I i II, Novosibirsk, 1973/74. Ent. Obozr. 55 (3): 725. (Russian). – (*Inst. Zool. & Parasitol., Acad. Sci. Lithuanian SSR, MTP-1 Lenino pr. 3, USSR-23600 Vilnius*).

A book review of the volumes listed in *OA* Nos. 473 and 653.