ODONATOLOGICAL ABSTRACTS

1972

(2584) REHAGE, H.O., 1972. Die bisher festgestellten Libellenarten des Kreises Wiedenbrück. *In*: E. Goretzki, [Ed.], Boden, Landschaft, Flora, Fauna. Wiedenbrück, pp. 282-284. [The name of the Publishers not stated]. — (*Biol. Stn Heiliges Meer, D-4534 Recke-Steinbeck, GFR*).
30 odon. spp. are listed for the county of Wiedenbrück, Westfalia, German Federal Republic. The more interesting taxa are Coenagrion scitulum, Sympetrum fonscolombei and Leucorrhinia pectoralis.

1976

(2585) DEEG, L., 1976. Odonata Jugoslawiens. *In*: R. Bretthauer, V. Hellmann & J. Schwoerbel, [Eds.], Biogeographisch-ökologische Exkursion nach Jugoslawien vom 6. bis 27.9.1975. Limnol. Inst. & Fachbereich Biol., Univ. Freiburg, Freiburg, pp. 166-169 (general introduction), 314 (list of spp.). — (c/o *Biol. Inst. [Zool.], Univ. Freiburg, Albertstr. 21a, D-7800 Freiburg, GFR*).
The paper contains a list of 13 spp., collected Sept. 6-27, 1975, mainly at the lakes of Ohrid, Prespa and Skutari (Skadar), and at the estuary of the Neretva, southern Yugoslavia.

(2586) FRANTSEVICH, L.I. & E. PICHKA, 1976. The size of binocular zone of the visual field in insects. Zh. evol. Biokhim. Fiziol. (J. evol. Biochem. Physiol.) 12: 461-665. (Russian, with Engl. s.). — (*Lab. Insect Physiol., Inst. Zool., Acad. Sci. Ukrainian SSR, Lenin Str. 15, USSR-252000 Kiev-30*).
The margin of the visual field and of the binocular zone in compound eyes were traced by means of ophthalmological methods, such as the observation of pseudopupils or the glow of ommatidia lit from inside. Predators such as Aeshna mixta and Sympetrum vulgatum, as well as honeybee drones and male flies which perceive their mates or prey as a moving point in the sky, have the smallest binocular zone. They could not discover the distance to a target by binocular vision. Insects which feed on flowers, such as bees or butterflies, have a large binocular "window" pointing in the landing direction or pointed to the apex of a proboscis in hovering species. Their binocular zone include 20-25% of their facets. Predators which hunt amidst vegetation, including aquatic dragonfly larvae such as Aeshna cyanea and adult damselflies such as Lestes virens, have the largest binocular zone which includes 30-75% of their facets. Binocular vision probably allows them to detect prey against a complex background. The number of facets in the entire eye and in the binocular zone for fourteen species of insects, including four odonates, is listed in a table.

(2587) MARTENS, K., 1976. Argonnekamp, 1-13 juli 1976. Libellen. [The Argonne workshop, July 1-13, 1976. Dragonflies]. 't Bokje, Kortrijk 2 (4/5): 6-16. (Dutch). — (*Mastplein 19, B-2710 Hoboken*).

A brief review is given of the odon. fauna (24 spp.) of the Argonne area, Dep. Ardennes, northern France, as recorded in July, 1976.

(2588) RZÓSKA, J., 1976. Notes on the benthos of the Nile system. *In*: J. Rzóska, [Ed.], The Nile, biology of an ancient river, pp. 345-351. Junk, The Hague. — (*6 Blakesley Ave., London W 5, UK*).
A reference is made to the work of P.S. Corbet and A. Tjønneland, some of which are dealing with the observations on the emergence of Odon. in Lake Victoria, near the outlet of the Victoria Nile (1955-1966). Bibliographic references are not given, nor are any other details on Odon. stated.

1977

(2589) ALEXANDER, R.Mc.N. & G. GOLDSPINK, [Eds.], 1977. Mechanics and energetics of animal locomotion. Chapman & Hall, London. XII+346 pp., 7 pls. excl. — Price: £19.—. (Publishers' address: *11 New Fetter Lane, London, EC4P 4EE, UK*).
Several well known authors contributed in their field to this book, which provides an impressive mass of information on vertebrate and invertebrate locomotion. Reference is made to wing muscle action in dragonflies, to wing venation, and to wing movement.

(2590) BEUTLER, H., 1977. Ein Beitrag zur Kenntnis der Libellenfauna des Naturschutzgebietes Zarth (Insecta, Odonata). Naturschutzarbeit in Berlin & Brandenburg 13: 91-97. — (*Author's address unknown*).
A brief account is given of ecology and the odon. fauna (26 spp.) of a large moorland area in the central German Democratic Republic. Erythromma viridulum and Ischnura pumilio are the more interesting taxa with regard to their zoogeographic distribution.

(2591) DUTMER, G. & F. DUIJM, 1977. Libellen. Tabellen voor de Nederlandse imago's en larven. [Dragonflies. Identification keys for the Dutch imagines and larvae]. Jeugdbondsuitgeverij NJN, Amsterdam. 56 pp., 1 sheet Errata excl. (Dutch). — Price: Hfl. 4.50. — (Address first author: *Vlasstr. 1, Groningen, NL*). — Copies can be ordered solely by remittance of the amount mentioned to Postal Account No. 23 30 40 of the Jeugdbondsuitgeverij, Amsterdam, NL, with the specification "Libellen-libellenlarventabel".
A reprint of the volume listed in *OA* No. 1041.

(2592) FARLEY, D.G. & L.C. YOUNCE, 1977. Effects of Gambusia affinis (Baird & Girard) on selected non-target organisms in Fresno County rice fields. Proc. Pap. 45th ann. Conf. Calif. Mosquito & Vector Control Assoc., Visalia, Calif., pp. 87-94. — (*Fresno Westside Mosquito Abatement Distr., Firebaugh, Cal., 93622, USA*).
The effects of introducing G. affinis at 0.25 lb fish/acre into 30 rice-fields in California, USA (for mosquito control) on non-target organisms were studied. Notonectids and odon. larvae were significantly reduced, hydrophilid adults, corixids and Ephemeroptera were reduced but not significantly so, and hydrophilid larvae, belostomids and dytiscid larvae and adults were not affected in numbers by the presence of G. affinis.

(2593) ILYUSHINA, T.L., 1977. [An experimental study of the role of aquatic insects as eliminators of trematodes in the larval stage]. Trudy gel'mintol. Lab. Akad. Nauk SSSR 27 [1977]: 158-173. (Russian). — (*Inst. Biol., Siber. Sect. USSR Acad. Sci., Ul. Frunze 21, USSR-630091 Novosibirsk*).
In a study conducted in the Novosibirsk region, USSR (1972) and in the delta of the Volga (1973-75), the ecological relationships between 32 spp. of aquatic insects (Odon., Ephemeroptera, Hemiptera, Coleoptera, Trichoptera and Diptera) and the cercariae of 9 spp. of Trematoda were investigated experimentally. Separate consideration was given to the course of elimination of metacercariae from insects that are obligate additional hosts, from insects that are

abortive additional hosts (in which development of the trematode ceases at the formation of metacercariae) and from insects that are unreceptive hosts (in which no development occurs). The effect of insect predation on cercariae was studied in relation to the bodily size of the predacious larvae at different stages of their growth, and it was found that young insect larvae, 5-10 mm long, consumed the greatest proportion of the cercarial population available to them. Factors that affect the amount of feeding are discussed. (Cf. also *OA* Nos. 740, 1759).

(2594) KIRMSE, W., 1977. Zur momentanen quantitativen Verhaltensänderung bei gleichbleibender Umweltsituation. Wiss. Z. Humboldt-Univ. Berlin (Math.-Naturwiss.) 26 (4): 399-400. (With Engl., Fr. and Russ. s's.). — *(Carl-Ludwig Inst. Physiol., Karl-Marx-Univ., Liebigstr. 27, DDR-701 Leipzig, GDR).*

Optomotor responses in Odon. and Mantodea as well as opto- and vestibulomotor responses in certain reptiles are used as examples to show that there is no stereotyped stimulus-response-relation, but a changing response intensity depending on the animal's readiness for responding to the stimulus pattern. The phenomenon can be interpreted as an energy saving onset of behavioural response.

(2595) ROMANUS, K., 1977. Zur Libellenfauna des Körbaer Teiches. Biol. Stud. Kareis Luckau 6: 41-42. — *(Author's address unknown).*

An annotated list is given of 15 spp. recorded March-Oct. 1970 in the Körbo wetland area, Luckau, German Democratic Republic. Calopteryx splendens has disappeared there after the application of (not further specified) insecticides in the surroundings.

(2596) YOUSUF, M. & M. YUNUS, 1977. Genera of subfamily Gomphinae (Gomphidae) with descriptions of three new species (Anisoptera: Odonata) from Pakistan. Pakistan J. sci. Red. 29: 56-62. — *(Dept. Ent., Univ. Agric., Faisalabad, Pakistan).*

The genera Anormogomphus, Anisogomphus and Ophiogomphus are briefly characterized, Anormogomphus kiritschenkoi Bart. is redescribed (Faisalabad, ♂, ♀), and the following 3 spp. are described and illustrated as new: Anormogomphus exilocorpus sp.n. (♂ holotype, ♀ allotype: Faisalabad, May 4, 1966), Anisogomphus vulvalis sp.n. (♀ holotype and paratype: Mingora, Swat, Aug. 4, 1966; ♂ unknown), and Ophiogomphus caudoforcipus sp.n. (♂ holotype: the same data as the former; unknown). The types are in the Ent. Mus., Univ. Agric., Faisalabad, Pakistan.

1978

(2597) BELYSHEV, B.F. & A.Yu. HARITONOV, 1978. On two fossil dragonflies (Insecta, Odonata) from upper reaches of the Vasyugan. Izv. sib. Otd. Akad. Nauk SSSR (Biol.) 1978 (10): 138. (Russian, with Engl. s.). — *(Inst. Biol., Siberian Sect. USSR Acad. Sci., Ul. Frunse 21, USSR-630091 Novosibirsk).*

The paper deals with the subfossil wings of Sympetrum flaveolum and Aeshna squamata, recovered during archaeological excavations in upper reaches of the Vasyugan, USSR, at a depth of 0.5 m, under crocks of ceramic vessel. The age of the find is about 3500 yrs.

(2598) BREHÉLIN, M., D. ZACHARY & J.A. HOFFMANN, 1978. A comparative ultrastructural study of blood cells from nine insect orders. Cell Tiss. Res. 195 (1): 45-57. — *(Lab. Biol. gén., Univ. Louis Pasteur, 12 rue de l'Université, F-67000 Strasbourg).*

A study of the hemocyte ultrastructure (incl. Aeshna cyanea) has led to the identification of 8 cell types, viz. (1) Plasmatocytes, whose cytoplasm is filled with small dense lysosomes and large heterogeneous structures, are phagocytic cells; — (2) Granulocytes, filled with uniformly electron dense granules, are involved in capsule formation; — (3) Coagulocytes, which contain granules and structured globules and which possess a

well developed RER, are involved in phagocytosis; — (4) Spherule cells are filled with large spherical inclusions; — (5) Oenocytoids are large cells with few cytoplasmic organelles. These 5 hemocyte types represent the majority of insect blood cells; — (6) Prohemocytes, blastic cells which are one of the stem cells of hemocytes, are very few in number in each species investigated; — (7) Thrombocytoids and; — (8) Prodocytes are restricted to a small number of insect spp. The ultrastructural characteristics of these hemocyte types are discussed. (Authors).

(2599) CARFI, S. & F. TERZANI, 1978. Note su alcune specie di odonati toscani. Redia 61: 191-203. (With Engl. s.). — (*Ist. Zool., Univ. Firenze, Via Romana 17, I-50125 Firenze*).
19 spp. from Tuscany, Italy are listed and discussed. New for the region are Calopteryx xanthostoma and Oxygastra curtisi.

(2600) FARRAR, J., 1978. Emergence of the Green Darner. Nat. Hist., New York 87 (8): 52-55. — (c/o *the Editor, Am. Mus. Nat. Hist., Central Park West at 97th Str., New York, N.Y. 10024, USA*).
The life cycle of Anax junius is briefly described. Emergence is concentrated upon and illustrated by colour photographs (full-page figs. of the ultimate instar larva and the adult, 5 smaller figs. of the emergence process). The morphological and behavioural changes of the larva, which take place as the time of transformation approaches, are given. The paper aims at the general reader.

(2601) FERGUSON, V.M. & R.C. FOX, 1978. A comparison of aquatic insects in natural inlets with those in the heated effluent from the Oconee Nuclear Station-littoral zone. J. Ga ent. Soc. 13 (3): 202-213. — (*Dept. Ent. & Econ. Zool., Clemson Univ., Clemson, South Carol. 29631, USA*).
Since 1973, the 3 reactor units of the Oconee Nuclear Station have discharged thermal effluent into Lake Keowee, South Carolina, USA. Aquatic insects were collected weekly from May 1975 - May 1976 at the Discharge Cove and in 3 natural inlets on Lake Keowee. Of the aquatic insects collected, 99.24% were Diptera. A comparison of insect populations in the 4 areas showed the Discharge Cove to be the least productive of 4 sampling sites, but more diverse in chironomid genera. Type of substrate and amount of organic matter present, as well as water level, had a direct influence on the abundance of insects. Thermal effluent is the probable cause for elimination of 4 insect orders (Ephemeroptera, Heteroptera, Odon. Trichoptera) in the Discharge Cove as well as shifts in the time of peak insect populations.

(2602) KEY, K.H.L., 1978. The conservation status of Australia's insect fauna. Occ. Pap. austr. natn. Parks & Wildlife Serv. 1: 1-24. (ISBN 0-642-03646-2). — (*Australian Natn. Parks & Wildlife Serv., Canberra, AU*).
This review of the conservation status of insects in Australia includes a discussion on the ecological role of insects in biotic communities and suggestions for investigations on the insect communities of national parks on Cape York Peninsula and on the effects of fire on the insect communities in a dry sclerophyll forest national park in Western Australia. Insects that are considered to be endangered are all those endemic to Lord Howe Island, 7 species of Odon. and several endemic Australia eumastacid grasshoppers, the status of which is threatened by grazing by sheep and rabbits.

(2603) KLAUSNITZER, B., G. FRIESE, W. HEINICKE, W. JOOST & G. MÜLLER, 1978. Bedrohte Insektenarten in der Deutschen Demokratischen Republik. 1. Beitrag. Ent. Ber., Berlin 1978 (2): 81-87. — (*Sekt. Biowissenschaften, Karl-Marx-Univ., Talstr. 33, DDR-701 Leipzig, GDR*).
The endangered insect spp. of the German Democratic Republic are discussed. Out of 64 odon. spp. recorded from the territory of the GDR, Cordulegaster bidentatus is considered extinct (recorded only in 1888 and 1912). Coenagrion mercuriale, Gomphus flavipes and Aeshna viridis are greatly

endangered, and so are Gomphus vulgatissimus, Aeshna subarctica, Cordulegaster boltoni and Somatochlora alpestris. The first group consists of spp. known from but a few localities in the GDR, while those of the second group are spp. bound to certain type of biotopes.

(2604) KUBOTA, T., 1978. A method of obtaining eggs from damselflies by electrical stimulation. Zool. Mag., Tokyo 87 (2): 169-170. (Jap., with Engl. s.). — (*Biol. Inst., Liberal Arts Coll., Kagoshima Univ., Kagoshima, 890, JA*).
Cercion calamorum and Ischnura senegalensis, ovipositing endophytically, were stimulated with an alternating electrical current. Their eggs were stripped into water and many of them developed to hatch. When the current was stopped, oviposition ceased. Currents with different cycles and voltages were applied through a pair of electrodes placed at a distance of 3 segments apart on the abdomen of the animal. A 10 V 60-cycle current was effective and oviposition of more than 5 eggs obtained in about 70% of the stimulated dragonflies.

(2605) MAMET, J.R., 1978. Contribution à la connaissance de la faune entomologique d'Agaléga (Océan Indien). Bull. Soc. ent. Fr. 83 (5/6): 97-107. — (*rue du Dr Roux, Rose Hill, Mauricius*).
A list is given of the insect fauna of the island of Agalega, Indian Ocean, collected in 1965. "Coenagriocnemis spp." is the only odon. name listed.

(2606) MATSUKI, K., 1978. Taxonomic studies of the larval stage of Gomphidae (Odonata) in Taiwan. Ann. Rep. Taiwan prov. Mus. 21: 133-180. (Chinese, with Engl. s.). — (*3-75-17 Nakadori, Tsurumi-ku, Yokohama, 230, JA*).
This is a journal edition of the M.Sc. thesis is listed in *OA* No. 2459.

(2607) MENON, M.G.R., 1978. Systematics of Indian insects. *In*: S.K. Prasad et al., [Eds.], Entomology in India (Suppl.), pp. 70-87. Ent. Soc. India, New Delhi. — (*Ind. Agric. Res. Inst., New Delhi, India*).
The history of insect taxonomy in India is traced from the late 18th century to present, and its present position is cirtically discussed, pointing out the lacunae that have still to be filled in before the taxonomy of Indian insects could be considered as based on a sound footing. As far as the Odon. are concerned, reference is made to the life work of the late F.C. Fraser. The general bibliographic list contains 109 titles.

(2608) MEYER, R.P. & S.L. CLEMENT, 1978. Studies on the biology of Tanypteryx hageni in California. Ann. ent. Soc. Am. 71 (5): 667-669. — (*Dept. Ent., Univ. California, Davis, Cal. 95616, USA*).
A population of T. hageni was associated with spring fed insectivorous plant bogs in California, USA. Females oviposited and larval development occurred in acid waterlogged substrates. The diet of late instar larvae consisted primarily of surface inhabiting arthropods, mostly spiders. Collection of fresh exuviae revealed that adults emerged from app. mid-May - early July. The most abundant groups of macroinvertebrates supported by the bogs were oligochaetes, and chironomid and tipulid larvae.

(2609) MOTH IVERSEN, T., P. WIBERG-LARSEN, S. BIRKHOLM HANSEN & F.S. HANSEN, 1978. The effect of partial and total drought on the macroinvertebrate communities of three small Danish streams. Hydrobiologia 60 (3): 235-242. — (*Freshw. Biol. Lab., Univ. Copenhagen, 51 Helsingørsgade, DK-3400 Hillerød*).
3 cases of partial or total drought were studied. Only at 1 locality (Milling Baek, Mid-Jutland) were the odon. present (Erythromma najas, unidentified Zygoptera), but the Order is not further considered in the text.

(2610) NEUMANN, F.G., 1978. Insect populations in eucalypt and pine forests in north-eastern Victoria. Aust. For. Res. 8 (1): 13-24. — (*For. Comm. Victoria, Treasury Pl., Mel-*

bourne, Victoria 3002, AU).
A survey was made of the diurnal airborne insect fauna in plantations of introduced radiata pine and mature native peppermint-type eucalyptus forest near Myrtleford, northeastern Victoria, Australia. The Zygoptera and Anisoptera are also among the trapped fauna.

(2611) SAMMAN, J. & M.P. THOMAS, 1978. Effect of an organophosphorus insecticide, Abate, used in the control of Simulium damnosum on non-target benthic fauna. Int. J. environ. Stud. 12 (2): 141-144. — (*Inst. Aquat. Biol., Achimota, Ghana*).
The effect was studied in the Oti river, West Africa, in the framework of a Onchocerciasis Control Program. Abate was administered by aerial spraying, and pre-dosing and post-dosing Surber samples were compared. Gomphidae and Libellulidae were among the non-target organisms killed (along with Baetidae, Leptophlebiidae and Dytiscidae). Though the larvicide was toxic to other non-target organisms, particularly Neoperla and Orthocladinae, the effect did not seem to be significant.

(2612) SCUDELLARI, L., 1978. Odonati dell' anfiteatro morenico del Garda. Atti XI Congr. naz. ital. Ent., pp. 229-235. (with Engl. s.). — (*Mus. Civ. Stor. Nat. Verona, Verona, Italy*).
The distribution and phenology of the Odon. of the morain regions south of Lake Garda, Italy, are described and discussed.

(2613) THORNHILL, R., 1978. Some arthropod predators and parasites of adult scorpionflies (Mecoptera). Environ. Ent. 7 (5): 714-716. — (*Dept. Biol., Univ. New Mexico, Albuquerque, New Mex. 87131, USA*).
Observations were carried out during 5 yrs on 9 Panorpa and 4 Bittacus spp. Lestes rectangularis is the only dragonfly reported to feed on scorpionflies.

(2614) TOWNS, D.R., 1978. Some little-known benthic insect taxa from a northern New Zealand river and its tributaries. N.Z. Ent. 6 (4): 409-419. — (*Dept. Zool., Univ. Auckland, Auckland, NZ*).
Figures and notes on occurrence are given for 17 taxa from 12 families of rare or little-known insects collected from the Waitakere River and Cascade Stream, in the Waitakere Ranges, northern New Zealand. Procordulia grayi is the only odon. sp. dealt with. In addition, a list is presented of all spp. collected during the study. The latter includes Xanthocnemis zealandica and P. grayi.

(2615) WILHM, J., H. NAMMINGA & C. FERRARIS, 1978. Species composition and diversity of benthic macroinvertebrates in Greasy Creek, Red Rock Creek and the Arkansas River. Am. Midl. Nat. 99 (2): 444-453. — (*Sch. Biol. Sci., LSW 402, Oklahoma St. Univ., Stillwater, Okl. 74074, USA*).
100 taxa of benthic macroinvertebrates were collected (March 1975 - Jan. 1976) on artificial substrate samplers at 7 stns in the 3 streams. Two thirds of these were Diptera, Ephemeroptera and Trichoptera. As far as the Odon. are concerned, not further identified Argia sp. and Gomphus sp. are listed. Number of taxa and density were low in late autumn and winter, probably reflecting the low temperatures. Maximum density occurred at most stations in early autumn, resulting in low values of species diversity. Numbers of taxa and species diversity did not reflect high conductivity or low oxygen concentration in Greasy Creek. Although numbers of taxa and values of diversity were generally similar in the creeks and the river, density was considerably greater in the river.

1979

(2616) ÅBRO, A., 1979. Attachment and feeding devices of water-mite larvae (Arrenurus spp.) parasitic on damselflies (Odonata, Zygoptera). Zool. Scr. 8 (3): 221-234. — (*Inst. Anat., Univ. Bergen, Årstadveien 19, N-5000 Bergen*).
Water-mite larvae of the subgenus Arrenu-

rus (Acari, Hydrachnellae) act as habitual ectoparasites on zygopteran imagines, mostly attached to the soft membranous cuticle. The powerful larval pedipalp claws grasp the cuticle and the distal sabre-like cheliceral segments tear it, thus obtaininng the host's tissue fluids. The chelicerae and palps cooperate to anchor the larva. The attached larva soon produces — in the host's subcuticular epidermis layer, and separated from the haemocoele by the thin sheet of subepidermal connective tissue — an elongated pouch, the stylostome, consisting of an acellular gelatinous substance, apparently secreted by the larva. Presumably, interaction with components in the host's tissue fluids solidifies the stylostome, which becomes firmly fixed to the host's body wall. The stylostome is thought to lengthen by repeated alternation between the suction of tissue fluids from the host and secretion of fresh soft substance forming additional stylostome segments. The resilient stylostome develops in a cleft between the host's cuticle and the subepidermal connective tissue in connection with partial decomposition of the host's epidermis, probably caused by cytotoxins leaking from the stylostome. In attempt to wall off the wound and thus to avoid influx of foreign substances, the host lays down a melanin sleeve around the stylostome at the perforation site. Lodgement of the functional stylostome separated from the haemocoele within the host's tissues might explain why the newly-formed stylostome seems immune from cellular host reactions. However, cellular encapsulation and melanization appear to happen to outworn, non-active stylostomes. (Author).

(2617) AKRE, B.G. & D.M. JOHNSON, 1979. Switching and sigmoid functional response curves by damselfly naiads with alternative prey available. J. Anim. Ecol. 48 (3): 703-720. — (*432 Pinewood Ln., Duluth, Minn. 55804, USA*).
The influence of alternate prey availability on the functional response of the final instar larvae of Anomalagrion hastatum to densities of standard-sized cladocerans (motile Daphnia and sessile Simocephalus) was studied. It is hypothesized that switching behaviour, described in detail, is caused by the circumstance that the larvae use 2 alternate searching modes (ambush and walking) that alter their encounter frequencies with motile or sessile prey.

(2618) ANDOH, T., M. OKADA & T. YOKOCHI, 1979. Tohkai no konchu. [Insects of the Tohkai District: their biology and identification]. Chunichi Shimbunsha, Nagoya. 224 pp. (Japanese). — Price: Y 980. — (Address first author: *Otowa 1-5-24. Ichinomiya, Aichi Pref., 491, JA*; — Publishers' address: *6-1, Sannomaru 1-chome, Naka-ku, Nagoya, 460, JA*).
This pocket-size book is organized into 4 main sections. pt. 2 (pp. 63-110) is dealing with the Odon. On pp. 204-210 a guide is presented to the insect observation sites, while on pp. 214-215 a list is given of the Odon. of the 4 prefectures of the Tohkai District (Japanese names only). The booklet is richly illustrated with black-and-white and colour photographs. — (*Abstracter's note*: Index of spp. and Engl. translation of figure captions and foot notes related to Odon., and translation of the titles of chapters are available from the Editor of Odonatologica or from the SIO office in Japan, Mr. K. Inoue, 5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA)

(2619) ANDRIES, J.C., 1979. Effect of exogenous JHI on imaginal determination in Aeshna cyanea. J. Insect Physiol. 25 (7): 621-627. — (*Lab. Biol. anim., Univ. Sci. & Techn. Lille, F-59655 Villeneuve d'Ascq-Cedex*).
Last instar larvae injected with 8 *ug* or more JHI prior to the end of the 4th ocular stage (day 7 or 8 of the instar) became perfect supernumerary larvae. This means that adult determination does not take place before this time. When JHI is applied later (days 9-13) larval-adult intermediates are formed. It seems, therefore, that the imaginal programming takes place at the end of the 4th ocular stage and might be correlated with the first ecdysone peak which occurs at the same

time. (Author).

(2620) BARLET, J., 1979. Questions à propos des muscles trochantero-notaux des insectes. Bull. Ann. Soc. r. belge Ent. 115: 93-111. — (*Lab. Morphol., Systém. & Ecol. anim., Inst. Van Beneden, Quai Van Beneden, B-4020 Liège*).
A review is given on the tergal depressor muscles in insects, incl. the references to the Odon.

(2621) BOUSFIELD, D., 1979. Where have all the flowers gone? Nature, Lond. 280 (5721): 348. — (*Author's address unknown*).
The article contains a note on odonatological and non-odonatological activities of the distinguished Brazilian odonatologist, Prof. Dr. Angelo B.M. Machado, Univ. Minas Gerais, Belo Horizonte.

(2622) CAMMAERTS, R., 1979. Les Odonates de Belgique et des régions limitrophes. *In*: J. Leclerq & C. Verstraeten, [Eds.], Atlas provisoire des insectes de Belgique, Gembloux, cartes 1333-1400, text 6 pp. — (*Lab. Biol. anim. & cellul., Univ. Libre de Bruxelles, C.P. 160, 50 av. F.D. Roosevelt, B-1050 Bruxelles*).
This is the Belgian part of the atlas of the European Invertebrate Survey project, showing geographical distribution of 67 spp. in Belgium. In the maps different signs are used for unchecked bibliographic records, for those made prior to 1950 and for the modern records. Bibliography of the Belgian faunistic literature is not given.

(2623) CHAPPELL, R.C., 1979. Insect ocelli: the new look at an enigmatic eye. Invest. Ophthalmol. Visual Sci. 14 (8) (Suppl.): 109. — (*Hunter Coll., 695 Park Ave., Box 210, City Univ. New York, New York, N.Y. 10021, USA*).
Over the past decade, the insect ocellus has received increasing attention. Found in all orders of insects, its role is not yet established, although multiple functions with some variations between spedies are suspected. proposed roles include shadow and horizon detection, phototaxis, and modulation of brain activity. Its role in shifting a honeybee's dance orientation from gravity to the position of a light source has recently been demonstrated. — Central projections of ocellar neurons into the brain, already mapped in half a dozen insects, provide a basis for comparative studies. Some species have neurons which run from one ocellus to another, suggesting the possibility of efferent information. The two basic types of neurons in this retina, receptors and second-order neurons, have been identified using the intracellular recording/Procion staining technique. Pharmacologic studies support anatomic evidence for feedback onto receptor cells. Such studies in the dragonfly suggest that acetylcholine (ACh) may be the receptor transmitter, and this is consistent with the finding of ACh concentrations of 225±51 nM/gm protein and choline acetyltransferase activity of 59±8 μM/hr/gm protein in that retina. — Factors important to understanding the vertebrate retina such as slow potential communication, feedback synaptic interactions, tonic-to phasic information processing, and pigment migration are now accessible for study in the relatively simple ocellar retina. (Author).

(2624) CHERRY, D.S., R.K. GUTHRIE, F.F. SHERBERGER & S.R. LARRICK, 1979. The influence of coal ash and thermal discharges upon the distribution and bioaccumulation of aquatic invertebrates. Hydrobiologia 62 (3): 257-267. — (*Biol. Dept. & Cent. Environ. Stud., Virginia Polytech. Inst. & St. Univ., Blacksburg, Va 24061, USA*).
The distribution, density and uptake of 20 elements by aquatic invertebrates inhabiting a drainage system, that received excessive coal ash effluent (275 JTU of turbidity) at one end and thermal loading (44.5 C) at the other end, was studied for 15 months. The ash settling basin filled during the first 8 months of sampling which resulted in the release of ash effluent directly into the receiving system. Density of invertebrates

was lowest in the 300 m stream between the ash basin and swamp and highest 1200 m beyond the stream-swamp confluence where ash influence was minimal. Invertebrate density was lowest in the stations where turbidity from ash effluent was greatest. The most tolerant invertebrates to coal ash stress were Odon. (Libellula sp., Enallagma sp.), crayfish (Procambarus sp.), and amphipods (Gammarus sp.) and gastropods (Physa sp.), and midges (Chironomidae) when the basin was filling. During the period of ash overflow, all groups were either reduced in numbers or absent. In the thermally stressed station. Libellula sp. was the predominant invertebrate sampled when water temperature ranged from 25.5-44.5 C ($\bar{x}$ = 28.7 C). All aquatic invertebrates were limited in numbers and density when temperature exceeded the lower and upper ranges of 10.0-38.0 C.

(2625) CORDULIA, Cahier d'amateurs. Published by the Collège Bourget, Rigaud, Quebec, Canada; edited by R. Hutchinson & A. Larochelle, Collège Bourget. Vol. 5, No. 2 (June, 1979). (French and Engl., most larger papers with s's. in Engl.). — Annual subscription for 1979 (4 issues): Can. $ 4.— (Canada, USA), Can. $ 5.— (others). — (c/o *R. Hutchinson, Collège Bourget, C.P. 1000, Rigaud, Que., J0P 1P0, CA*).
The issue has appeared on the occasion of the Fifth International Symposium of Odonatology, Montreal, Aug. 5-11, 1979. (Cf. *OA* No. 2548). — Contents: *Hutchinson, R.*: Liste des publications traitant de la faune odonatologique du Québec de 1871 à 1979) [253 titles] (21-33); — *Larochelle, A.*: Observations sur l'accouplement et la ponte de 22 espèces d'Odonates du Québec (34-37); — *Legault, J.* (62 Place Le Roy, Repentigny, Que., J6A 1P8, CA): Dénombrement des Odonates du marécage du Bout-De-L'Ile, Ile de Montréal, Québec (38); — Anonymous: Notulae Odonatologicae [Fr. & Engl.] (38); — *Legault, J.*: Liste préliminaire des Odonates de l'Etang Streit à Philipsburg, Comté de Missisquoi, sud du Québec (39); — Liste des Odonates capturés à Frelighsburg (Missisquoi), Québec (40); — Capture d'Odonates à l'Ile-aux-Noix (Saint-Jean), Québec (40); — récolte d'Odonates à Saint-Côme (40).

(2626) CRINGAN, M.S., 1979. Dragonflies and damselflies of McKinney Marsh. Emporia St. Univ. Res. Stud. 27 (3): 1-28. — (*Div. Environmental Health, Topeka, Kansas, USA*; — for reprints apply to: *Dr. C.W. Prophet, Div. Biol. Sci., Emporia St. Univ., 1200 Commercial Str., Emporia, Kansas 66801, USA*).
28 spp. are reported from McKinney Marsh, Lyon Co., Kansas, USA, 11 of which were also taken in larval stage. Occurrence periods are reported for all adults, and the oviposition periods for 13 spp. Relative abundance of adults is estimated from the median week of occurrence. In addition, 62 taxa of aquatic macroinvertebrates were found in association with larvae of the 11 odon. spp.

(2627) CRUMPTON, J., 1979. Aspects of the biology of Xanthocnemis zealandica and Austrolestes colensonis (Odonata: Zygoptera) at three ponds in the South Island, New Zealand. N.Z.Jl Zool. 6: 285-297. — (*Dept. Zool., Univ. Canterbury, Christchurch-1, NZ*).
The 2 spp. were univoltine and emerged asynchronously. At Woodend Pond, 1971, larval growth was devided into cohorts by the drying up of some larval habitats in summer and autumn. Larval development was continuous in the other (permanent) habitats. A. colensonis differed from X. zealandica in its oviposition sites and its ability to survive the winter in the egg stage. There were differences in the larval food of the 2 spp. reflecting their differing agility. (Author).

(2628) DICKEHUTH, R., 1979. Das naturschutzgebiet "Heidesumpf and der Strothe", und sein Insektenfauna. 2. überarbeitete Auflage. Machradt , Bad Lippspringe. 16 pp. — (*Arminiuspark 3-5, D-4792 Bad Lippspringe, GFR*).

This is the second revised edition of the pamphlet listed in *OA* No. 1835.

(2629) DUMONT, H., 1979. Limnologie van Sahara en Sahel: bijdrage tot een beter begrip van de klimaatsveranderingen van het laat-Pleistoceen en Holoceen. [Limnology of Sahara and the Sahel: a contribution to a better understanding of the climatic changes during the Late Pleistocene and Holocene]. Fac. Sci., Univ. Ghent, Gent. 557 pp. (Dutch). — (*Inst. Zool., Univ. Ghent, Ledeganckstr. 35, B-9000 Gent*).
This outstanding volume is organized into the following main chapters: "Introduction", "Sahara and Sahel: physical aspects", "Aquatic biogeography of Sahara", "Distributional patterns", "Some distributional factors of the local nature", "Discussion: reconstruction of the climate puzzle", and "Epilogue". It is understandable that a considerable portion of the monograph by one of the greatest and most prolific odonatologists of our time is devoted to the Odon. (incl. pp. 331-388, maps 154-177). During his numerous expeditions throughout Sahara, the Sahel, northern Africa, the Middle East and Asia Minor (not mentioning his first-hand knowledge of the odon. fauna of the mediterranean Europe, tropical Africa and of the considerable portions of southwestern Asia) the author has gathered together an enormous wealth of material and observations. These, coupled with critical and thorough considerations of the large, but scattered literature on the subject, have enabled him to produce a long-needed critical account of the odon. fauna of the region. It goes without saying that the 37 spp., known from this area, are discussed in great detail and also from points of approach not hitherto used in odonatology. This, and the distributional maps of all taxa concerned, will make the book, for a long time to come, a first class reference work on the odon. fauna of Sahara and the adjacent territories. — (***Abstracter's note***: The methods of analysis and biogeographic synthesis, used throughout the book, are certainly entirely new in the field of odonatology, bringing odonate taxonomy on a level that has been hardly practised by any taxonomist. The author has once again shown his qualities as a taxonomist and his abilities to handle critically and to a well-defined purpose his large knowledge of terrestrial and aquatic biology, geology and numerous other disciplines. His experience in taxonomy, ecology and biogeography of a number of other invertebrate groups, notably of Cnidaria, Nematoda, Rotifera, Cladocera and Copepoda, was a great advantage in the evaluation and generalization of the odonatological data. — Professor Dumont has to be cordially congratulated with the production of this monograph, which is not only indespensable, but also typographically nicely produced volume, and we are happy to learn that an English edition is scheduled to appear soon.

(2630) EISELER, B., 1979. Ökologische Untersuchungen zur standörtlichen Differenzierung der Libellenfauna im Schweinfurter Trockengebiet mit semiquantitativen Erfassungen. M.Sc.thesis, Univ. of Bonn, III+179 pp., 54 figs., 61 tables incl. — (*Zweifaller Str. 10, D-5106 Roetgen-Mulartshütte, GFR*).
This is an extensive study of the dragonfly fauna composition in an area near Schweinfurt, Northern Bavaria, GFR. The area, immediately neighbouring the southern banks of the river Main, comprises waters of various ecological characters, e.g. backwaters of the Main, sand and gravel pits of various ages, fish-ponds and some creeks. 21 water bodies were selected and their ecological conditions characterized by recording the state of vegetation, microclimatic data and a wide scope of waterchemical data during the seasons of 1977 and 1978. At the same time dragonflies were collected at these sites. The composition of the dragonfly cenoses is discussed in detail referring to the ecological conditions of the respective habitat, but no distinct correlation between water chemism and the composition of the cenoses could be found. 31 autochthonous spp. were recorded from this area. Among these, Lestes barbarus,

Ischnura pumilio, Gomphus pulchellus and Orthetrum brunneum are worth mentioning. The dragonfly fauna of the region immediately south of the river Main in its middle and upper section has been hitherto only poorly known from a few antiquated papers. So this detailed and thorough up-to-date study is a valuable contribution to faunistic research.

(2631) FONTAINE, R. & J.-G. PILON, 1979. Étude de la croissance postembryonnaire chez Enallagma ebrium (Hagen) (Zygoptera: Coenagrionidae). Ann. Soc. ent. Québec 24 (2): 85-105. (With Engl. s.). — (*Dép. Sci. biol., Univ. Montreal, C.P. 6128, Montreal, Que. H3C 3J7, CA*).
Data obtained from laboratory rearings were used to analyse variation occurring during larval growth of E. ebrium. Intrastage variation was investigated with allometric equations along with the evidence on the presence of distinct growth phases.

(2632) FRANKE, U., 1979. Libellen im Dürbheimer Moos. Ein Beitrag zur Odonatenfauna der Schwäbischen Alb. Stuttgarter Beitr. Naturk. (A) 1979 (327): 1-9. (With Engl. s.). — (*Teggingerstr. 1, D-7760 Rudolfzell, GFR*).
An annotated list is given of the odon. fauna (17 spp.) of a low moor in the southwestern Swabian Alb, German Federal Republic. The fauna combines elements of a pond-coenosis with those of a mesotrophic moor.

(2633) FRANKE, U., 1979. Bildbestimmungsschlüssel mitteleuropäischer Libellen-Larven (Insecta: Odonata). Stuttgarter Beitr. Naturk., (A) 1979 (333): 1-17. (With Engl. s.). — (*Teggingerstr. 1, D-7760 Radolfzell, GFR*).
A pictorial key, based on the last instar, is given for 77 spp. of Central Europe.

(2634) FRIEDRICH, E., 1979. Faunistisch-ökologische Mitteilungen. 1. (Odonata: Zygoptera). — Coenagrion hastulatum (Charpentier) neu für Rheinland-Pfalz. Pfälzer Heimat 30 (1): 11. — (*An den Hofwiesen 6, D-6741 Ilbesheim, GFR*).
C. hastulatum is recorded (from 2 localities) for the first time for the federal state of Rheinland-Pfalz, German Federal Republic.

(2635) FRITH, D.W., 1979. A twelve month study of insect abundance and composition at various localities on Aldabra Atoll. Phil. Trans. R. Soc. Lond. (B) 286 (1011): 119-126, 1 microfiche separately. — (*"Prionodura", Paluma, via Townsville, Queensland 4810, AU*).
The atoll Aldabra, Seychelles, is situated in the western Indian Ocean, and is distinguished primarily by its population of 150.000 giant tortoises. No other terrestrial ecosystem is similarly dominated by a cold-blooded reptile. Insect populations were sampled at regular intervals, by using Heath light traps, throughout a 12 month period at various localities. The odon. fauna of the atoll has been published by R.A.A. Blackman & E.C.G. Pinhey (1967, Arnoldia 3 [12]: 1-38). Owing to their sparsity the Odon. are not discussed in the text, though they are listed in the microfiche "appendix". — (*Abstracter's note*: The circumstance that the Editors have decided to issue the tables in the microfiche form only, is most unfortunate and greatly inconvenient both to librarians and to readers).

(2636) GAMBLES, R.M., 1979. West African species of Macromia (Odonata: Corduliidae) belonging to the picta and sophia groups. Syst. Ent. 4: 389-407. — (*Windings, Whitchurch Hill, Reading RG8 7NU, UK*).
M. amicorum sp.n., discovered almost simultaneously by 4 different workers in Nigeria and the Ivory Coast, is described (♂ holotype: Bandama Riv. nr., Korhogo, Ivory Coast, Apr. 1971; ♀ and numerous paratypes of both sexes: type locality and its general area, Assob Falls and Kagoro in Nigeria). It is compared with the closely related M. flavimitella which is distributed from Uganda to the Central African Republic. The 2 spp. appear to have been confused in collections with the common and widely spread M. picta. — The members

of the sophia group, and other large dark spp. easily confused with them, are reviewed, type material compared, and new synonymy established. The spp. sophia and insignis, regarded as synonyms for nearly a century, are shown to be distinct, and a key to the spp. of the group is provided. (Author).

(2637) GIESEN, T.G. & M.H.J. GEURTS, 1979. Libellen in de 'Zompe'. [Dragonflies in the 'Zompe']. Natura, Amsterdam 76 (8): 222-225. (Dutch). — (*Van Roggenstr. 8, NL.-7011 GE Gaanderen*).
The odon. fauna (12 spp.) of this marshy Forest Reserve (surface 70 ha) near the city of Doetinchem, the Netherlands, is discussed. Of particular interest is the (uncertain) sight record of Cordulegaster boltoni.

(2638) GOYVAERTS, P., 1979. Cordulia aenea (Odonata: Corduliidae) a new county record. Ir. Nat. J. 19 (9): 329. — (*Kenmare Rd., Glengarriff, Co. Cork, Eire*).
C. aenea is reported as new for Co. Cork, Ireland.

(2639) INOUE, K., 1979. [Life history of Stylurus annulatus]. Nature and Insects 14 (6): 30-36. (Japanese). — (*5-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA*).
The larval habitat in the canal of the Uji Hydropower Plant, Kansai, Japan, is described along with a brief account of its odon. fauna. The main portion of the paper deals with various aspects of emergence, but substantial notes on adult behaviour, oviposition and egg morphology and hatching are also provided. S. annulatus occurs in the continental China and Korea, and has a very local distribution in Japan. With the recent construction of the Amagase Dam, one of its largest Japanese populations has been destroyed. — (*Abstracter's note*: Copies of unabridged Engl. version of the paper are available from the author or from the Editors of Odonatologica).

(2640) KAISER, H., 1979. The dynamics of populations as result of the properties of individual animals. Fortschr. Zool. 25 (2/3): 109-136. — (*Lehrstuhl Ökologie, Univ. Aachen, Kopernikusstr. 16, D-5100 Aachen, GFR*).
A new approach to the quantification of population processes is proposed. It focusses on individual animals as description units and is therefore called "individuals approach". Models based on this approach are compared with systems models for two examples: The control of density in dragonflies at the mating place and the population dynamics of rotifers in laboratory experiments. An individuals model gives more realistic and detailed information about what is going on in the population, and it is powerful in forecasting. The individuals approach is capable of deriving the properties of the whole population from a description of the physiological and behavioural properties of individual animals. To get a view of the properties of the whole population it should be complemented by a systems description. (Author).

(2641) KUZNECOVA, V.G., 1979. Hromosomy golokineticheskogo tipa i ih rasprostranenie u nasekomyh i drugih bespozvonochnyh zhivotnyh. [The holokinetic chromosomes and their distribution in insects and invertebrates]. *In*: L.A. Chubareva, [Ed.], Karyosystematics of the invertebrate animals, pp. 5-19, 116 (abstract), Zool. Inst., USSR Acad Sci., Leningrad. (Russian). — (*Dept. Karyosyst. & Population Genet., Zool. Inst., USSR Acad. Sci., Universitetskaya nab. 1, USSR-199164 Leningrad-V*).
It is stated, on the basis of older literature, that "it is possible that some Odon." possess holokinetic chromosomes.

(2642) MARTENS, K., 1979. Enkele aspekten van de populatiebiologie bij waterjuffers (Odonata-Zygoptera). [Some aspects of the damselfly population biology (Odonata-Zygoptera)]. Tijdschr. Jeugd en Wetensch. kathol. Onderwijs 1979 (55): 4-7. (Dutch). — (*Mastplein 19, B-2710 Hoboken*).
A brief general review of some aspects of the subject, written on the level of and directed at the young undergraduate dragonfly

observers.

(2643) MARTENS, K., 1979. Interessante libellenwaarnemingen. [Interesting dragonfly observations]. Phegea 7 (4): 88. (Dutch). — (*Mastplein 19, B-2710 Hoboken*).
Lestes barbarus has not been noticed in Belgium since 1911. Here a ♂ is brought on record, taken at the Kalmthoutse Heide, Sept. 22, 1970. Onychogomphus forcipatus is also a rare and local sp. in the Belgian fauna, hence the 2 records given in this note are of some interest (Alle-sur-Semois and Botassart).

(2644) MAY, M.L., 1979. Lista preliminar de nombre y clave para identificar los Odonata (caballitos) de la Isla de Barro Colorado. Editorial Universitaria, Panamá & Smithsonian Tropical Research Institute (Cuadros de Ciencias, No 1), 50 pp., 2 pls. excl. (Imprenta Universitaria, Panamá). — (*Dept. Ent., Cook Coll., Rutgers Univ., New Brunswick, New Jersey 08903, USA*).
This slim volume is a welcome addition to the odon. literature, since it is the first booklet on the Odon. of a South-America region, that is more or less commercially published, directed at a non-specialist readership and written in a national language. The brief introduction and the general chapter on the terminology of the genital structures are followed by a concise account of the regional fauna (Isla de Barro Colorado, Republic of Panamá) and by a (simplified) key to the adults. The use of the latter is facilitated by a brief (and illustrated) section on the odon. venational characters. A list of the hitherto recorded spp. in the Canal Zone is also provided. The work is mainly based on author's great and first-hand knowledge of the Panamanian dragonflies.

(2645) MILLER, W.H., 1979. Ocular optical filtering. *In*: H. Autrum, [Ed.], Handbook of sensory physiology, Vol. 7, Pt. 6 A, pp. 69-143. Springer, Berlin. — (*Dept. Ophthalmol. & Vis. Sci., Yale Univ. Sch. Med., New Haven, Conn. 06510, USA*).
This review paper on the optical filters in the eyes of vertebrates and invertebrates contains some information on the eyes of dragonflies. — Bernhard and Miller observed corneal nipples on the eyes of many species of insects. These structure can serve as anti-reflection coatings if their are more than 50 nm high. The highest nipples, which tend to occur in advanced orders, are probably good for camouflage or nocturnal vision. The species of dragonflies and damselflies that were studied all had corneal nipples that were less than 50 nm high. — Snyder predicts that only those animals that move at low angular velocity in bright sunlight will have enough illumination to provide sufficient contrast sensitivity so that they can profit by having their foveal receptors spaced near the diffraction limit. He argues that fast angular motion, such as is seen in Musca, reduces the light available per receptor and is therefore not compatible with high visual acuity. Horridge and Sherk confirmed this prediction by showing that certain diurnal locusts, dragonflies, and wasps come close to the diffraction limit. — (Cf. *OA* Nos. 1893, 1929, 2024, 2091, 2092).

(2646) MOLNAR, D.R. & R.J. LAVIGNE, 1979. The Odonata of Wyoming (dragonflies and damselflies). Sci. Monogr. Agric. Exp. Stn Univ. Wyoming 37: 1-142. — (*Dept. Ent., Plant Sci. Div., P.O. Box 3354, Univ. Stn, Univ. Wyoming, Laramie, Wyoming 82071, USA*).
This is a distributional atlas of the odon. fauna of Wyoming, USA (77 spp.), based primarily on own intensive collecting (2 yrs) in a wide variety of habitats throughout the state, but also including published faunistic records. The known distribution of each sp. is plotted on a map, and the locality data, incl. those from literature, are given in great detail (locality name and position, altitude, collection date, ecological notes). — (*Abstracter's note*: There are but a few similar works on the odon. fauna of North America, whereas atlases are regularly appearing on the European fauna, mostly in the framework of the European Invertebrate Survey

Project. The present book essentially and favourably differs from the E.I.S. publications by presenting the complete regional bibliography and by listing detailed locality and ecological data. Needless to say, this information greatly enhances the value of the work, which should serve as a model for the preparation of publications of this kind).

(2647) NEVEU, A., L. LAPCHIN & J.C. VIGNES, 1979. Le macrobenthos de la basse Nivelle, petit fleuve côtier des Pyrénées-Atlantiques. Ann. Zool. Ecol. anim. 11 (1): 85-111. (With Engl. s.). — (*Lab. Ecol. hydrobiol., 65 rue de Saint-Brieuc, F-35042 Rennes Cedex*).
The investigation of the Nivelle river (Pays Basque) in the Atlantic Pyrenees, France, has shown an important development of certain groups of Ephemeroptera, Diptera and Trichoptera. Odon. (Gomphidae) account for only 0.51% of the biomass.

(2648) PEZALLA, V.M., 1979. Behavioral ecology of dragonfly Libellula pulchella Drury (Odonata: Anisoptera). Am. Midl. nat. 102 (1): 1-22. — (*1143 South Highland, Oak Park, Ill. 60304, USA*).
The observations were carried out at 4 ponds in Minnesota, USA. ♂♂ are highly aggressive and defend a particular portion of the breeding site from all other ♂♂. Territories are established only in areas of the pond which have water free of surface vegetation, a sunny exposure and perch sites offering an unobstructed view of the territory. ♂♂ normally remain in the same territory throughout the day and are rarely displaced by other ♂♂. They are, however, seldom present at the site for more than 1 day. Territorial defense consists of patrol, pursuit and circle flights and physical attacks. The response of a territorial ♂ to an intruder depends, largely on its behaviour. Non-territorial ♂♂ are more likely to evoke intense aggression. A number of other odon. spp., particularly those similar to L. pulchella in size and behaviour, are also the objects of aggression. At high population densities the frequency of aggressive interactions increases and territory size decreases. High densities also result in increased interference with mating. Interference is reduced to some extent by the brevity of copulation and by ♂ guarding and ♀ avoidance behaviour. Certain areas of the breeding site are more attractive to ♀♀, and ♂ with territories there achieve the most matings. A number of abiotic factors including time of year, time of day, light intensity and temperature have a strong influence on the pattern of ♂ and ♀ occurrence at the pond. Peaks in abundance of both sexes occur within similar ranges of temperature and light intensity. The temporal peak in ♀ abundance is shorter than that of ♂♂. Time of day and light intensity have a significant effect on abundance only within the range of temperature favourable for breeding activity. Beyond this range few dragonflies appear at the pond. Even when temperatures are favourable, a large proportion of a ♂'s time is spent thermoregulating By varying its perching posture in relation to the sun, this dragonfly is able to maintain thoracic temperatures within the range necessary for reproductive behaviour and thus achieves a certain degree of independence from fluctuation in the ambient temperature. (Author). (cf. also *OA* No. 2087).

(2649) PINHEY, E., 1979. Odonata. *In*: J. Ledger, [Ed.], (S.H. Skaife's) African insect life (revised edn). Struik, Cape Town — Johannesburg, pp. 35-41, figs. 41-48, col. pls. 26-29. — (*Natn. Mus., P.O. Box 240, Bulawayo, Rhodesia*).
A general introduction is given to dragonflies of southern Africa (i.e. South of the Zambezi Riv.), with a list of 7 families under Zygoptera, 4 under Anisoptera, and short notes on each family, along with a few references to Corbet and Pinhey. (Author). — (*Abstracter's note*: In a letter to the Abstracter, dated Oct. 22, 1979, the following additional information has been supplied by Dr. Pinhey: "In March 1978 the editor of the new edition, Dr. J. Ledger, asked various specialists to recommend changes from the 1953 edn [S.H. Skaife, African insect life, Longmans Green,

London etc.; Odon.: Chapt. 9, pp. 82-90], to bring it up-to-date without too much alteration of Skaife's style. I was requested to do the dragonflies and since Skaife's text and classification were inaccurate and inadequate, it required a complete overhaul of this section. I submitted this in the form of notes. I was not concerned with the new illustrations for this chapter [i.e. Chapter 3; photographs by A. Bannister]. They include drawings of nymphs, half-tone photos of a few unnamed dragonflies to show resting positions, tandem linkage and adult emergence. Colour plates 26-29 show: (26) an unnamed Trithemis sp. (= arteriosa), (27) 'Brachythemis lacustris' (is really Trithemis kirbyi ardens, ♂), (28) Enallagma glaucum in tandem (probably correct sp.), and (29) Anax imperator").

(2650) ROBERTSON, H.M., 1979. Courtship in the Chlorocyphidae (Odonata). Abstr. Pap. Symp. Anim. Communication, Zool. Soc. Southern Afr., Cape Town, pp. 32-33. — (*Author's address unknown*).
[Verbatim text:] Platycypha caligata is a zygopteran with some structural similarities to the Anisoptera. In colour it is a highly sexually dimorphic sp., whose mating activities take place at mountain streams for a short period of sunshine over midday. The ♂♂ are territorial, centering their territories around possible oviposition sites (sticks and roots). The territorial behaviour is very complex, involving a characteristic "parallel dance". A ♂ attracts a ♀ to this oviposition site by a characteristic flight involving display of his blue abdomen, and there courts her using the white fronts of his expanded tibiae. She appears to test the suitability of the site by making oviposition movements, and may then reject or accept the site and so also the ♂. Usually only territorial ♂♂ mate and the site is always involved in the courtship. The evolution of this complex courtship and that of the ♂ territoriality may have been linked. This example also suggests alterntive explanations to those usually invoked for the function of "female coyness".

(2651) SAND-KUBOW, M., 1979. Mit Teufelsnadel und Augenstecher sind Gewässer und Seen in Ordnung. Glocke, Oelde 99 (251): 1 p. (issue of Oct. 28). — (c/o *the Editors, E. Holterdorf, Holterdorfer Str. 4, D-474 Oelde, GFR*).
An extensive interview, in a local Westfalian daily, with Dr. R. Rudolph, Münster, on his odonatological research work. The article was published on the occasion of the First Meeting of German Odonatologists (Münster, Oct. 6, 1979), organized by Dr. Rudolph on behalf of the International Odonatological Society. A portrait is also provided. (Cf. also *OA* No. 2652).

(2652) SCHEMANN, W., 1979. Internationale Tagung der Libellenforscher in Münster. Westfälische Nachrichten, Münster 1979 (174): 1 p. (issue of July 30). — (c/o *the Editors, Westfälische Nachrichten, Soesterstr. 11, D-44 Münster, GFR*).
This is a daily's interview with Dr. R. Rudolph, a prominent German odonatologist, published on the occasion of the preparatory work for the First Meeting of German Odonatologists (Münster, Oct. 6, 1979), organized by Dr. Rudolph on behalf of the International Odonatological Society (SIO). The article contains extensive references to Dr. Rudolph's research program in the fields of odon. physiology, ecology and local faunistics, as well as his portrait is also provided. (Cf. also *OA* No. 2651).

(2653) SCHNEIDER, W., 1979. Ergebnisse der Reisen des R. Kinzelbach in die Länder des Nahen Ostens. Insecta: Odonata. Systematische Liste der in den Jahren 1977, 1978 und 1979 gesammelten Arten. Inst. Zool., Johannes-Gutenberg Univ., Mainz. II+30 pp. — (*Inst. Zool., Johannes-Gutenberg Univ., Saarstr. 21, Postfach 3980, D-6500 Mainz, GFR*).
An annotated list is given of 24 spp., collected 1977-1979 in Turkey, Syria and Jordan. Structural characters are illustrated of Coenagrion puella syriaca (Morton), Pseudagrion kersteni (Gerst.) Orthetrum coerulescens (Fabr.) and O. anceps (Schnei-

der).

(2654) SNYDER, A.W., 1979. Physics of vision in compound eyes. *In*: H. Autrum, [Ed.], Handbook of sensory physiology, Vol. 7, Pt. 6A, pp. 225-313. Springer, Berlin. — (*Inst. Adv. Stud., Res. Sch. Biol. Sci., Austr. Natn. Univ., Canberra, A.C.T. 2600, AU*).
Eye design is characterized by the parameter p (=facet diameter multiplied by the interommatidial angle) and by the acceptance angle of the ommatidium. The most suitable value of the parameter depends upon the intensity of the light as well as upon the angular velocity of the animal. It is advantageous for an animal to have its ommatidia spaced at the limit set by diffraction, i.e., p=0.29 μm, only if it is active in bright light and relatively stationary while examining objects, otherwise p should be larger. Although no known compound eye has an eye parameter p as small as 0.29 μm, many foveas of bright-light locusts, dragonflies, and wasps closely approach it. An increase in the angular velocity of an animal is equivalent to a decrease in light intensity. An animal that flies predominantly in linear motion along its longitudinal axis, such as the dragonfly, has larger interommatidial angles along the horizontal axis than along the vertical axis. — The absolute (or anatomic) resolving power of an animal with its compound eyes is set by the interommatidial angle and not by p. Animals with the smallest interommatidial angles have the highest resolving power. The larger eyes typically have smaller interommatidial angles. The interommatidial angles of dragonflies tend to be smallest in the central (or flatter) region of the eye. The highest resolving power achieved in vertebrate eyes (three times that of man in eagles and falcons) is about 100 fold that in those compound eyes with the highest anatomic resolving power, e.g. the dragonfly Aeshna palmata with interommatidial angles of 0.24°. The smallest hummingbirds have a head size equal to the head of large dragonflies, but their resolving power is ten times greater. — Curiously, desert hawks, eagles, and probably man take significantly less advantage of their potential optics (p = 0.5 μm) than wasps and dragonflies (p = 0.31 μm). Comparing a compound eye with a vertebrate eye of the same p value, the vertebrate eye suffers a greater loss in its high frequency resolving power for a given decrease in luminance. — (Cf. *OA* Nos. 1893, 2024, 2091, 2092).

(2655) STOBBE, H., 1979. DJN Libellenschlüssel. Bestimmungsschlüssel für die Libellen der Bundesrepublik Deutschland. Deutscher Jugendbund für Naturbeobachtung, Hamburg. II+33 pp. — (Author's address: *Ahrensburger Platz 4, D-2000 Hamburg-67, GFR*; — Publishers' address: *Buchenstr. 18, D-2000 Hamburg-60, GFR*).
This is a revised and enlarged edition of the volume listed in *OA* No. 1482. New are the chapters on nature conservation (including a list of 12 in the German Federal Republic endangered spp. to be included in the 1980 Nature Conservation Bill), collecting, rearing, and on the field work. The bibliographic list is also considerably longer than in the previous edition. — (*Abstracter's note*: This excellent and concisely written key should be warmly recommended to all regional workers. Copies should be ordered from the Publishers, not from the Author).

(2656) STONE, S.L. & R.C. CHAPPELL, 1979. Receptor off-response modified by synaptic blocking agents. Invest. Ophthalmol. Visual Sci. 18 (4) (Suppl.): 32. — (*Hunter Coll., City Univ. New York, New York, N.Y., USA*).
Both synaptic anatomy of the retina of the dragonfly median ocellus and the effect of drugs on the photoresponse of its second-order neurons suggest that there is feedback onto photoreceptor terminals. If so, the same drugs might be expected to alter the oscillatory off response which is a unique characteristic of these receptors. — The authors found that the prominent off oscillations of intracellularly recorded receptor responses are modified by application of various pharmacologic agents. Responses to

drugs were similar in preparations with intact or cut ocellar nerves. Curare, eserine, and picrotoxin increased the off response duration. In addition, curare could block the off oscillation completely, while eserine and picrotoxin tended to increase the amplitude of the off hyperpolarization. — Large, spontaneous dark oscillations appeared regularly during or after drug perfusion in intact nerve preparations, possibly reflecting a disruption of the dark equilibrium of a feedback loop. Similar but more pronounced oscillations were seeen in cut nerve preparations even before drugs. The amplitude, frequency, and duration of dark oscillations seem dependent on flash intensities and prior history of the cell. They were modified by the same drugs which modify the normal off oscillation and were correlated with the appearance of a large, sustained hyperpolarization following bright test flashes. (Authors).

(2657) TARANOVA, V.M., 1979. Composition of the flora and fauna of the Volga. Order Odonata. *In*: P.D. Mordukhai-Boltovskoi, [Ed.], The river Volga and its life. Junk, the Hague, pp. [381], 436-437, 440-441. — (*Inst. Inland Water Biol., USSR Acad. Sci., USSR-152742 Borok, Nekouz, Yaroslavl*).
This is an English edition of the volume listed in *OA* No. 2437. 62 odon. spp. are recorded in larval or adult stage. Out of these, 44 are known from the Upper and 35 from the Lower Volga. The fauna of the Middle Volga is but little known. A list of spp. is given in a table. Gomphidae, Corduliidae and Libellulidae are bottom dwellers, while the larvae of Epallage fatime inhabit the stony floor of the sections with considerable water velocity.

(2658) THEISCHINGER, G. & J.A.L. WATSON, 1979. Odonata from Carnarvon Gorge, Queensland. Aust. ent. Mag. 6 (2): 25-28. — (*Biol. Abt., Oberoesterreichisches Landesmus., Museumstr. 14, A-4010 Linz*).
27 spp. are known from Carnarvon Gorge, Queensland, Australia; they constitute an outlier of the fauna of southeastern Queensland and northeastern New South Wales. 14 spp. are stream-dwellers, and all but one of these have southern affinities. The gorge is the northernmost known locality of 2 of these southern spp. 6 spp. occur in the tributaries but not in the main gorge; 2 of these are known only from the Carnarvon Gorge area, and the other 4 show minor differences from their counterparts elsewhere in Australia. (Authors).

(2659) [TORENBEEK, R.], 1979. Verslag libellen onderzoek Meentweg. [Report on the dragonfly observations at the Meentweg]. Saxicola, Bussum 1979 (Oct.): 6-11. (Dutch). — (*Van 't Hoffweg 28, Bussum, NL*).
Observations are recorded on 12 spp., gathered from early June to late Aug. 1979 at the locality nr Naarden, Noord Holland prov., the Netherlands. Of particular interest is the evidence on the nearly total isolation in time of the adult seasons of Erythromma najas and E. viridulum.

(2660) TREMBLAY, P., Quelques récoltes d'Odonates au Québec de 1976 à 1978. Bull. Invent. Ins. Québec 1 (3): 47-48. — (*6437 Louis-Dupire, Montreal, Que. H1M 1A7, CA*).
An annotated list is given of 23 spp. collected 1976-1978 at various localities in Quebec, Canada.

(2661) VAN TOL, J., 1979. Computerprogrammatuur voor het bewerken van gegevens van EIS-Nederland. [The computer programming for the treatment of the data of the Netherlands section of the European Invertebrate Survey]. Nieuwsbr. Europ. Invert. Surv. Nederland 1979 (7): 3-8. (Dutch). — (*Rijskmus. Nat. Hist., Raamsteeg 2, Leiden, NL*).
The article contains a facsimile of the punch form designed for the use in the inventarisation of the odon. distribution in the Netherlands (available from the author), and a graph showing the percentage abundance of Calopteryx splendens records (in terms of the % of the total odon. records in the Netherlands), given for 10-yrs periods from 1890 to 1980 excl. Since 1910-1920 this sp. is

on the decline, the lowest abundance being that of the 1970-1980 period. The graph is based on the material available in the Dutch collections.

(2662) WAGEMANN, E., 1979. Faunistisch-ökologische Mitteilungen. 2. (Odonata: Lestidae) — Lestes barbarus (F.) neu für die Südpfalz. Massenvorkommen 1978. Pfälzer Heimat 30 (2): 41-42. — (*Hartmannstr. 4, D-674 Landau, GFR*).
A massive appearance of L. barbarus (June 20-30, 1978) in the area between Knittelsheim and Bellheim, southern Pfalz, German Federal Republic, is reported. Some of the specimens were teneral. It is suggested that the phenomenon was conditioned by the circumstance that the breeding sites (small pools) did not dry out in the late summer of 1978.

(2663) WAGER, V.A., 1979. The amazing story of dragonflies. Natal Mercury 1979 (Oct. 13): 6. — (*Ocean View Hotel, 354 Musgrave Rd., Durban, Natal, Rep. Sth. Afr.*).
The article seems to be largely a repeat of that listed in *OA* No. 1935. The insert fig. of larva in photo appears badly touched up.

(2664) WESTFALL, M.J., Jr. & K.J. TENNESSEN, 1979. Taxonomic clarification within the genus Dromogomphus Selys (Odonata: Gomphidae). Fla Ent. 62 (3): 266-273. — (*Dept. Zool., Univ. Florida, Gainesville, Fla 32611, USA*).
Keys and illustrations are given for the separation of adults and larvae of D. armatus Sel., D. spinosus Sel. and D. spoliatus (Hag.). The present known distributions and flight dates are listed. (Authors).

(2665) WITTIG, R., 1979. Wasser, Lösungsmittel, Lebensraum und Ökofaktor. Akademische Verlagsanstalt, Wiesbaden. VIII+184 pp., 103 figs. incl. — Price: DM 24,80. — (Author's address: *Inst. Geographie, Univ. Münster, Robert-Koch-Str. 28, D-44 Münster, GFR*).
An integrated and exhaustive view of the physical and chemical properties of water and its role in biological systems are presented. A few notes on the physiology of dragonfly larvae, cited from the literature, are included.