

## ODONATOLOGICAL ABSTRACTS

1972

- (1349) HIURA, I., 1972. [Problems of *Mnais strigata*]. Kumamoto Konchu-dokokaiho (J. Kumamoto Entomologists) 40: 1-16. (Japanese). — (*Osaka Nat. Hist. Mus., Nagai Park, Higashinagai-cho, Higashisumiyoshiku, Osaka, 546, JA*).

A classification of the complicated forms of the Japanese *Mnais* is proposed. These are considered to belong to 2 distinct spp., *M. strigata* and *M. nawai*. The latter has orange-winged ♂♂ and lightly orange-winged ♀♀, the larvae possess longer lateral gills, with pointed tips. *M. strigata*, on the other hand, is characterized by several forms of ♂♂ and hyaline-winged ♀♀, with larvae having shorter lateral gills, with rounded tips. It is divided into 6 races. The ♂♂ of 5 of these (Tohoku, Bohsoh, Nankai, Saikai and Chugoku) appear in coloured- and hyaline-winged forms, while the ♂♂ of the Setouchi race are hyaline winged only. The range of the Setouchi race is almost equal to that of *M. nawai*, and coincides with the area covered in the Pliocene by the huge Ko-setonaikai Lake (or inland sea). (Cf. also *OA* No. 1298).

- (1350) HIURA, I., 1972. [Contribution to the knowledge of *Mnais strigata* in Kyushu]. Kumamoto Konchu-dokokaiho 40: 17-24. (Japanese). — (*Osaka Nat. Hist. Mus., Nagai Park, Higashinagai-cho, Higashisumiyoshiku, Osaka, 546, JA*).

The Saikai race of *M. strigata* is found in the SW parts of Kyushu, Japan, while the Chugoku and the Setouchi races and *M. nawai* occur in the NE areas of the island. The known distribution is mapped.

- (1351) SAHNI, D.N., 1972. Studies on the Odonata of Kumaon. Part I. Suborder Anisoptera, family Libellulidae. Bull. Ent., Delhi 11 (1) [1970]: 37-54. — (*Agric. Complex, Himachal Pradesh Univ., Palampur, Dist. Kangra, Himachal Pradesh, India*).

17 spp. from different parts of Kumaon, northwestern India, are redescribed and illustrated, including additional descriptive notes and figures of ♂ and/or ♀ genitalia of *Orthetrum fraseri* Sahni (1965. Indian J. Ent. 27: 294-295) and *Crocothemis indica* Sahni (1965. Indian J. Ent. 27: 298-301). (For Pts. II and III cf. *OA* Nos. 1013 and 927 respectively). — (*Abstracter's note: According to the date printed on the cover of the issue, Part II of this series appeared in 1972 and not in 1971 as indicated erroneously in OA No. 1013*).

1974

- (1352) KHAND, M., A. JABBAR & M.A.H. QADRI, 1974. Determination of lethal doses of Artemisia and taramira oils in comparison with DDT and lindane against full grown larvae of *Anopheles stephensi* Liston (Culicidae). Agric. Pak. 25 (1): 21-34. — (*Dept. Zool., Univ. Karachi, Karachi, Pakistan*).

Laboratory experiments were designed to determine the lethal doses of Artemisia and taramira (from *Eruca sativa*) oils, DDT and lindane against malaria mosquito larvae and to determine the susceptibility of some invertebrates economically important. The invertebrates were liberated in separate aquaria filled with emulsions of equal concentrations. The results obtained in 24 h

were calculated by Abbot's formula. A 100% mortality of *A. stephensi* was recorded with a 0.12% concentrated emulsion of lindane, which also caused from 50-100% annihilation of the test organisms (water beetle, water scorpion, giant water bug, dragonfly, earthworm and gastropod). A 0.014% concentrated emulsion of DDT caused 100% mortality of the mosquito larvae and 40% mortality to the other animals. A 0.016% emulsion of Artemisia oil caused 100% mortality of the mosquito larvae, but was harmless to the test organism. A 0.02% concentrated emulsion of taramira oil was 100% toxic to mosquito larvae and caused no harm to the other animals.

- (1353) KIME, J.B., 1974. Ecological relationships among three species of aeshnid dragonfly larvae (Odonata: Aeshnidae). Thesis, Univ. Washington. 154 pp. — (*Author's address unknown*). — Microfilm or xerox copy available (refer to Order No. 75-28, 376) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others).  
(Verbatim abstract from Diss. Abstr. 36, 6 [1975]: 2605-B): The phenology and ecological relationships of 3 spp. of aeshnid larvae, *Aeshna californica*, *A. multicolor*, and *Anax junius* were studied in the laboratory and in the field in central Washington desert ponds. All 3 spp. are univoltine in this region. *A. californica* is a spring sp., with a synchronized spring emergence and relatively synchronous larval development. *A. multicolor* is a summer sp., with an unsynchronized summer emergence and relatively unsynchronized larval development. *A. junius* larvae apparently develop in two cohorts, an early cohort of the offspring of adults that migrate to the area from southern North America in early spring, and a later cohort of the offspring of resident adults. — It was hypothesized that competition between the very similar spp. *A. californica* and *A. multicolor* (and

between the 2 cohorts of *A. junius*) is reduced by the temporal differentiation of their life histories. The result of this differentiation is that the larvae are almost always present in different size ranges. Evidence was collected in the laboratory and in the field that the type and size of prey taken as well as the diameter of the perch preferred are correlated with larval size, so that competition between larvae should be reduced if they are present in different size ranges. — While *A. californica* and *A. multicolor* larvae are very similar in behavior and appearance, *A. junius* larvae are much more active and often brilliantly colored. Laboratory experiments demonstrated that *A. junius* larvae will accept smaller perches, flee to open water more often, and are more active when hungry than *Aeshna* larvae. *A. junius* larvae also adopt a more conspicuous resting stance than *Aeshna* larvae, which cling tightly to their perches. It was hypothesized that *A. junius* larvae outcompete the *Aeshna* larvae in fishless ponds due to their greater activity and voracity, but that *Anax* larvae, due to their conspicuous behavior, are less successful in ponds with predatory fish. This hypothesis was supported by the relative abundance of the larvae at the 4 study sites: *A. junius* was the dominant sp. only at the two ponds which lacked fish. The importance of the mechanisms mentioned above in allowing the coexistence of odon. spp. with similar requirements was discussed in terms of this and other assemblages of odon. larvae. It was suggested that the existence of 2 temperate phenologies in Odon. ("spring species" and "summer species") may allow the coexistence of more spp., particularly in the larval stage where competition for food may be more severe than in the adult stage, where the principal advantages of temporally offset life histories have previously been thought to lie.

- (1354) KOFLER, A., 1974. Zur Tierwelt um Gut Dietrichstein bei Feldkirchen in Kärnten. *Carinthia* II 164 [84]: 313-331. — (*Maximilianstr. 15, A-9900 Lienz, Osttirol*).

The list of the fauna of the estate of Dietrichstein nr. Feldkirchen, Carinthia, Austria, includes also 8 odon. spp., of which *Orthetrum albistylum* has not been previously recorded from Carinthia.

- (1355) LIU, Chung, 1974. Studies on the metacercaria and adult of *Prosthogonimus anatinus* and *P. cuneatus* (Trematoda: Prosthogonimidae). *Acta zool. sin.* 20 (4): 395-408. (Chin., with Engl. s.). — (*Dept. Parasitol., Kirm Med. Inst., Changchun, China*).

Prosthogonimiasis is an important poultry disease, caused by trematodes belonging to the genus *Prosthogonimus*, which is widely distributed in China. *P. anatinus* and *P. cuneatus*, occurring in the Canton area, were studied. The 2nd intermediate hosts of *P. anatinus* are *Ictinogomphus rapax* and *I. clavatus* and those of *P. cuneatus* are *Orthetrum sabina*, *Brachythemis contaminata*, *Crocothemis servilia* and *I. rapax*. Experimental final hosts are chickens and ducklings. The morphology of the encysted and excysted metacercaria, young and fully matured adults was studied. The cysts and the adults of the 2 spp. can be easily differentiated. Observations of the adults of the 2 spp. at various ages indicate that variations occur in certain characters, such as the size and shape of the body, size and position of certain organs, etc. which were used by some earlier workers for diagnosis. Further observations also indicate that the following morphological features are quite constant and can be used as specific characters for identification: the ratio between the acetabulum and the oral sucker, the extent of the vitellaria and the characteristics of the egg. On the basis of these a revision of the genus is attempted. After re-grouping the known species of the genus, a total of at least 24 spp. are recognized as valid, of which 4 occur in China.

- (1356) MAY, M.L., 1974. Behavioral thermoregulation in Anisoptera. Thesis, Univ. Florida. 229 pp. — (*Dept. Physiol. & Biophysics, Univ. Illinois at Urbana-Champaign, 524 Burrill Hall, Urbana, Illinois 61801, USA*). — Microfilm or xerox copy available (refer

to Order No. 74-27, 881) at University Microfilms, Dissertation Copies, P.O.B. 1764, Ann Arbor, Michigan 48106, USA (for USA) and at University Microfilms Ltd., Tylers Green, High Wycombe, Buckinghamshire, UK (for Europe and others). (Verbatim abstract from *Diss. Abstr.* 35, 6 [1974]: 3113-B): Several anisopterans maintain their body temperature more constant than ambient temperature. Spp. that spend most of their active period on perches and make only short flights (perchers) thermoregulate heliothermally, primarily by means of postural adjustments and perch site selection. Even the smallest spp. probably obtain some thermal advantage from postural adjustments. Some of the spp. that fly continuously (fliers) are endothermic regulators during flight. They regulate body temperature largely by (1) controlling metabolic heat production by alternately using gliding or powered flight; (2) controlling heat loss by altering circulation between the thorax and abdomen. Small fliers are unable to regulate well because they are subject to high rates of convective heat loss. — Cooling constants, as defined by Newton's law of cooling, are related to thoracic weight by a negative power function over a wide size range. Cooling constants were higher in live dragonflies than in dead ones, a difference that was accentuated at high ambient temperatures. The high cooling constants probably result from increased rates of circulation at high temperatures. — Most fliers, and some large perchers, are able to elevate their body temperature endothermally by "wing-whirring". In some spp. the rate of heat production apparently varies in response to ambient temperature. The body temperature at which flight is initiated after warm-up is positively correlated with body weight. This is probably because wing loading increases with increasing body size. Warm-up rate is positively correlated with thoracic weight up to weights of 0.5 g. This relationship may result from the weight dependence of metabolism and thermal conductance. — The maximum voluntarily tolerated body temperature and the thresh-

old of heat-torpor of several species were determined in laboratory and field studies. Both parameters are correlated with normal environment. The minimum temperature at which flight is possible is positively correlated with body weight and is higher in tropical dragonflies than in temperate zone spp. — Body temperature is more variable relative to air temperature in tropical than in temperate zone spp. The ability of dragonflies to maintain a relatively constant body temperature is determined primarily by climate, body size, and behavior (Cf. also *OA* No. 1410).

- (1357) MERCATI, I., 1974. Omero Castellani. *Boll. Ass. romana Ent.* 29 (3-4): 29-31. (Italian). — (*c/o Assoc. Romana Entomol., Mus. Civ. Zool., Via Ulisse Aldrovandi 18, I-00197 Roma*).

An appreciation of O. Castellani (Sept. 11, 1903 - Dec. 2, 1974) is followed by a list of his entomological publications. (For his odonatological achievements cf. *Odonatologica* 5 [1975]: 77-78).

- (1358) SHARAF, R.K. & S.D. TRIPATHI, 1974. Feeding propensity and mode of attack of short-bodied dragon-fly nymphs on carp fry and fingerlings. *Jawaharlal Nehru Krishi Vishwa Vidyalaya Res. J.* 8 (2): 159-160. — (*Jawaharlal Nehru Krishi Vishwa Vidyalaya Coll. Fish., Jabalpur-482004, Madhya Pradesh, India*).

Any inadvertent entry of odon. larvae into conditioning hapas is highly detrimental to the survival of carp fry or fingerlings. The larvae are voracious predators of fingerlings, catching them by the tail and eating anteriorly as far as possible.

- (1359) UBUKATA, H., 1974. [Cercion hieroglyphicum from Lake Tôro]. *Bull. Kushiro Munic. Mus.* 228: 5. (Japanese). — (*Zool. Inst., Fac. Sci., Hokkaido Univ., Sapporo 060, JA*).

A faunistic note.

- (1360) WATKINS, W.D. & D.C. TARTER, 1974. Acute toxicity of rotenone on the naiadal stage of the dragonfly, *Basiaeschna janata*

Say, under laboratory conditions. *Proc. W. Va. Acad. Sci.* 46 (2): 141-145. — (*Dept. Biol. Sci., Marshall Univ., Huntington, W. Va. 25701, USA*).

The acute toxicity of rotenone on the naiadal stage of *B. janata* was tested under laboratory conditions. A straight-line graphical interpolation method was used to determine the concentration of rotenone at which 50% of the naiads survived after 96 h ( $TL_{m}^{96}$ ). The lethal concentration of rotenone was 0.22 mg/l.

- (1361) YABU, S., 1974. [Dragonfly fauna of the Nagai Park]. *Nature Study* 20 (2): 17-19. (Japanese). — (69, *Kokubu-cho, Tennoji-ku, Osaka, 543, JA*).

In the period 1970-1973, 29 odon. spp. were observed at 2 ponds in the Nagai Botanic Gardens, Osaka, Japan. It seems absurd that during the construction of the Osaka Nat. Hist. Mus. in the same period, the water vegetation has been removed from the ponds, with the result that *Symphetrum gracile* (Japanese folk name: "Naniwa-tombo", "Naniwa" being the old name for Osaka, and this sp. its symbol) has become extinct there and the strength of the populations of 10 other spp., incl. *Libellula quadrimaculata asahinai*, has greatly decreased. — (*Abstracter's note: This monthly is published by the Friends' Circle of the Osaka Nat. Hist. Mus., Nagai Park, Higashinagaicho, Higashisumiyoshi-ku, Osaka, 546, JA*).

## 1975

- (1362) ALFORD, D.V., 1975. The capture of *Bombus soroensis* by a dragonfly. *Bee Wild* 56 (4): 153-154. — (*Ministry Agric. Fish. & Food, Brooklands Ave., Cambridge CB2 2DR, UK*).

A detailed description is given of the attack on and the subsequent consuming of a ♂ *B. soroensis* (Fabr.) by *Cordulegaster boltoni*.

- (1363) BAKAEV, S., 1975. O gnezdovanii chernogolovoy tryasoguzki v nizov'yah reki Zarafshan. [On the nesting of *Motacilla* flora in the lower reaches of the Zarafshan River]. *Ekologiya* 1975 (1): 103-105. (Russian). —

(*Pedagog. Inst., Bukhara, USSR*).

Among the data presented is a note on the diet of this bird sp. in the Uzbek region (USSR) studied; chiefly Formicidae (Hymenoptera), followed by Coleoptera, with occasional specimens of larval Odon., Blattodea, Orthoptera, Heteroptera and Aranea.

- (1364) BALESTRAZZI, E. & I. BUCCIARELLI, 1975. Ricerche faunistiche sulle torbiere d'Iseo. III. Odonata. *Redia* 56: 231-269. (With Engl. s.). — (*Mus. Civ. Stor. Nat., Corso Venezia 55, I-20121 Milano*).

This is a monographic treatment of the odon. fauna (43 spp.) of the Iseo marshes, Lombardy, Italy, the field work for which has been carried out during 1967-1973. The occurrence of *Nehalennia speciosa*, *Oxygastra curtisi* and *Leucorrhinia pectoralis* is of particular interest. The larval stage of the first and the last of these is figured. (Cf. also *OA* Nos. 202, 203).

- (1365) BAYANOV, M.G., 1975. Progenesis of the trematode *Posotocus confusus* (Looss, 1894), an amphibian parasite. *Parazitologiya* 9 (2): 122-126. (Russian, with Engl. s.). — (*Bashkirian St. Univ., Ufa, South Ural, USSR*).

*Aeshna grandis*, *A. cyanea*, *A. juncea*, *Anax imperator* were infected (invasion extensity 63,5%) with progenetic metacercariae of *P. confusus*. Observations were carried out at Lake Karagally, (Bashkiria, South Ural, USSR) where the definite hosts of this trematode, Anura, are absent. Under experimental conditions metacercariae remain in the intestine of *Rana terrestris* not more than 24 h. When placed in water they excrete eggs containing miracidia. The intermediate host is the mollusk *Bithynia tentaculata*. Eggs of the parasite are spread over the water mainly by birds eating infected dragonflies.

- (1366) BUCCIARELLI, I., & G. MATTIONI, 1975. Cariche sociali e soci della Società entomologica italiana da 1869 all 1968. *Mem. Soc. ent. ital.* 48 (5) 1969: 1073-1116. (With Engl. parallel translation

of the main texts). — (*Mus. Civ. Stor. Nat., Corso Venezia 55, I-20121 Milano*).

The paper has been published for the Centenary of the Italian Entomological Society (1869-1969) and includes the By-Laws (and their modifications), a list of Officers and (chronological and alphabetical) lists of members of the Society in the first century of its existence. As a matter of course the respective data of numerous Italian odonatologists can be found in the publication.

- (1367) CHINO, Y., 1975. On the aquatic insect communities in shore zones and influents as well as effluents of lakes in Shinshu. *New Ent.* 24 (1): 8-17. (Japanese, with Engl. s.). — (*c/o Editors, Ent. Soc. Shinshu, Lab. Biol., Fac. Textile Sci. & Technol., Shinshu Univ., Ueda, 386, JA*).

A survey is given of the communities of 7 lake systems in the Nagano Pref., Japan. The species lists include also 7 odon. taxa.

- (1368) CORDULIA. Cahier d'amateurs. Published by the Collège Bourget, Rigaud, Quebec, Canada. Edited by R. Hutchinson & A. Laroche, Collège Bourget. Vol. 1, No. 4 (Dec., 1975). (French, with Engl. s's., or Engl. with French s's.). — Annual subscription for 1975 (4 issues): Can.\$ 2,— (Canada, USA), Can.\$ 3,— (others). — (*c/o R. Hutchinson, Collège Bourget, C.P. 1000, Rigaud, Que., CA*).
- Legault, J.* (62 Place Le Roy, Repentigny, Qué., CA): Les odonates de la région du Mont Pinacle, sud du Québec; — *Hutchinson, R.*: La chasse aux libellules du genre Gomphus; — *Hutchinson, R.*: Capacité des larves d'*Aeshna* de se tourner la tête pour voir des proies; — *Hutchinson, R.*: Notes biogéographiques sur *Pantala flavescens* Fabricius (Anisoptera: Libellulidae); — *Landry, J.-F. & R. Anctil* (30 rue Déziel, Lévis, Qué., CA): Découverte de *Nehalennia gracilis* Morse (Odonata: Zygoptera) près de Port-au-Saumon, comté de Charlevoix, Québec; — *Hutchinson, R.*: A fourth record of *Ophiogomphus carolus* Needham from Quebec; — (*Anonymous*): Publications sur les odonates.

- (1369) DRONEN, N.O. Jr., 1975. The life cycle of *Haematoloechus coloradensis* Cort, 1915 (Digenea: Plagiorchiidae), with emphasis on host susceptibility to infection. *J. Parasitol.* 61 (4): 657-660. — (Dept. Biol., Texas A & M Univ., College Station, Texas, USA).  
 Mother and daughter sporocysts and xiphidiocercariae of *H. coloradensis* develop in the snail, *Physa virgata*. Cercariae penetrate and encyst in odon. larvae *Enallagma* spp., *Tramea* sp., *Libellula* sp. and *Anax* sp.. Upon ingestion by the vertebrate host, metacercariae excyst and migrate into the lungs where they mature. *H. coloradensis* is specific for its definite host, *Rana pipiens*, but shows some development in *Ambystoma tigrinum*. Although *H. coloradensis* is specific for its snail host, all odon. spp. tested served equally well as the 2nd intermediate host.
- (1370) GRACILE. (Newsletter of Odonatology). Published by the Kansai Research Group of Odonatology, Osaka. No. 18 (December, 1975). (Japanese). — (c/o K. Tani, 129 Jizochō, Nara 630, JA).  
*Obana, S.*: Considerations on the polymorphism in *Mnais strigata*; — \**Matsumoto, K.*: Dragonfly survey in Ohmi in May; — \**Obana, S.*: Report on the dragonfly survey at Kawakami-daira; — *Yamashita, R.*: *Libellula quadrimaculata* asahinai in the Nagai Botanic Gardens; — \**Obana, S.*: Report on the dragonfly survey at Mt. Koya; — \**Anaze, N.*: Dragonfly observations at Ao Marsh (Wakayama Prefecture); — \**Inoue, K.*: Dragonfly observations at Kizugawa River and the surroundings; — *Nagase, K.*: Odonate fauna of Kagawa Prefecture; — *Tominaga, O.*: Dragonflies collected in Tohoku District; — *Morimitsu, S. & H. Morimitsu*: *Anax guttatus* at Sakai City; — *Kitagawa, M.*: *Mnais strigata* of the Ikuchijima Island; — *Obana, S.*: Reports on the 29th, 30th and 31st meetings of the Kansai Research Group of Odonatology; — *Tani, K.*: Book Reviews; — (Anonymous): Echoes of our publication, "Dragonfly fauna of the Kinki District, Central Japan". — (Abstracter's notes: The papers marked with an asterisk [\*] are partial reports on a larger program, carried out since several years by the members of the Kansai Research Group of Odonatology and aiming at a complete survey of the odon. fauna of the Kansai District, Japan; — cf. also the Abstracter's note in *OA* No. 307. — The abstracts of papers and addresses of the authors will appear in *Odonatologica* V, 4, Dec. 1976. — An unabridged Engl. translation of *Obana's* *Mnais* paper is available from Mr. K. Inoue, 4-9, Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA, or from the Editors of *Odonatologica*).
- (1371) HANUMANTHA RAO, K. & C. GOPALASWAMY, 1975. *Orthetrotrema longicaeca* n. sp. (Trematoda: Digenea) from dragonfly naiads. *Riv. Parassit.* 36 (1): 29-32. (With Italian s.). — (Dept. Zool., Andhra Univ., Waltair, India).  
*O. longicaeca* sp. n., from the body cavity of larvae of *Brachythemis* sp. is described. It is compared with *O. monostomum*. *Orthetrotrema* is suggested to be intermediate between *Dicrocoeliidae* and *Lecithodendriidae*.
- (1372) HARITONOV, A. YU., 1975. Strekozy kak massovye komponenty vodnyh biocenozov. [Dragonflies as a mass component of the aquatic biocenoses]. In: A.I. Cherepanov [Ed.], *Biologicheskie resursy zapadnoy Sibiri i ih ohrana*. Nauka, Novosibirsk, pp. 63-64. (Russian). — (*Inst. Biol., Siberian Sect. Acad. Sci. USSR, Ul. Frunse 11, USSR-630091 Novosibirsk*).  
 The density and composition of the odon. population of a small lake nr. Cheliyabinsk, USSR, were estimated on the basis of the numbers of exuviae counted at 2-days intervals on a given surface. The numbers (and %) of various genera, calculated for the whole lake, were as follows: *Lestes* 47300 (18.33), *Coenagrion* 17200 (6.67), *Enallagma* 3870 (1.50), *Erythromma* 3440 (1.33), *Aeshna* 430 (0.17), *Leucorrhinia* 5160 (2.00), *Libellula* 6020 (2.33) and *Sympetrum* 49880 (19.33). The figures apply to the summer season, 1972.
- (1373) HEYER, W.R., R.W. McDIARMID & D.L.

WEIGMANN, 1975. Tadpoles, predation and pond habitats in the tropics. *Biotropica* 7 (2): 100-111. — (Dept. Amphib. & Reptiles, Smithsonian Inst., Washington, DC 20560, USA).

Tadpoles involved in predator-prey interactions were studied in tropical wet forest in Costa Rica under laboratory and field conditions. Larvae of the frog *Leptodactylus pentadactylus* and larvae of the odon. *Pantala flavescens* are important predators on larvae of several spp. of frogs. The predators discriminate the prey on the basis of size and species, but not type of habitat in which predation occurs. A graphical model is proposed to illustrate the relationships between species diversity and habitat complexity as they affect the composition of tadpole communities. The model is used to evaluate the relative importance of abiotic and biotic factors in determining the use of specific kinds of aquatic habitats by frogs with larval stages. Predation by permanent aquatic predators (primarily fish) is considered the most important biotic factor influencing the temporal and spatial composition of tadpole communities. The development and maintenance of predatory feeding modes, including cannibalism, in certain tadpoles is examined in the light of the model. (Authors).

(1374) JOHNSON, C., 1975. Polymorphism and natural selection in ischnuran damselflies. *Evol. Theory* 1: 81-90. — (Dept. Zool., Univ. Florida, Gainesville, Fla 32611, USA).

The data for sex-limited ♀ dimorphism and its likely interaction with natural selection are summarized. The ♂-like andromorphs offer increased reproductive isolation, but are more vulnerable to predation. The cryptic heteromorphs have higher resistance against predation, but engage in interspecific mating, thereby lowering their reproductive potentials. These observations appear to explain the higher observed frequencies of andromorphs in sympatric assemblages. ♂ mating preferences exist, with androphilic and heterophilic types having a genetic determination similar to

that of the ♀ morphs. The system allows a rapid restructuring of the populations with shifts of sympatry, though additional associations with fitness must exist. (Author).

(1375) KIAUTA, B., 1975. On a small dragonfly collection from Nepal. *Kailash J. Himalayan Stud.* 3 (3): 289-294. (Dept. anim. Cytogenet. & Cytotaxon., Univ. Utrecht, Padualaan 8, Utrecht, NL).

12 spp. collected by H. Franz in the western Terai (Amlekhganj) and at the Rara Lake, Humla (Sept. 30 - Oct. 9, 1972), are brought on record. *Ischnura elegans* and *Sympetrum haematoneura*, both from the Rara Lake, are new to the Nepalese fauna. Notes on their habitats, breeding sites and the Nepalese and general distribution are also provided for most of them. (No reprints were supplied to the author and numerous printing errors are due to the fact that no proofs were furnished by the Editors). (Author).

(1376) LIEFTINCK, M.A., 1975. The dragonflies (Odonata) of New Caledonia and the Loyalty Islands. Part I. *Imagines. Cah. O.R.S.T.O.M. (Hydrobiol.)* 9 (3): 127-166. (With Fr. s.). — (*Nwe. Veenendaalseweg 224, Rhenen, NL*).

This is a critical account of the odon. fauna of the indicated islands (40 spp. are so far known from New Caledonia, 8 from the Loyalty Islands). The following 6 taxa are described and figured as new: *Caledargiolestes janiceae*, *Isosticta gracilior*, *I. humilior*, *Hemicordulia hilaris*, *Synthemis ariadne*, *Tramea transmarina intersepta*; all from New Caledonia. *Pantala flavescens* is recorded from New Zealand for the first time. Endemism and faunal relations with Australia, Papuan Region and New Zealand are discussed and keys are provided to the N. Caledonian spp. of *Agriolestinae* (descriptive) and to the regional *Isosticta*. — (*Abstracter's note: Part II, dealing with the larval stages, is in preparation*).

(1377) MACHADO, A.B.M., 1975. *Neoneura schreiberi* nova espécie da regio amazônica (Odonata-Protoneuridae). [*Neoneura schrei-*

beri, a new species from the Amazon region. (Odonata-Protoneturidae)]. *Ciênc. e Cult.* 27 (7): 764-766. (Portuguese, with Engl. s.).— (*Inst. Ciênc. Biol., Univ. Minais Gerais, C.P. 2486, BR-3000 Belo Horizonte, Brazil*).

The new sp. from the State of Amapá, Brazil, is described and illustrated.

- (1378) MARCUZZI, G. & L. DALLE MOLLE, 1975. Secondo contributo dell'ecologia della torbiera piana di Fivà (Trentino occidentale). *Studi trent. Sc. Nat.*, (N.S.) 52 (4B): 187-221. — (*Ist. Biol. anim., Univ. Padova, Via Loredan 10, I-35100 Padova*). While the first paper of the series (1971. *Studi trent. Sci. nat.* 48) deals with the general ecological description of the moorland of Fivà, Trentino prov., northern Italy, in the present paper an account is given of the fauna recorded, incl. 7 spp. of Odon., of which *Enallagma cyathigerum* and *Coenagrion pulchellum* occur in Italy only locally.
- (1379) MITRA, T.R., 1975. On a collection of Odonata from Manipur, India. *Ent. News* 86 (9-10): 213-216. — (*398 Dum Dum Park, Calcutta-700055, India*). A list is given of 11 spp., collected during May 1974, and Dec. 1974 - Febr. 1975 in the Manipur Valley, previously administratively a part of Assam, India.
- (1380) PINHEY, E., 1975. The insects. In: D.W. Phillipson [Ed.], *Mosi-oa-Tunya* [Smoke that thunders]. A handbook to the Victoria Falls region. Longman, Salisbury. pp. 201-218, pl. 14 (col.). — (*Natl Mus., P.O.B. 240, Bulawayo, Rhodesia*). The introductory general characterization of the insect fauna of the Victoria Falls Region ("Mosi-oa-Tunya" is the old native name, in the Lozi language, for the Victoria Falls), Rhodesia and Zambia, is followed by a review of the more characteristic spp., arranged per orders. About 100 spp. of Odon. have been found in and around the Falls area (dealt with on pp. 202-204, fig. 1, nos. 1-8), quite a number of which are briefly discussed. A complete list of spp. is

not given, but the bibliographic list contains all the more important technical papers dealing with the odon. fauna of the area. (*Abstracter's note*: This popular book of 222 pp. will be certainly useful to those tourist visitors of the Falls that have a special interest in the insect (incl. dragonfly) fauna of the area. It should be noted that a certain area around the Falls has been declared a biological sanctuary by the National Parks Departments of Rhodesia and Zambia, within which no animal and plant material of any kind may be collected. Outside these boundaries the insects may be collected at will).

- (1381) REES, C.J.C., 1975. Form and function in corrugated insect wings. *Nature* 256 (5514): 200-203. — (*Dept. Biol., Univ. York, Helmsington, Yorkshire YO1 5DD, UK*). The mechanical properties of insect wings, as derived from detailed measurements on sections of epoxy resin embedded whole wings (a.o. *Aeshna cyanea*) are compared to those of regularly folded or tubularly reinforced beams. Corrugation tends to be deeper in the anterior half of the wing and probably reflects the chordwise distribution of aerodynamic forces. Stout chordwise bars at the thoracic end of the corrugations prevent the folds from opening up when under load, the wing thus retaining its stiffness. Corrugated wings will have very little resistance to torsional deformation but torsional deformation of inertial and aerodynamic origin may well be very small.
- (1382) ROSOWSKI, J.H., Jr. & R.L. WILLEY, 1975. *Colacium libellae* sp. nov. (Euglenophyceae), a photosynthetic inhabitant of the larval damselfly rectum. *J. Phycol.* 11 (3): 310-315. — (*Sch. Life Sci., Univ. Nebraska, Lincoln, Nebraska 68508, USA*). *C. libellae* sp. n., in the non-flagellated palmella stage and lacking stalks, lines the cuticle of the rectum of *Ischnura verticalis* larvae, forming a conspicuous green plug.
- (1383) RUESINK, R. & M. NELEMANS, 1975. Libellen in N-Drente. Een oecologisch

onderzoek. [Dragonflies in North Drente. An ecological study]. M.Sci. Thesis, Univ. Groningen. IV + 82 pp. (Dutch). — (*Lab. Plant Ecol., Univ. Groningen, Kerklaan 30, Haren, Groningen, NL*).

In the period March-Sept., 1975 an inquiry has been carried out, at various localities in Drente province, the Netherlands, into the correlations between the occurrence of various odon. spp. on one hand, and the plant communities on the other. In all, 31 spp. were recorded, of which *Nehalennia speciosa*, *Lestes virens* and *Sympetrum striolatum* are new for the province. In spite of clear distinctions in faunal composition and species abundance between various biotopes, the existence of a direct correlation between the odon. fauna and the vegetation of the breeding site could not be demonstrated. — (*Abstracter's note: Cf. also e.g. H. Ant, 1967. Das Auftreten von Odonaten-Imagines in einigen Pflanzengesellschaften des Lippe-Ufers, Schriftenreihe f. Vegetationsk. 2: 237-240, where the author arrived at a different conclusion.*)

- (1384) SHRESTHA, R.L., 1975. Insects collection. Nat. Hist. Mus., Kathmandu. 7 pp., 1 pl. — (*Nat. Hist. Mus., Anandakuti, Shwayambhu, Kathmandu, Nepal*).
- The booklet has been prepared for (Nepalese) entomology students and lay insect collectors, and gives a brief description of standard collecting equipment and of basic methods for collecting and preserving insect material. Being the first publication on this subject in the Nepalese literature it will be indispensable to all those serious local entomology students who do not have access to expensive foreign publications. The mounting of adult odon. specimens is also illustrated. — (*Abstracter's notes: In addition to 2 other entomological (lepidopterological) publications and a journal, the first issue of which is in the press, this is one of the 4 "collecting guides" published hitherto by the (Nepalese) Natural History Museum, which institution has started functioning on July 17, 1975, and has developed since then an unusually broad spectrum of organizational, publicistic, educational and scien-*

tific activities. An official (and published) 17-point programme of the Museum, was drawn up by the Directors (Mr. S.C. Singh, botany; Mr. R.L. Shrestha, zoology, incl. entomology). In the course of the very first year of the Museum's existence some points of the programme were brought to realization. For the time being a rapid further development of the scientific activities of the Museum is hindered by (1) the (initial) lack of relevant taxonomic literature, (2) lack of an adequate possibility of registration of the foreign publications dealing with the Nepalese fauna and flora, (3) lack of technical equipment and personnel, (4) lack of specialized taxonomists, and (5) by a number of shortsighted governmental regulations that make normal bona fide cooperation with foreign taxonomists very difficult. In spite of its short existence the Museum possesses relatively rich collections, incl. a small collection of unidentified odon. material. The Directors are soliciting the assistance of specialists to get it identified and enlarged. The Abstracter feels that the efforts of the Museum certainly deserve the support of anyone who is able to give it. — For information on the odon. collection in the Division of Entomology, Lalitpur, Nepal, cf. *OA* No. 809 and *Odonatologica* 4 [1975]: 89-93.

- (1385) SINGH, A. & M. PRASAD, 1975. New record of *Rhinocypha bifasciata* Selys (Odonata: Zygoptera: Chlorocyphidae) from North-West India. Newslett. Zool. Surv. India 1 (1): 3. — (*Northern Regional Stn. Zool. Surv. India, 13 Subhas Rd., Dehra Dun - 248001, U.P., India*).
- R. bifasciata* is recorded from the Corbett National Park, Naini Tal, India. This is the first record of this sp. from western India, where occur the following spp. of this genus: *quadrimaculata* Sel., *unimaculata* Sel., *trifasciata* Sel., and *bifasciata* besoni Fraser.
- (1386) TEMBHARE, D.B. & V.K. THAKARE, 1975. The histological and histochemical studies on the ovary in relation to vitellogenesis in the dragonfly, *Orthetrum chrysis*

Selys (Libellulidae: Odonata). *Z. Mikrosk. Anat. Forsch.* 89 (1): 108-127. — (*Post-Grad. Dept. Zool., Univ. Nagpur, Amravati Rd., Nagpur-440010, India*).

The ovaries consist of large numbers of panoistic ovarioles in the last instar larva and adult *O. chrysis*. In the larva the vitellaria are compactly filled with the primary oocytes and vitellogenesis takes place only in the adult. During vitellogenesis oocytes change their shape, size and cytological organization and their developmental stages can be divided into pre-vitellogenic, early-vitellogenic, late-vitellogenic and maturation stages. PAS-positive material appears first around the germinal vesicle in the early-vitellogenic stage and later migrates towards the periphery. Glycogen appears in the late-vitellogenic stage. DNA is abundantly present in the nuclei of the oocytes during the pre-vitellogenic and completely absent in early-vitellogenic, vitellogenic, late-vitellogenic and maturation stages. It is observed in the nuclei of follicular epithelial cells of all the stages. RNA is abundantly present in cytoplasm of the pre-vitellogenic oocytes but later gradually decreases. During the early-vitellogenic and vitellogenic stages a high concentration of RNA in the follicular epithelial cells was observed. The protein bodies appear first in the interfollicular spaces and toward the periphery of the oocytes near the enveloping follicular epithelial cells, during the early-vitellogenic stage suggesting the formation of yolk proteins from the haemolymph. In *O. chrysis* the sudanophilic bodies appear first in the follicular cells and then lie in the peripheral region of the oocytes, suggesting the incorporation of yolk lipid either from the follicular epithelium or from the haemolymph through the follicular epithelium. The phospholipids are synthesized in pre-vitellogenic to late-vitellogenic stages. In the late-vitellogenic stage the phospholipid granules are present abundantly in the follicular epithelium, while in the maturation stage they disappear, suggesting their utilisation in the formation of vitelline membrane and chorion. The neutral fats are present in the form of

large numbers of droplets in the oocytes during the maturation stage.

- (1387) THAKARE, V.K., D.B. TEMBHARE & K.B. DESHMUKH, 1975. Free amino acids in the haemolymph of the last instar nymph of the dragonfly, *Orthetrum chrysis* (Selys) (Odonata: Libellulidae). *Experientia* 31 (12): 1472-1473. — (*Post-Grad. Dept. Zool., Univ. Nagpur, Amravati Rd., Nagpur. 440010, India*).

Analysis of the haemolymph of last-instar larvae of *O. chrysis* showed the presence of ornithine, histidine, lysine, aspartic acid, serine, arginine, threonine, alanine, proline, tyrosine, tryptophan, valine, isoleucine and phenylalanine. After centrifugation of the insects for 10 min, glutamic acid,  $\alpha$ -amino-butyric acid, methionine, cystine and leucine were present in addition. After the larvae had been starved for 4 days, their haemolymph contained the 15 amino acids found originally, plus glutamic acid and leucine. The 17 amino acids in the haemolymph of starved larvae occurred at higher concentrations than in controls.

- (1388) THOMPSON, D.J., 1975. Towards a predator-prey model incorporating age structure: the effects of predator and prey size on the predation of *Daphnia magna* by *Ischnura elegans*. *J. Anim. Ecol.* 44 (3): 907-916. — (*Dept. Biol., Univ. York, York YO1 5DD, UK*).

The functional responses of 5 instars of *I. elegans* feeding on 5 arbitrary size-classes of *D. magna* were obtained. (1) The 2 basic components of predator-prey models, the attack coefficient ( $a$ ) and the handling time ( $T_h$ ) were estimated from the data, using the random predator equation of Rogers, *J. Anim. Ecol.*, 18, 1-35 (1972). (2) 2 ways in which the parameter estimates from the random predator equation may be unrealistic are discussed; they are: the use of too many points on the plateau of a type-2 functional response curve in estimating  $a$  and  $T_h$  and the use of data points in which over-exploitation had occurred. (3) The variation of  $a$  and  $T_h$  with prey and predator size is described. Both increase nearly

monotonically, a with increased predator size and decreased prey size,  $T_h$  with decreased predator size and increased prey size. The possible effects of prey and predator size on the sub-components of a and  $T_h$  are discussed. (4) The consequences of the fact that the a and  $T_h$  values used are averaged over the time the experiment was run are considered.

- (1389) TOPP, W., 1975. Zur Besiedlung einer neu entstehenden Insel. Untersuchungen am "Hohen Knechtsand". Zool. Jb. (Syst.) 102 (2): 215-240. (With Engl. s.). — (*Abt. Ökol., Zool. Inst., Univ. Kiel, Hegewischstr. 3, D-23 Kiel, GFR*).

The spp., numbers and abundance of Collembola, Odon., Orthopteroidea, Coleoptera and Lepidoptera on Hoher Knechtsand, a small, almost 14 yrs old island in the German Bight, North Sea, German Federal Republic, 14 km from the shore, were studied. The establishment of the taxa considered is defined in terms of reproductive success and presence on the island during the 3 yrs of investigation. (Cf. also *OA* No. 406).

- (1390) UBUKATA, H., 1975. [Territorial behaviour of *Cordulia aenea*]. Insectarium, Tokyo 12 (9): 196-199. (Japanese). (*Zool. Inst., Fac. Sci., Hokkaido Univ., Sapporo 060, JA*).

The influence of population density upon the territorial behaviour and the functions of territory were studied in *C. aenea amurensis*. At the pond, mature  $\delta\delta$  change the flight type from "long range patrol flight" (20-60 m along the shore without defence of the area) to "short range patrol flight" (= territorial flight: 8-15 m, with defence of the area, when the population density exceeds the value 1  $\delta$  per 12.2 m, which coincides closely with the average length of the territory. The comparison of the density ratio ( $\delta$  density at the more preferred site / that at the less preferred site) among various values of total density revealed that the territorial behaviour promotes the movement of surplus  $\delta\delta$  toward less preferred sites. As the functions of territory of

*C. aenea*, prevention of interference with mating and increase of the mating expectancy of the population were assumed. (Author). (Cf. also *OA* Nos. 609, 1192).

- (1391) YABU, S. & M. FUJISE, 1975. [Dragonfly fauna of the Momogaike Pond in Osaka]. Nature Study 21 (8): 93-94. (Japanese). — (*69, Kokubu-cho, Tennoji-ku, Osaka, 543, JA*).

5 yrs observations (from 1970 onwards) revealed 22 spp. for a pond in an urbanized area of Osaka, Japan. 4 of these are considered immigrants, incl. *Anax guttatus* and *Somatochlora uchidai*. Of particular interest is the observation of a  $\delta$  *Calopteryx atrata*, since no streaming water of any kind is in the surroundings of the pond.

- (1392) ZIMMERMANN, W., 1975. Zum Vorkommen seltener Libellenarten in Thüringen (Odonata, Anisoptera). Ent. Ber., Berlin 1975 (2): 23-26. — (*Museum der Natur, Parkallee 15, DDR-58 Gotha*).

The occurrence of *Aeshna affinis*, *Cordulegaster boltoni*, and *Somatochlora alpestris* in Thuringia, German Democratic Republic, is discussed.

## 1976

- (1393) BISCHOF, A., 1976. Die Odonaten des Kantons Graubünden. 3. Mitteilung. Mitt. ent. Ges. Basel, (N.F.) 26 (1): 1-5. (*Heckenweg 4, CH-7000 Chur*).

A list and a brief zoogeographical analysis are given of the odon. fauna (17 spp.) of the Weiermühle nr. Bonaduz (alt. 680 m), Kanton Grisons, Switzerland, as recorded during 21 visits to the locality between 1969-1975. Among the more interesting spp. are *Cordulegaster boltoni* and *Symptetrum pedemontanum*. 6 spp. are of mediterranean and 11 of eurosiberian origin. For the first 2 papers in this series cf. *OA* Nos. 17, 629).

- (1394) BÖGER, K., 1976. Red area book: Himmelmoor, Naturk. Jb. DJN 1975-1976: 124-133. — (*Andreas-Schlüter-Weg 10, D-*

2085 *Quickborn, GFR*).

A brief description is given of the Himmelmoor, between Bilsbech and Pinnau, Hamburger Umland, German Federal Republic. Out of the 8 recorded odon. spp., some are probably not autochthonous in the moor.

- (1395) **CORDULIA**. Cahier d'amateurs. Published by the Collège Bourget, Rigaud, Quebec, Canada. Edited by R. Hutchinson & A. Larochelle, Collège Bourget, Vol. 2, No. 1 (March, 1976). (French and Engl., all larger papers with s's in both languages). — Annual subscriptions for 1976 (4 issues): Can.\$ 2.— (Canada, USA), Can.\$ 3.— (others). — (c/o R. Hutchinson, Collège Bourget, C.P. 1000, Rigaud, Que., CA).  
*Lavigne, R.* (*Ent. Sect., Univ. Wyoming, Laramie, Wyoming 82071, USA*): Odonata as prey of robber flies (Diptera: Asilidae); — *Hutchinson, R.*: Quelques libellules victimes de l'automobile, en 1975; — *Hutchinson, R.*: Nouvelles captures de libellules dans leur dortoir, le 11 juin 1975; — *Hutchinson, R.*: Sur le comportement de libellules qui touchent l'eau en volant; — *Annonces* (Odonatologica; E.M. Walker: The Odonata of Canada and Alaska, vols. 1-3; A. Robert: Les Libellules du Québec); — *Hutchinson, R.*: Signification des essais de zygoptères au bord de l'eau (Zygoptera); — *Annonces* (Une loupe bon marché; Enveloppes de cellophane pour collection de libellules; Expédition odonatologique; Une idée); — *Hutchinson, R.*: Comment j'ai capturé des libellules hors de ma portée; — *Hutchinson, R.*: Capture et description du vol de patrouille de *Somatochlora cingulata* Selys (Anisoptera: Corduliidae); — *Hutchinson, R.*: Habitude de vol de *Cordulegaster maculatus* Selys et *C. diastatops* Selys (Anisoptera: Cordulegasteridae); — (*Anonymous*): Publications sur les Odonates.
- (1396) **EDA, S.**, 1976. A guide to the collection and observation of dragonflies. New Science, Tokyo. XIV + 100 pp., 9 pls. (1 col.) incl. (Japanese, with Engl. translation of the title, the list of contents and the captions of plates). — Price ¥ 750.—.

(Dept. Oral Pathol., Matsumoto Dental Coll., 1780 Gobara, Hirooka, Shiojiri, Nagano, 399-07, JA).

The Foreword (by Dr. S. Asahina) and Introduction are followed by the 3 main chapters of the book, divided into 19 sub-headings, viz. "Dragonfly collecting" (larvae, exuviae, rearing, adults, preparation for the collection), "Biology of dragonflies" (larval life, emergence, flight, migration, resting, bathing, territoriality, sexual behaviour, hibernation), and "Field observations of behaviour" (incl. a chapter on photography). The Appendix contains a Checklist of the Japanese spp. (with Latin and vernacular names), a bibliographic list (41 titles) and some concluding remarks. The value of the booklet is enhanced by numerous illustrations, most of which are excellent photographs by the author. A photo showing Drs. Asahina and Eda in the field is also included. — (*Abstracter's note*: Although the booklet is intended for young Japanese dragonfly collectors in the first place, the checklist will make it very useful to anyone interested in the Japanese fauna. The presentation of the material, though limited to the Japanese fauna, is certainly unique in the odonatological literature, and it is hoped that Dr. Eda's example will find followers in other languages).

- (1397) **GRACILE**. (Newsletter of Odonatology). Published by the Kansai Research Group of Odonatology, Osaka, No. 19 (March, 1976). (Japanese). — (c/o K. Tani, 129 Jizocho, Nara, 630, JA).  
*Tsuda, S.*: Considerations on *Mnais strigata*; — *Inoue, K.*: Recent papers on *Mnais* by Dr. S. Asahina; — *Obana, S.*: Report on the 32nd meeting of the Kansai Research Group of Odonatology; — *Inoue, K.*: Report on the 33rd meeting of the Kansai Research Group of Odonatology. — (*Abstracter's notes*: The abstracts of papers and addresses of the authors will appear in Odonatologica V, 4, Dec. 1976. — An unabridged Engl. translation of the Tsuda *Mnais strigata* paper is available from Mr. K. Inoue, 5-9. Fuminosato 4-chome, Abeno-

ku, Osaka, 545, JA, or from the Editors of *Odonatologica*).

- (1398) HASSELL, M.P., J.H. LAWTON & J.R. BEDDINGTON, 1976. The components of arthropod predation. I. The prey death-rate. *J. Anim. Ecol.* 45 (1): 135-164. – (*Dept. Zool. & Appl. Entomol., Imperial Coll., London SW7 2AZ, UK*).  
The components of arthropod predator-prey interactions are reviewed within the framework of 2 fundamental processes, viz. the prey death rate (as determined by predation), and the rate of increase of the predator population. The 3 major components which contribute to the prey death rate are prey density, predator density, and the relative distributions of the predator and its prey. The odon. spp. considered are *Ischnura elegans* and *Lestes sponsa*. (*Abstracter's note*: The second paper in this series appeared in the same issue, pp. 165-185, under the subtitle, The predator rate of increase, and with the authors' sequence Beddington-Hassell-Lawton, but does not include any references to Odon.).
- (1399) HEYMANS, T., 1976. Beekjuffer. [*Calopteryx*]. *Groei en Bloei* 1976 (June): 38-39. (Dutch). – (*c/o Groei en Bloei Centrum, Kwekerijweg 2, Den Haag, NL*).  
A brief popular description of the life of *Calopteryx splendens* and *C. virgo*. The colour photograph (by L. Boekhout), accompanying the article, represents a *Coenagrion pulchellum*, and not a *Calopteryx* as erroneously stated in the caption.
- (1400) HUTCHINSON, R., 1976. La chasse aux libellules du genre *Ophiogomphus*. *Faberies* 2 (1): 9-10. – (*Collège Bourget, C.P. 1000, Rigaud, Que., CA*).  
An attempt is made to describe briefly the fascination of tracking *Ophiogomphus* spp. in the field, and the author's data on 4 out of 6 representatives of the genus in Quebec, Canada, are brought on record (*aspersus*, *carolus*, *colubrinus*, *mainensis*). The collectors are invited to report their Quebec records of the *Ophiogomphus* spp. to the author. (For a similar account on the Canadian representatives of *Gomphus*, cf. a paper, by the same author, the title of which is listed in *OA* No. 1368).
- (1401) HUTCHINSON, R., 1976. Observation d'une ponte d'*Agrion amatum* Hagen. *Faberies* 2 (2): 18-19. – (*Collège Bourget, C.P. 1000, Rigaud, Quebec, CA*).  
Oviposition and associated behaviour of *Calopteryx amatum* (Hag.) are described from observation in Quebec, Canada.
- (1402) HUTCHINSON, R., 1976. Premiers vols d'individus ténérax de l'espèce *Plathemis lydia*. *Faberies* 2 (3): 38-39. – (*Collège Bourget, C.P. 1000, Rigaud, Que., CA*).  
Observations on the maiden flight are described, as observed nr. Caillon, Quebec, Canada on May 25, 1975.
- (1403) JURZITZA, G., 1976. Bileks Azurjungfer in den Nord-Alpen. *Kosmos* 72 (6): 248-250. – (*Bot. Inst. I., Univ. Karlsruhe, Kaiserstr. 12, D-75 Karlsruhe, GFR*).  
An outline is given of the history of the discovery of *Coenagrion hylas* in Europe (1952, Zwingsee, Bavaria, German Federal Republic), and the ecological conditions, population strength and behaviour of this sp. at a newly (1973) discovered second locality (which is neither named nor geographically specified) are briefly described. In honour of the original discoverer of this sp. in Europe, the late Alois Bilek, the German vernacular name "Bileks Azurjungfer", is introduced, and it is hoped that the article will inspire dragonfly collectors to look out for more breeding sites of *C. hylas* in the Northern Alps. 2 excellent colour photographs (♂, ♀) are added. (Cf. also *Odonatologica* 3 [1974]: 181-185; 4 [1975]: 31-33). – (*Abstracter's note*: No reprints are available from the author. The journal issue can be obtained, at the price of DM 3.30, from the Publishers: "Kosmos", Postfach 640, D-7000 Stuttgart, GFR).
- (1404) JURZITZA, G., 1976. Libelle. I. Beutefang, Fressen und Häutung der Larve. Super-8 mm Kurzfilm, F 82021. V-DIA-Verlag,

- Heidelberg. (With an explanatory text booklet, 8 pp.). – (*Bot. Inst. I, Univ. Karlsruhe, Kaiserstr. 12, D-75 Karlsruhe, GFR*). A 3 min super-8 film on the prey capture, feeding behaviour and ecdysis (casting of the cuticle) of the larva of *Aeshna* sp. (Cf. also *OA* No. 69).
- (1405) JURZITZA, G., 1976. Libelle, II. Schlüpfvorgang. Super-8 mm Kurzfilm, F 82022. V-DIA-Verlag, Heidelberg. (With an explanatory text booklet, 7 pp.). – (*Bot. Inst. I, Univ. Karlsruhe, Kaiserstr. 12, D-75 Karlsruhe, GFR*).  
A 3 min 15 sec super-8 film on the emergence of *Libellula quadrimaculata*.
- (1406) KUWAHARA, H., 1976. (Dragonflies collected in Taiwan by the O.[saka]K.[onchu] D.[okokai] members). *Crude* 13: 15-20. (Japanese). – (16-17, *Fuminosato 4-chome, Abeno-ku, Osaka, 545, JA*).  
Between 1968-1975, 35 spp. were collected in Taiwan, Lan Yü and Lü Tao Islands by 8 members of the Osaka Research Group of Entomology (O.K.D.). The collections include also *Chlorogomphus b. brevistigma* and *Agrionoptera insignis* ssp. – (*Abstracter's note*: The journal is published by the Osaka Research Group of Entomology, c/o Y. Shoyi, 1-13-16, Sohji-ji, Ibaragi, Osaka Pref., 567, JA).
- (1407) LAROCHELLE, A., 1976. Adrien Robert (1906-1964). *Faberies* 2 (3): 25-26. (French). – (*Collège Bourget, C.P. 1000, Rigaud, Que., CA*).  
A brief retrospective outline of life and works of A. Robert, c.s.v. (June 29, 1906 - Aug. 15, 1964), Professor at the Univ. Montreal, and a well known Quebec entomologist, author of a number of odonatol. publications, incl. the monograph, "Les Libellules du Québec", Ministère du Tourisme, Québec, 1963 (2nd ed. 1966, still available).
- (1408) LEBUIS, M.-A. & J.-G. PILON, 1976. Analyse comparative de la faune odonatologique de quatre milieux de la région de Saint-Hippolyte, Comté de Prévost, Québec. *Ann. Soc. ent. Québec* 21 (1): 3-25. (With Engl. s.). – (*Dép. Biol., Univ. Montréal, C.P. 6128, Montréal-101, Que., CA*).  
The analysis of the odon. fauna was made of 4 lakes in the Quebec prov., Canada, viz. Geai (dystrophic), Cromwell, Croche (eutrophic), and La Poche (dystrophic bog). The Odum index was used for the determination of similarities and dissimilarities of the 4 basins. Data on the abundance, emergence and sexual behaviour are also recorded for most spp.
- (1409) LÖDL, M., 1976. Die Libellenfauna Österreichs. *Linzer biol. Beitr.* 8 (1): 135-159. – (*Bierwolfgasse 52, A-2103 Langenzersdorf*).  
New (or otherwise interesting) records are presented for 32 Austrian spp., and a tabular synopsis is given of the distribution over the 9 provinces (= "Länder") of 78 spp. recorded from Austria up to 1975, 3 of which are in need of confirmation. (*Abstracter's note*: The last similar review of the distribution of Austrian Odon. is that by D. St. Quentin, 1959. *Catalogus faunae Austriae*, XII c: Odonata. 11 pp., Springer, Wien.).
- (1410) MAY, M.L., 1976. Thermoregulation and adaptation to temperature in dragonflies (Odonata: Anisoptera). *Ecol. Monogr.* 46 (1): 1-32. – (*Dept. Physiol. & Biophysics, Univ. Illinois at Urbana-Champaign, 524 Burrill Hall, Urbana, Illinois 61801, USA*).  
Text of the author's abstract is the same as that in *OA* No. 1356.
- (1411) NOORDWIJK, M. van, 1976. Een aanzet tot onderzoek naar oecologische differentiatie bij libellen. [A suggestion for an inquiry into the ecological differentiation in dragonflies]. *Anax* 8 (1): 44-46. (Dutch). – (*Meerpaal 49, Groningen, NL*).  
This is a reprint of the paper listed in *OA* No. 1078. Note the new address of the author, formerly leader of the Dragonfly Group of the Dutch-Christian-Catholic Youth Federation of Nature Friends (CKJN).
- (1412) PAPE, R., 1976. Red area book: Alster-

niederung. Naturk. Jb. DJN 1975-1976: 112-122. — (*Meiendorferweg 54, D-2000 Hamburg-73, GFR*).

Ecology description and lists of selected animal groups are given for the lowland wetlands in the upper Alster region (Wakendorfer Moor), District Segeberg, Schleswig-Holstein, German Federal Republic. Among the 25 autochthonous odon. spp. *Platycnemis pennipes*, *Coenagrion hastulatum*, *Ischnura pumilio* and *Calopteryx virgo* are considered of particular interest; due to the lack of adequate biotopes these occur only very locally in the Hamburg area.

- (1413) PINHEY, E., 1976. The completion of a research project. *Falcon* 6 (1): 71-72. — (*Natl Mus., P.O.B. 240, Bulawayo, Rhodesia*).

This is a brief general account of the odonatological results obtained during the 1975 Falcon College Expedition (Rhodesia) to the Okavango delta (Khwai, Moremi and Four-Rivers), Botswana. A number of more interesting records are mentioned, the most spectacular of these being the capture of both sexes of *Anax bangweuluensis* around Xugana.

- (1414) PRITCHARD, G., 1976. Further observations on the functional morphology of the head and mouthparts of dragonfly larvae (Odonata). *Quaest. Ent.* 12: 89-114. (With French s.). — (*Dept. Biol., Univ. Calgary, Calgary, Alberta, CA*).

The structure and musculature of the head and mouthparts of last instar larvae of *Aeshna interrupta lineata* and *Libellula quadrimaculata* are described. Particular attention is paid to the features related to protraction of the labium, including the T-shaped hypopharyngeal apodeme and the musculature in the elbow and at the base of the labium. Motion picture recordings of the strike using camera speeds of up to 200 frames per second have allowed a more detailed analysis of the strike than has previously been possible. The protraction of the labium is arbitrarily divided into five phrases and an explanation for the characteristics of this sequence is offered. The

primary force causing protraction of the labium is the hydraulic pressure developed by contraction of the lateral muscles of the thorax and abdomen. However the flexor muscles of the prementum are believed to be contracted during the early stages of pressure build-up, and their sudden release would then provide a mechanism whereby additional force is put into the strike. Such a proposal is supported by earlier observations on the strike and also by recordings of pressure changes in the thorax. The T-shaped apodeme provides support for the labial base, acts as the hinge for the postmentum, serves as the attachment point for important muscles and through its elastic properties allows the postmentum to return after the strike. (Author).

- (1415) RUDOLPH, R., 1976. Libellenbeobachtungen in Münsterland. *Natur- u. Landschaftsk. Westfalen* 12 (1): 30-32. — (*Fliednerstr. 21, D-4400, Münster, GFR*).

A popular account on odon. of the Münsterland, Westfalia, German Federal Republic, mainly for the convenience of secondary school teachers, leading biological excursions to this area.

- (1416) RUDOLPH, R., 1976. Die Libellenfauna des NSG Steinbruch Vellern. *Natur & Heimat* 36 (2): 25-28. — (*Fliednerstr. 21, D-4400 Münster, GFR*).

The odon. fauna (13 spp.) of the nature reserve, Steinbruch Vellern, Münsterland, Westfalia, German Federal Republic, is discussed. It is characterized by a low number of spp., a relatively high percentage of mediterranean elements, and by small populations of all anisopteran and some zygopteran spp.

- (1417) SCHALLER, F.E. & J.A. HOFFMANN, 1976. Métabolisme de l' $\alpha$ -ecdysone in vivo et in vitro chez *Aeshna cyanea* (Insecte, Odonate). *Colloques internationaux C.N.R.S. 251 (Actualités sur les hormones d'Invertébrés)*, pp. 393-401. (French, with Engl. s.; Colloquium held at Villeneuve d'Ascq, France, on Sept. 9-12, 1975). — (*Lab. Biol. gén., Univ. L. Pasteur, 12 Rue*

*de l'Université, F-67000 Strassbourg).*

The control of moulting in two steps is demonstrated in *Aeshna* (1) by removal of either the cerebral level (by electro-coagulation of the pars intercerebralis), or the prothoracic level (by extirpation of the prothoracic or ventral glands that produce ecdysone): each of these operations prevents moulting and the insects remain as permanent larvae, (2) by implantation of either a pars-corpora cardiaca complex, or at least two pairs of ventral glands into such larvae. The first type of implantation induces resumption of development regardless of the age of the larval donor in its instar, while a positive response of the second type depends on both the number of glands implanted and the age of the donor, the highest activity occurring when the donor is near the end of the intermolt. In fact, the titer of ecdysone ( $\alpha + \beta$ ), as determined by the *Calliphora* bioassay, shows a significant peak during the last third of the intermolt; permanent larvae lack ecdysone. These physiological data make it necessary to determine the metabolic fate of ecdysone in relation to the changes in the level of this hormone during the larval intermolt. — Radiolabelled  $\alpha$ -ecdysone was injected into the abdomen of *Aeshna* and the radioactive metabolites from the insects and their excretory products were extracted. At the time of a low endogenous hormone titer (days 1 to 15 of a 25-day duration of the last larval instar) the conversion rate of  $\alpha$  to  $\beta$ -ecdysone is low, while conjugation and oxydation (leading to 3-dehydro-ecdysone) are rapid and significant; at this time ecdysone and its metabolites are excreted in massive amounts through the faeces. In contrast, at the time of the increase of the endogenous hormone level (from days 16 to 25), 20-hydroxylation becomes the predominant metabolic pathway of injected  $\alpha$ -ecdysone; conjugation and dehydrogenation become less important; the excretion rate of both ecdysone and its metabolites is considerably depressed. Thus, it appears that there is a correlation between the level of endogenous ecdysone and the metabolic fate of

this hormone. We also found that the rate of 20-hydroxylation is not affected by the extirpation of the ventral glands. — Incubation of different tissue fragments with radiolabelled  $\alpha$ -ecdysone shows that in *Aeshna* 20-hydroxylation occurs essentially in the fat body and in the Malpighian tubules. Inactivation and 3-dehydrogenation of ecdysone are primarily observed in the Malpighian tubules and in the midgut. Ecdysone 20-hydroxylase activity was demonstrated to be present mainly in the microsomal fraction of the fat body of this insect. (Authors).

- (1418) SPURIS, Z., 1976. Dzīvie izraktēni [Living fossils]. Zinātne, Riga. 68 pp. — Price: 0,12 Rubles. — (Latvian). — (*Inst. Biol., Latvian Acad. Sci., Miera ielā 3, USSR-229021 Salapils*).  
A popular booklet, including a chapter (pp. 59-63) on Odon.
- (1419) STOBBE, H., 1976. Libellen (Odonata) des Donauriedes. Naturk. Jb. DJN 1975-1976: 82-101. — (*Ahrensburger Platz 4, D-2000 Hamburg-67, GFR*).  
A detailed account is given of the odon. fauna (29 spp.) of the Donauried area, nr. Donaumünster, between Ulm and Ingolstadt, Bavaria, German Federal Republic. A general ecology description of the study area is followed by faunal analyses of single biotopes and by a systematic faunistic account. Where available, notes on autecological observations of single spp. are also furnished.
- (1420) STRAUSFELD, N.J., 1976. Atlas of an insect brain. Springer, Berlin-Heidelberg-New York. 214 pp., 71 pls. — (*Author's address unknown*).  
The main contents of the monograph are restricted to the Common House Fly (*Musca domestica*), but here and there reference is made to other groups as well, incl. Odon. The book is indispensable to anyone interested in insect neuro-anatomy and neurophysiology.
- (1421) VEENSTRA, J., 1976. Odonata. Anax 8

(1): 19-24. (Dutch). — (*Hoeverstein 16-c, Wageningen, NL*).

A brief popular outline of the main features of dragonflies, with a considerable list of papers on the Dutch fauna, prepared for the convenience of young members of the Dutch Christian-Catholic Youth Federation of Nature Friends (CKJN), that are interested in dragonflies.

(1422) VERDONK, M., 1976. Libellenonderzoek landgoed "De Beek" 1975. [The dragonflies of the estate "De Beek" in 1975]. *Anax* 8 (1): 3-13. (Dutch). — (*Verhulstlaan 8, Bussum, NL*).

A brief popular report is presented of the main results of spring-summer observations (1975) on the population structure of the odon. fauna of a ditch, considered to represent a representative example of this type of odon. habitat in the central Netherlands (Noord-Holland province).

(1423) VERDONK, M., 1976. Libellenstudiekring. [Dragonfly Study Club]. *Anax* 8 (1): 25. (Dutch). — (*Verhulstlaan 8, Bussum, NL*). Announcement of the foundation of a Dragonfly Study Club in the framework of the Dutch Christian-Catholic Youth Federation of Nature Friends (CKJN), and its program. The latter includes also a publication of a quarterly newsletter. Detailed information should be obtained from the author.

(1423) VERDONK, M., 1976. Mogelijkheden voor libellenonderzoek. [The possibilities for dragonfly research]. *Anax* 8 (1): 35-36. (Dutch). — (*Verhulstlaan 8, Bussum, NL*). 6 technically simple topics are briefly outlined that could be profitably worked on by the members of the Dutch Christian-Catholic Youth Federation of Nature Friends (CKJN) interested in dragonflies.