Dipterists Digest

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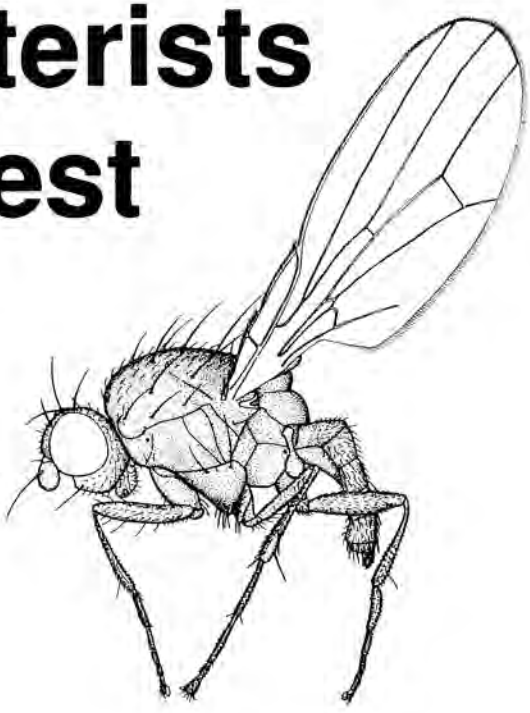

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Dipterists Digest

Dipterists Digest is the journal of the **Dipterists Forum**. It is intended for amateur, semi-professional and professional field dipterists with interests in British and NW European flies. The scope of **Dipterists Digest** is:

- the behaviour, ecology and natural history of flies;
- new and improved techniques (e.g. collecting, rearing etc);
- the conservation of flies;
- provisional and interim reports from the Diptera Recording Schemes, including maps;
- records and assessments of rare and scarce species including those new to regions, countries, districts etc;
- local faunal accounts and field meeting results specially if accompanied with good ecological/natural history interpretion;
- descriptions of species new to science, and
- notes on identification including deletions, ammendments to standard key works and checklists.

Articles may be of any length up to 3,000 words and must not have been accepted for publication elsewhere. Items exceeding this length may be serialised or printed in full, depending on competition for space. Articles should be written in clear and concise English, preferably typed double spaced on one side of A4 paper. Style and format should follow articles published in the most recent issue. References to journals should give the title in full. Only scientific names should be underlined. Tables should be on separate sheets. Figures should be drawn in clear black ink, about twice their printed size and lettered clearly. Descriptions of new species should include a note of which museum or institution type material is being deposited. Material submitted on 3.5" computer disc should be in ASCII format and accompanied by hard copy. Authors will be provided with twenty reprints of papers of two or more pages in length.

Articles and notes for publication should be sent to the Editor, Dr Graham E. Rotheray, Royal Museum of Scotland, Chambers Street, Edinburgh, EH1 1JF, UK. Enquiries about subscriptions and information about the **Dipterists Forum** should be addressed to the Membership Secretary, Liz Howe, Ger-y-Parc, Marianglas, Tynygongl, Benllech, Gwynedd, LL74 8NS, UK.

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DISCUSSION PAPER

Some reflections on the history of systematic Dipterology

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"Respect for the past must be pious but not mad"
(V.V.Rozinov)

Introduction

This is the text of a talk that was presented at the opening session of the Third International Congress of Dipterology at Guelph, Canada, 14-19 August 1994. This talk proved to be of wide interest, and numerous requests were received for its publication. Unfortunately, and purely for reasons of cost, none of the illustrative material that accompanied the talk can be included here.

The theme underlying the talk was: "Those who cannot remember and understand the past are condemned to repeat it" (George Santayana, 1863-1952, American philosopher and poet). Some of the material is dealt with more fully in Thompson & Pont (1994).

We take the science of identification and classification, of taxonomy and systematics, very much for granted and accept it as part of the collective creative intelligence of our culture that takes us beyond routine existence and into significant living. But this has not always been so, and systematics is a curious and very modern phenomenon. It requires a society with sufficient economic resources, communications, social motivation, intellectual curiosity, and, above all, optical equipment. These prerequisites only came together in the 17th and 18th centuries in western Europe, and it is during this period that we find the beginnings of empirical systematic entomology. We all like landmarks to define turning-points or trends, and in entomology the year 1758 with the 10th edition of Linnaeus' *Systema Naturae* has become just such a landmark. This work was indeed a quantum-leap forwards in the theory and practice of classification, an example of what the historian of science Thomas Kuhn (1970) has termed "paradigm forming science", but of course it did not arise in a vacuum any more than did, say, the music of Mozart or the painting of Michaelangelo or the plays of Shakespeare. The greatest protagonists of science and of art have been eclectic, and so I shall first consider what happened before Linnaeus and then move on to some of his successors.

The pre-Linnaean era

Peoples at all times and in all places have had a utilitarian attitude towards the world around them. That is to say, they have been interested in the manner in which the environment impinges upon their personal and collective aspirations and endeavours. So it is not surprising that the earliest cultures have left records, albeit of a very primitive kind, of the

beneficial and noxious insects that affected their lives: apiculture was depicted on stone slabs from 2000 BC, and is even recorded in a prehistoric cave painting in Spain. Sericulture was recorded in China as early as 3300 BC, and locusts are shown in Egyptian tomb carvings from 2470 BC. Locusts, wasps, hornets, house flies, biting flies, vine pests, lice, fleas and other insects were feared and were endowed with a numinous aura: as people were without what we would now term a scientific outlook, the insects themselves were endowed with human qualities and the plagues of insects that afflicted settled human populations were thought to be manifestations of the wrath of the gods. In ancient Egypt, the hieroglyph for a fly stands for both impudence and courage, and the military decoration for bravery was a fly. In the Middle East (as recorded in the Bible) the god Baal-zebub, "lord of the flies", was worshipped because he gave protection against flies. The Jewish Talmud states that if a man finds a hair and a fly in the food cooked by his wife, the fly although disgusting is excused because it is not her fault, but the hair is inexcusable and may become grounds for a divorce. One cognomen of the Ancient Greek God Zeus was "myiagros" ("hunter of flies") because of his ability to clear his temples of flies. It us worth adding here that, according to the Bible, the oldest profession is in fact systematics. In *Genesis* chapter 2 verses 19-20, we read: "And out of the ground the Lord God formed every beast of the field and every fowl of the air; and brought them unto Adam to see what he would call them; and whatsoever Adam called every living creature, that was the name thereof. And Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field." And all this before God had created woman!

The *real* foundations of classification as we understand it were laid by Aristotle (384-322 BC), an Ancient Greek philosopher trained in the transcendalistic school of Plato but a firm realist in his own outlook and philosophy. Aristotle was the tutor of Alexander the Great. His work embraced the whole of knowledge, and as a zoologist his observations and his conclusions were not definitively superseded for 2000 years, at the end of the 18th century. He was a vastly talented encyclopaedist, but not the pioneering researcher or indefatigable observer of phenomena that he is often held up to be. With no optical equipment, Aristotle recognised a group of insects with only two wings, and also distinguished between flies with a soft tongue and those with a biting tongue. He mentioned the names "myia" (for higher flies, Muscidae, Calliphoridae, Sarcophagidae), "myops" and "oistros" (for horseflies, Tabanidae), "konops" and "empis" (for mosquitoes, gnats and midges, Culicoidea). Most of these survive still though not necessarily with the same meaning. He recognised different stages of the life-history, but could not always integrate them into life-cycles. For example, he mentioned that some flies extruded living maggots, yet also referred to the spontaneous generation of maggots in dung. He also knew the vinegar fly (*Drosophila*), and wrote that it did not mate or produce offspring but generated spontaneously from decaying matter.

With the decline of Classical Greek learning, entomology sank back to basics, to its practical and utilitarian elements. The outstanding naturalist of the Roman era was Pliny the Elder (23-79 AD), an intelligent and industrious member of the landed classes. He wrote an encyclopaedic *Historia Naturalis*, claiming to be a synopsis "of 20,000 subjects from 200 works", which is largely derivative. So far as classification is concerned, Pliny followed Aristotle in distinguishing between flies with a fixed biting proboscis and flies with a soft sucking proboscis.

The Medieval period in Europe, up to the the close of the 15th century, was one of intellectual regression in all branches of scientific knowledge. The temporal and spiritual power of the Roman Catholic church was based upon an authority, tradition and dogma in which empirical science had no place. All knowledge, all explanations, and all theology were set out in the bible, the work of the early Church fathers, and the works of medieval scholastics such as Thomas Aquinas. Progress was not possible, nor was it desired. The Church would have agreed with the 20th century English essayist G. K. Chesterton (1874-1936) who wrote, albeit tongue-in-cheek, that "progress is the mother of problems". All zoological knowledge was contained in Aristotle, and the medieval compilations and codices show little advance on his work. Indeed, almost all works were so theologically orientated and so overlaid with religious symbolism that they were not only factually unreliable but scientifically absurd. The fly was a symbol of the devil and of suffering. These and many subsequent works even up to the time of Linnaeus used "musca" ("fly") in a completely vernacular sense and included many forms that had four wings: scorpion flies, dragon flies, stone flies, caddis flies, lacewings, wasps of various kinds, even some water bugs.

One bizarre feature of medieval man's relationship with insects was in the field of pest control. Insects were actually tried before secular and ecclesiastical courts, prosecuted and sentenced to banishment or to excommunication. In some cases they were even physically arraigned before the courts and then executed. The last ecclesiastical judgement was made in 1733.

This dark cloud of ignorance and superstition was gradually dispersed by two events: the invention of printing and the fall of Constantinople, which led on to the European Reformation. To see how entomological science suddenly expanded as scientists began to observe the real world rather than produce conflations based on their predecessors, we can contrast two works. On the one hand, there is *De differentiis animalivm libri decem* of 1552 by the Englishman Edward Wotton (1492-1555), a London physician. This is a neo-Aristotelian work, sagacious but dry, in which two groups of flies are distinguished, "culex" for the nematocerous and biting flies and "musca" for the rest. On the other hand, there is book 3 of *De animalibvs insectis* of 1602 by the Italian Ulysse Aldrovandus (1522-1605), a physician and botanist in Bologna, Italy, the founder and director of a large botanical garden there. This can be called the first work to establish systematic entomology as a science, and was of such importance that Linnaeus was still citing it in 1758. Aldrovandus gave numerous well-cut wood engravings, primitive but recognisable. He also distinguished between "culex" and "musca", but included other groups in these concepts: mayflies were in "musca", whilst scorpion flies and others were in "culex". But he gave illustrations of 72 species of *Musca* and 23 of *Culex*, and so, for the first time, a means was given for recognising the different taxa being discussed.

The invention of the microscope in The Netherlands in 1599 opened up new areas for investigation, and the foundation of several academies and learned societies fostered dissemination of the results. It also led to the democratisation of science. The first entomologist to exploit the microscope was the Italian Francesco Redi (1626-1698) who, in 1668, definitively established that insects did not arise from decaying matter but from eggs deposited by adult females on suitable substrates, thus dealing the theory of spontaneous

generation its death blow. This he achieved through experiments with carrion flies and meat, in open and covered containers.

The second half of the 17th century saw the further exploitation of the microscope by two Dutchmen, Johann Jacob Swammerdam (1637-1680) and Anthony van Leeuwenhoek (1632-1723). Swammerdam was described by the Swedish Lepidopterist Felix Bryk as a "brooding Faustian figure, full of mystical ecstasy and religious, physico-theological contemplations, constantly suffering monetary cares". He achieved a great deal in his short and troubled life. He was a skilled observer and dissector, and his work gave a tremendous impulse to the comparative study of structures, anatomy, physiology and embryology. In his posthumous *Historia insectorum generalis* of 1685 he classified insects into four classes according to their metamorphosis and this reflects the real advances being made in the acquisition of biological knowledge. He was able to disentangle insect transformations which had previously seemed anomalous and perplexing. He knew the flies that come from larvae in rotting meat and those that live as parasites in other insects, and gave a delightful account of the latrine fly, *Fannia scalaris*.

Leeuwenhoek came from a brewer's family and was entirely self-taught. He devoted his life to the natural sciences, and made himself many microscopes some of which had more than one lens and gave magnifications up to 270 times. He found, however, that it was better to work at lower powers because of the problem with illumination. Like his contemporary Robert Hooke, his observations were desultory and random but he initiated biological enquiries of great interest. His observations on insects included spermatozoa, muscle histology, optic nerves, corneal dissections, and so on. His investigation of the biology of the cranefly *Tipula paludosa* was a little classic. In his *Arcana naturae detecta* of 1695 he described the sperm of flies, and illustrated scales from a mosquito wing.

In England, Robert Hooke (1635-1703), a man of great versatility and mechanical ingenuity, modified the microscope and published his studies of various objects in his *Micrographia* of 1665. His random observations included a bluebottle and a mosquito/midge.

Further advances were made in the work of the Englishman John Ray (1628-1705). Ray was the son of a blacksmith and became a fellow of Trinity College, Cambridge. In the early 1660s, with the restoration of the monarchy, he had a dispute over oaths of religious allegiance, was turned out of church and college, and was reduced to penury. He was patronised by his friend the naturalist Francis Willughby (1635-1672) and became tutor to his children. Willughby lived at Wollaton Hall, built in 1588 and described as "one of the noblest examples of English domestic architecture". It is now a most delightful Natural History Museum, still in its own extensive grounds and deerpark within the city of Nottingham. Willughby died in 1672. Ray spent the last 35 years of his life writing up their scientific labours, subsisting on the pension of £60 a year left to him in Willughby's will. Ray followed Swammerdam in erecting a system based on morphological and biological facts. He is credited with being the first zoologist to recognise the species and the genus as systematic units, defining the species as a collective idea for the offspring from the same or identical progenitors and the genus as a group of species that resemble each other. His great work *Historia insectorum* was published posthumously in 1710. Like many of his immediate

predecessors he recognised two groups of flies: "musca bipennes" (two-winged flies) and "musca quadripennes" (four-winged flies). This again highlights the very vernacular use of the term "musca" in these pre-Linnaean works.

Not all works were so ambitious or comprehensive in scope. Johann Leonhard Frisch (1660-1743) published a multi-volume work entitled *Beschreibung von allerley Insecten in Teutsch-Land*, from 1720 to 1738, describing the structure and habits of various insects from Germany. In 1662, the Dutchman Johann Goedart published an account of 144 breeding experiments with insects (*Metamorphosis et historia naturalis insectorum*, with an English translation by Martin Lister in 1682). Another Dutchman, S. Blankaart in 1688 published a delightful little book entitled *Schou-burg der rupsen, wormen, ma'den, en vliegende dierkens daar uit voortkomende*, illustrated by coloured plates. It dealt with the immature stages of various insects.

The last great figure before Linnaeus was the Frenchman R. A. F. de Réaumur (1683-1757), a prolific and enormously influential naturalist. The son of an appeal judge in La Rochelle, Réaumur devoted 50 years of his life to the industrial arts, general physics and natural history, passing an honorable and tranquil life partly on his estate at Saintonge and partly at his country house at Bercy near Paris. He stressed, above all else, the importance of personal observation and personal experience. He wrote a series of *Mémoires pour servir à l'histoire des insectes* in six volumes (1734-1742), generally considered to be his most important work, and embodying his morphological and biological observations on Diptera. Amongst other things he noted that the higher flies included oviparous and viviparous species; he observed the method of adult eclosion using the ptilinum; and he reared blue bottles, green bottles, flesh flies and house flies from meat, and described the blue bottle in great detail (adult, feeding mechanisms, immature stages). It is interesting that his group of "mouches" (flies) still included two-winged and four-winged forms, and that his two-winged forms included one group with a soft, sucking proboscis and a second group with a hard, piercing proboscis. This, it will immediately be recognised, is no different from Aristotle's classification 2000 years earlier.

Linnaeus and his successors

We come now to Carl von Linnaeus (1707-1778). With hindsight it is easy to see the importance of the 10th edition of *Systema Naturae* of 1758, yet at the time its impact was neither instantaneous nor universal, and there is no caesura in the scientific literature at 1758. Linnaeus arrived only gradually at his binominal nomenclature. Originally he used one word for the genus and up to 12 for the species: for him, as for his contemporaries, the "species" element had become an enormously cumbersome cursive descriptive sequence. He gradually refined his procedures until he was consistently binominal in 1749 for plants (*Pan Svecicus*) and 1754 for animals (*Museum Adolphi Friederici*). In 1758 he gave a well-defined view of orders, genera and species, and a means for distinguishing the species. These conspicuous merits, together with his clarity of thought, love of order and limpidity of style, helped to promulgate both his system and his method. His nomenclature and many of his classes, orders, genera and species are now part of the permanent fabric of zoology. But, despite his industry and versatility, he did not probe deeply into the fundamentals of biology: for

example, he firmly believed in creation, despite the stirrings of an evolutionary theory that was already evident in the work of his French contemporary Buffon.

The 1st edition of *Systema Naturae* (1735) was a very slim volume, not marking any great advance on contemporary knowledge and not giving any indication of what would follow. It dealt essentially with higher classification and paid very scant attention to species. It was only in the 4th edition (1744) that Linnaeus used the name Diptera for an order of two-winged flies. The 6th edition (1748) gave a more expanded treatment, but the 7th, 8th and 9th editions remained essentially unchanged. The 10th edition involved a complete transformation. It followed the methodology which Linnaeus had worked out in the 1st edition of his *Fauna Svecica* of 1746, a work devoted to the Swedish fauna, and which he now applied to the world fauna. A brief examination and comparison of the two shows the principles involved and explains why it has had such a profound effect. Firstly, the orders are subdivided into genera, and the genera into species-groups or directly into species. Each species has a single-word epithet, and it is with this contribution to clarity and communication that most of us are familiar. There follows a brief diagnosis, and it is important to note that this is not intended to be a full formal description but is rather a diagnosis of the kind that one finds in modern field guides. Then there are references to earlier workers, a statement of the geographical distribution, and notes on the biology.

This work was followed by a second edition of the *Fauna Svecica* (1761) in which Linnaeus applied his new nomenclature. Several further editions of the *Systema Naturae* followed: a 12th edition (1767) by Linnaeus himself; a 13th and greatly enlarged edition by the German zoologist Gmelin (1790) which was translated into English by Turton in 1801; and an expanded edition by the Frenchman de Villers (1789) that incorporated work by De Geer, Fabricius, Scopoli and Schrank.

As entomological science expanded it became impossible for individuals to cope with the flood of material that was being collected and with the tomes of publications that were issuing from the presses of every major European city. Specialisation began, a trend that has continued right down to the present day. Linnaeus' successor Fabricius worked only on insects, and his successor Meigen, the father of European Dipterology, concentrated on Diptera. Specialists in related fields made quite outstanding advances, too, as can be seen from a remarkable book published in 1763 by M. F. Ledermüller, entitled *Mikroskopische Gemüths- und Augen Ergötzung*, which contains numerous colour plates not only of objects but of the methods of study and projection. Works such as this gave tremendous impetus to morphology, anatomy and histology.

Johann Christian Fabricius (1745-1808) was Linnaeus' foremost pupil. He worked hard to develop classificatory ideas based on the mouth-parts, and was unwilling to admit that the use of other characters would contribute either to clarity or to a "natural" system. He considered that the greater the number of characters used the greater would be the ensuing chaos. In 1775 he divided the Diptera into the familiar two sections based on the structure of the proboscis, and apart from the greater number of generic names that he employed this was still scarcely different from Aristotle's division of the Diptera.

The argument about the number and nature of the characters that should be used in classification rumbled on for decades. The Frenchman E. L. Geoffroy (1762) and the Italian J. A. Scopoli (1763) had been the leading proponents of the view that all available structures should be used for classification, and with the complete dominance of Meigen in Dipterology in the first decades of the 19th century this was the view that prevailed.

Zoologists in France in the early 19th century were the most significant system-builders and contributed most towards the ideas of natural classification. Lamarck and especially P. A. Latreille used characters from all parts of the insect anatomy and moved towards more "eclectic", or, as we would now say, "integrated" systems of classification. It was Latreille who was the first to introduce the concept of the "family" as we now understand it (e.g. Latreille, 1825)

Discussion of what constitutes a "natural" classification has of course never ceased. Most systematists liked to believe, and still like to believe, that they are working towards a natural classification. As in religious and metaphysical speculation, everyone believes that he knows the right road to the truth. In religious beliefs, God is thought to reveal to man the natural order of his creation, and we are still continuing along the same route except that we now consult our computers instead of God. We write programmes that give us the results we desire, in the same way that our predecessors (and indeed all too many of our contemporaries) ascribed to God the characteristics that underpinned their own political, social, racial or personal attitudes. It is salutary to remind ourselves, as the Swedish explorer and philosopher Erik Nordenskiöld pointed out in 1921, that in nature only individuals are found, whilst genera, orders, classes, exist only in our imagination.

Ralph Waldo Emerson (1803-1882), the American essayist and poet, wrote: "There is properly no history, only biography", and I shall now take a more detailed look at five of the individuals who contributed to progress in systematic Dipterology during the era after Linnaeus and who have been of particular interest to me in the course of my recent work on the Muscidae: De Geer, Moses Harris, Meigen, Wiedemann and Macquart.

Charles De Geer (1720-1778)

Charles De Geer, Baron of Leufsta, was born into the foremost family in Sweden. The family was of Dutch extraction and had settled in Sweden during the early years of the 17th century, where Charles' great-grandfather, Louis De Geer (died 1652), owned iron and copper mines, iron foundries, munitions factories, and immense tracts of land in southern Sweden, purchased with wealth acquired during the Swedish imperial era. Between the ages of 4 and 18 De Geer lived with his family at Utrecht in The Netherlands. He returned to Sweden in 1738, on the death of his father, and settled in Uppsala. While still a young man he had been left the family iron mines of Dannemora in Uppland province and other estates, and in 1741 inherited one of the largest fortunes in Sweden. He settled on his estate at Leufsta (Lövsta), 60 km north of Uppsala and close to the Baltic coast, and also lived in Stockholm where his family owned various properties. With considerable managerial powers and keen business acumen he was able to multiply his capital and increase his estates and mining holdings, yet for all that he was a liberal and generous man according to

contemporary reports. He was on cordial terms with Linnaeus, who had also returned to Sweden in 1738 (though not to Uppsala until 1741), and was a regular supporter of the Academy of Sciences in Stockholm. He was also a member of the Swedish parliament, a Royal chamberlain, and later master of the Royal Household. He died of gout, an occupational hazard for all the well-to-do of that century.

De Geer married a Swedish lady, Catharina Charlotta Ribbing, thus breaking with an old family tradition: she was the first Swedish-born wife in the family. She was a remarkable woman, and attracted considerable attention by having all her children inoculated against smallpox. In recognition of this example, a medal was struck of her in 1756.

De Geer was one of those fortunate individuals who combined intellectual ability, good education, independent means and ample time for pursuing his chosen subject. He was a cool and sober thinker, as well as an elegant and high-minded courtier, but no dilettante. His work was regarded very highly by his contemporaries and successors, and between 1776 and 1783 his *Mémoires* appeared in a German translation by the Quedlinburg priest Johann Götze, who had previously translated Bonnet, Réaumur and Linnaeus into German.

De Geer was a great admirer of Réaumur. His *magnum opus*, the *Mémoires pour servir à l'histoire des insectes*, in seven volumes published between 1752 and 1778, was closely modelled on the work of Réaumur. Not only does it have the same title, but it is also written in French and is produced in large quarto and with the same decorations. Even the most casual glance at the *Mémoires* will show De Geer's acute powers of observation and description, and the patient care with which he pursued his investigations. The *Mémoires* deal with 1446 species, with data on life-histories, food, reproduction, with numerous illustrations on 238 copper plates.

Perusal of the *Mémoires* illustrates how uneven was the acceptance of Linnaeus' binominal nomenclature, even among his close friends. Volume 1 (1752) was too early, but volume 2 (1771) did not employ the binominal system. It was only in volume 3 (1773) and subsequent volumes that De Geer adopted this system. Even so, it was reluctantly adopted, with the specific name in brackets and followed by a long cursive diagnosis as in the old system. De Geer also changed Linnaeus' names if he did not like them or thought them inappropriate. The Linnaean system and nomenclature gradually became established through usage in the 1760s and 1770s, and De Geer's adoption of the system was evidently a concession to usage rather than from conviction that the method was right: he was more interested in the biologies of insects than in their descriptions and names. And he was never reticent in discussing any differences he had with Linnaeus, as his letters to the great man show: "not everyone sees things in the same light, and people have the weakness of frequently being too fond of their own opinions" (16 October 1772); and again: "if here and there I am still of a different opinion, I am now as before asking you not to take it amiss" (23 February 1774).

De Geer's collection is now in Stockholm Natural History Museum and is still kept intact though no longer in the original cabinets or with any of the original labels.

Moses Harris (1730-?1788)

At the time that the final volumes of De Geer's work were being published, the Englishman Moses Harris brought out a work on English insects. Little is known of the life and personal circumstances of Harris. Indeed, even the year of his death is uncertain. What is known, however, is that he had little formal education; that he began to be interested in entomology at the age of 12; that he had an uncle who was a member of the first Aurelian Society in London; that his adult life was spent in comparatively easy circumstances and was devoted to entomology; that he married and had one son; and that he probably lived in south-east England, since Tilbury (Essex) and Dartford (Kent) are mentioned as localities in his writings. He was undoubtedly a patient, accurate and original observer. He was an accomplished miniature painter, and his work as an illustrator and engraver was of such quality that his services were eagerly sought by his contemporaries. He was castigated by Dru Drury for being too slow, but this was because he insisted always on a high standard of accuracy in his engravings and colouring.

His work *Exposition of English Insects* (1776-1780) is one of the gems of 18th century entomological literature. But it presents problems at various levels that have proved largely insurmountable. Yet it repays study. As the English Dipterist G. H. Verrall wrote in 1901: "Moses Harris never ought to have been ignored in the Diptera, in which he was more than an equal with his contemporaries in nomenclature while he was almost 50 years in advance of any other Dipterologist in venation."

Firstly, the printed date at the beginning of the volume is 1776, but the actual dates on the plates range from 1766 to 1780, so the work cannot have appeared in 1776 in its entirety. It appears to have been published in 5 decads, each with ten plates and accompanying text. The first decad is given the definite date of publication of 1776. The others are tentatively assigned to 1776 and 1780. Secondly, there are variations in the coloured plates within and between editions. The printed text appears to be consistent, though some of the names are emended or mis-spelled in the second and subsequent redactions. The plates, however, often exhibit quite striking differences from copy to copy of the same edition. These are obviously due to the mode of production of colour plates at the time: it is said that copies of the engraved plates were printed, and then given to classes of young ladies to colour for their art practice. Using the original hand-coloured plate as a model they would colour the engraved plates with varying degrees of accuracy. It is also important to note that there are sometimes discrepancies between the text and the plates, where descriptions of the colour just do not match what is shown, and there are also discrepancies between the scale-lines shown on the plates and measurements given in the descriptions. Thirdly, Harris' collection is generally considered to have been destroyed. It seems inconceivable that it should still be in existence in a small local museum in England or even in private hands, though one should remember the rediscovery in a London antique shop in 1962 of the collection of Bracy Clark whose pioneering work on Oestridae was published in 1797 (Sabrosky, 1972).

Although nearly 300 species of Diptera are described in this work, it easy to see why Dipterists have felt disinclined to interpret the names. The work was ignored by Fabricius, and so fell into undeserved oblivion although it is one of the best and best-illustrated in early

modern literature. A further inhibiting factor is the grammatical form of the names: those ending in -o or -or are finite verb forms (*restituo*, *ingredior*), and those ending in -e or -er are adverbs (*delicate*, *semulater*). They displeased Harris' contemporaries, and in our time are disallowed by the requirements of the *International Code of Zoological Nomenclature*.

A glance at this work, however, soon shows its many merits There is an English and a French text, arranged in parallel columns, giving the descriptive matter. The descriptions, judged by the standards of the time, were good. The coloured figures, particularly of the larger species, are with few exceptions excellent. And the work contains numerous biological and ecological observations which show Harris to have been much more than just a collector.

If the introductory pages of the work are consulted, it is easy to see how far descriptive Dipterology had advanced within a single generation from the 10th edition of *Systema Naturae*. In no author before Meigen do we find such detailed explanations of terminology nor such relevant illustrations to accompany them. Harris was the first entomologist to recognise the importance of wing-venation in classification. For example, take the genus *Musca* which still, at that time, covered almost all the Brachycera and Cyclorrhapha: whereas Linnaeus divided his *Musca* into 7 groups based on aristal structure and body pilosity, Harris divided the genus into 9 groups based largely on wing-venation. It was left to Fallén and Meigen a generation later to rediscover the importance of wing-venation.

Christian Rudolph Wilhelm Wiedemann (1770-1840)

In the closing years of the 18th century, a brilliant circle of writers and critics gathered in the little German town of Jena, where the great Friedrich Schiller was teaching history at the university. These were the proponents of the so-called Romantic movement in German literature and art, which was in essence a rebellion against the rationalism of the preceding Age of Enlightenment and a recognition that there is more than reason and order in human society and the human mind. There was the writer Ludwig Tieck, the author of numerous novels, short stories and plays; the poet Novalis, writer of visionary celebrations of love and death; the philosopher Fichte, author of a practical and immensely popular philosophy; the philosopher Schelling whose work *System of Transcendental Idealism* with its insistence that the human consciousness is fulfilled by art, was enormously influential; and the brothers Schlegel - August Wilhelm, critic, poet and translator of Shakespeare's plays into German (which are still the standard performing versions), and Friedrich, writer, critic and founder of the modern science of philology. Also in the group was A.W.Schlegel's wife Caroline. These were immensely fruitful years in German intellectual life, but inevitably, amongst such brilliant individualists, arguments and disagreements led to the break-up of the group. Caroline divorced Schlegel and married Schelling in 1803.

What has this to do with Dipterology? Very little, of course, but there is a connection. Caroline Schlegel/Schelling was the daughter of J. D. Michaelis, Professor of Oriental studies at Göttingen University, and her younger sister Luise married Christian Rudolph Wilhelm Wiedemann, author of the first fundamental works on exotic, i.e. non-European, Diptera. Wiedemann appears as a shadowy figure in Dipterology: there is no biography in

the entomological literature, nor is any portrait of him known to exist. From obituaries in the medical literature and from Luise Wiedemann's autobiographical reminiscences, published in a very obscure and small edition in 1929, it has been possible to put together a biographical, social and scientific background for this influential Dipterist.

Wiedemann was born in Brunswick in 1770 and qualified as a medical doctor at Jena in 1792. Natural history interests were already a prominent element in his life, and so he then undertook a journey to England and Wales to further his studies in mineralogy. There he received news of his appointment as Professor of Anatomy at Brunswick's Collegium Carolinum. In 1796 he married Luise Michaelis, and over the next ten years his teaching career and medical practice in Brunswick prospered. He specialised in midwifery and wrote several very successful textbooks; he also wrote a textbook of anatomy and, being fluent in Latin, English and French, translated a number of important medical works into German - all of which was part of an endeavour among scholars and scientists in Brunswick to make German rather than Latin the language of learning in Germany. He read and wrote poetry, was an accomplished musician, and collected books and paintings. He travelled to Paris for 6 months to study French techniques in obstetric practice. He wrote a book on the treatment of accident victims, a booklet on smallpox vaccination, and even a review of certain classes of fossils.

At this time the German Coleopterists Illiger and Hellwig were active in Brunswick. Despite his youth, Illiger was already the most profound and influential entomologist of the time in Germany. In 1801 they were joined by Count Hoffmansegg, fresh from a 4-year scientific exploration of Portugal. These three friends amalgamated their entomological collections, which rapidly became the most complete and scientifically important collection of the time in Germany. When the Museum für Naturkunde in Wilhelm von Humboldt's new University of Berlin was opened in 1809, the collection was moved there and at Hoffmansegg's intiative Illiger was appointed as first director of the Museum. Wiedemann was certainly in contact with these three during his time in Brunswick: his work bears the obvious hallmarks of Illiger's influence on methodology and terminology, and he also refers to Illiger having attended some of his natural history lectures.

In 1804, however, in the course of a delivery which he supervised in person as was his custom, Wiedemann infected himself with a venereal disease, most probably syphilis. He was seriously ill on-and-off for years, and never fully recovered his health. In 1805 came an invitation to Kiel as Professor of Medicine, to open a new maternity hospital and direct a new training institute for midwives. Kiel was at that time part of the Duchy of Holstein and in Denmark, but Wiedemann rapidly learned Danish and gave instruction in both Danish and German. Conditions were hard in Kiel, and on several occasions he was also compelled to take extended periods of sick leave in France and Italy. But, despite setbacks, his career prospered. His clinic became established and slowly expanded, with infusions of his own personal funds. Of his nine children, 4 died in infancy. When his brother-in-law died he adopted his two nephews. One of these, G. A. Michaelis, followed in his uncle's footsteps and eventually succeeded Wiedemann as director of the clinic. Although one of the great names in the development of obstetrics as a scientific discipline, Michaelis subsequently became embroiled in a controversy with I. P. Semmelweiss over puerperal fever and

committed suicide in 1848 by throwing himself in front of a moving train. Two of Wiedemann's daughters married into the Welcker family of Ofleiden in Hessen province, and this place-name occasionally appears on labelled specimens in Wiedemann's collection. Another daughter married an Olshausen, and it is through the Olshausen family that many of the Wiedemann records and papers survived. His only son to live beyond infancy followed his father and became a medical doctor.

Wiedemann's interest in the taxonomy of Diptera expanded suddenly after 1814. Perhaps it was an activity that could be safely undertaken without overtaxing his fragile strength. After publishing a few short papers in the 1810s, he worked steadily through the 1820s on his great 2-volume work *Aussereuropäische zweiflügelige Insekten* (1828-1830). But by 1829 his eyesight was so poor that he had to give up close work. His work at the hospital also declined, but entries in the day-book recording the confinements and case-histories continued in his hand until September 1839. He died in 1840.

Wiedemann was said by a contemporary to be one of the best and most reliable obstetricians in Germany, and his international contacts and experience enabled him to lead the German schools in the right direction. He held ideas that were well in advance of his time, and as a practising obstetrician was exceptionally gifted and skilful. According to Michaelis' figures, the infant mortality for 2573 births in his clinic was 5.7%, a very low figure for the time. Through his energy and drive, the maternity hospital in the little town of Kiel achieved an international reputation, a remarkable achievement when set against the background of his own chronic ill-health.

As a Dipterist, Wiedemann came to see himself as the successor of Fabricius in the field of "exotic" Dipterology and as doing for the exotic Diptera what Meigen was doing for the European Diptera. He was regarded by his contemporaries and by subsequent generations as a careful worker and describer, and his later papers show a number of clear advances on the work of his predecessors: descriptions include a Latin diagnosis, a detailed German description, the sex of the specimens, the collecting locality, and the collection in which they are deposited. He noted the precision that Illiger and Hoffmansegg were bringing to zoological terminology and nomenclature, and he introduced into his own work a consistent and precisely-defined terminology for morphological structures and, most especially, for colours.

At this time Fabricius' collection was in Kiel, and Wiedemann was able to consult it when verifying his own identifications or when puzzling over some of Fabricius' far from informative descriptions. In one of his early papers he stated that he had compared his specimens with those in the Fabricius collection, noting that he only used specimens bearing Fabricius' labels because the others, without labels, were subsequent additions and did not always belong to the same species. This shows a clear understanding of the type-specimen concept in our modern sense of authentic original specimens.

Embedded in the Gothic script of his introduction to volume 1 of *Aussereuropäische zweiflügelige Insekten* are two further facts of interest to the systematist. Firstly, there are notes on synonymy and generic assignments of many Fabrician species which, since so many

of the original Fabrician types were destroyed in the last century, are the nearest we are likely to get to accurate interpretation of the names. Secondly, he obtained American material from the Philadelphia Academy of the species described by Thomas Say and retained some of it in his collection. Say's types were also destroyed in the last century, so that these few surviving specimens, now in the Wiedemann material in Vienna, are all that remain to guide us in the interpretation of these names.

Johann Wilhelm Meigen (1764-1845)

One of the most significant events for European Dipterology was the association of Wiedemann and Meigen, and this brings us to the founder of European Dipterology, Johann Wilhelm Meigen, in every way a contrast with the urbane and affluent Wiedemann. In an age when few people had the means or the leisure to pursue an activity such as entomology, Meigen was an anomalous and very remarkable figure. He came from a poor farming family, and his long life was a continual struggle against poverty. Yet, by natural talent, dedication, industry and sheer perseverance he was able to produce, among other things, a 7-volume monograph on European Diptera between 1818 and 1838, describing and illustrating 5500 species.

Meigen was born near Düsseldorf in the west of Germany, and he lived in that part of Germany all his life, from 1796 onwards at Stolberg near Aachen and close to what is now the Belgian border. He received a little formal education between the ages of 8 and 10, but was otherwise entirely self-taught. He taught himself French, art, calligraphy and geography, and also pursued various interests in natural history, particularly botany and entomology. He specialised in Diptera after 1788, and his gifts for minute observation and draughtsmanship were soon put to good use. At first he supported himself by working as a private tutor to wealthy families and by teaching French. During the Napoleonic Wars in Europe, however, there was little demand in Germany for a teacher of French, but he was able to teach art, geography, history, piano and astronomy. He served as secretary to various committees in Stolberg, which was then the centre of the European brass industry, worked as a church organist, and undertook several commissions as draughtsman to topographical surveys of the Stolberg area. He taught himself Latin and Greek in order to polish his entomological nomenclature. At various times he published a book of chorales, a set of astronomical maps, a German translation of the Abbé Fénélon's celebrated *Aventures de Télémaque* of 1699 (which became a standard school text), a handbook on butterflies, an unfinished work on Lepidoptera containing 125 plates, and several botanical books including a 3-volume work on the flora of Germany. His magnum opus, however, was the *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten*, for which he prepared the plates and personally engraved those for volumes 6 and 7 in order to reduce publication expenses. He also prepared and engraved the plates for Wiedemann's *Aussereuropäische zweiflügelige Insekten*; and prepared 305 hand-coloured plates to accompany his own monograph, which were not published until recently, illustrating all but a handful of species (Morge, 1975, 1976a, 1976b).

These plates are remarkable achievements, and a view of the originals in the library of the Muséum National d'Histoire Naturelle in Paris is well worthwhile. Meigen wrote that his

routine work was done with a x6 handlens, and detailed drawings with a x20 microscope. He was a skilled draughtsman and worked rapidly. On his northern journey, for example, was able to describe and illustrate 400 species. His working day began regularly at 4 am, and continued until late at night.

Publication of the *Systematische Beschreibung* was only possible because his friend Wiedemann arranged royal patronage of the work and organised a subscription list. Such was his near-destitution in old age that in 1839 he was forced to write to the Crown Prince of Prussia and beg for a small pension, and he then sold all his natural history assets: his Diptera collection and the 305 unpublished plates to Macquart on behalf of the Paris Museum, other insects and some manuscripts to the Hymenopterist Arnold Förster of Aachen, his herbarium and his library. Yet for all that he did not become embittered and Macquart in 1839 found him full of vivacity, charm and warmth. And far from spending a lifetime working in isolation, he was in correspondence with the leading entomologists of the day and was visited in Stolberg by, among others, Fabricius, Illiger and Count Hoffmansegg. Wiedemann, von Winthem, and Macquart.

The first contact between Wiedemann and Meigen was in 1815, the outcome of which was that Meigen took up again his studies of European Diptera and began preparing the *Systematische Beschreibung*. Wiedemann wrote to the Kings of Prussia, Denmark and Württemberg, the Emperor of Austria, and the Crown Prince of Brunswick requesting financial support, and in 1817 spent a week at Meigen's home in Stolberg. He arranged for the Diptera collections in Vienna and Berlin (where the Hoffmansegg Collection was now located) to be sent to Meigen. He also wrote the introductory chapter for volume 1 of the *Systematische Beschreibung*. But Wiedemann's enthusiasm for this project and his altruism did not stop there. In 1822 he again stayed with Meigen, and invited Meigen to visit him. The following year, 1823, Meigen undertook what was in those days a long and arduous journey for a 60-year-old man, from Stolberg to Kiel. Wiedemann paid out of his own pocket for Meigen's travelling expenses and gave him a small bursary to compensate for the loss of earnings during the 12-week absence from home. This journey is dealt with at length in Meigen's autobiography (published by Morge, 1974). For a man of his limited means, it was obviously a momentous event and opportunity, and he kept a detailed diary for the benefit of his family on his return.

Now an easy day's drive, it took him 8 days to reach Hamburg, where he stayed with the von Winthem family. Loaded with drawing equipment, all his plates, specimens for comparison and specimens for exchange, he probably took little other baggage. To illustrate the strenuous, and precarious, nature of travel in the Europe of 1823, here is one of his near-disasters, on this occasion near Düsseldorf. His coach was due to leave the village of Elberfeld at 1 pm, and so he spent the morning visiting his sister and an old friend in a nearby village. He returned in good time, to find that the coach, with all his luggage, had already left for the next staging post at Schwelm 15 km away. Unable to hire a private chaise, Meigen set off after it on foot and after 1½ hours' brisk walking caught up with it at Schwelm, where it had had to spend 2 hours unloading and re-sorting the baggage.

In Hamburg, the entomologist Wilhelm von Winthem gave him an overcoat even though it

was mid-summer, because of the exposed nature of travel in the open carriages then universally used in North Germany. Even so, he arrived at Kiel at 9 am soaked to the skin after a journey through the night in an open carriage. Wiedemann pounced on him immediately with a box of flies, but he was saved from this excessive enthusiasm by Luise Wiedemann who said: "My God, just let him get his breath back before you start burdening him with your flies."

The two men sailed to Copenhagen where they were guests of the wealthy businessman and entomologist B. W. Westermann. Here Meigen was able to work on the Fabricius and other material in the Royal Museum. Meigen was delighted to find that at this latitude, after rising at 4 am to begin work, he could still read by natural light at 11 pm. The two then travelled on to Lund, where they were the guests of Fallén and Zetterstedt. There the polyglot conversation fascinated Meigen: he and Fallén conversed in French, which Fallén preferred to German; Zetterstedt knew little French, and spoke Latin to Wiedemann; and of course Fallén and Zetterstedt spoke Swedish to each other. On the return journey Meigen stayed another three weeks with Wiedemann before setting off for home.

On this journey, Meigen described and illustrated 400 species, and the additional material that he saw from North Germany and South Sweden was incorporated into his work, from volume 4 (1824) of the *Systematische Beschreibung* onwards. The four Dipterists also exchanged material.

As a small recompense for Wiedemann's friendship and support, Meigen prepared the plates of illustrations for Wiedemann's *Aussereuropäische zweiflügelige Insekten*.

Pierre-Justin-Marie Macquart (1778-1855)

It was in 1839 that the Frenchman Macquart, already with an established reputation as a Dipterist, visited the aged Meigen in Stolberg and negotiated the sale of his Diptera collection and the 305 unpublished hand-coloured plates to the Paris Museum.

Pierre-Justin-Marie Macquart was born in the town of Hazebrouck in Northern France and died in the nearby city of Lille. The Macquart family had lived in Northern France since the 15th century. One of Macquart's direct forebears, Philippe Macquart, married in 1456 a certain Jeanne Lys, daughter of Pierre d'Arc and niece of Joan of Arc, the Maid of Orleans. Macquart was one of three brothers. The oldest was an ornithologist, whose collection formed the nucleus of the Muséum d'Histoire Naturelle at Lille. The second was a botanist and director of a botanical garden containing over 3000 species. Macquart had a broad-based interest in natural history but in the early 1800s and under the influence of Latreille concentrated on entomology. His father was a magistrate in Lille with a country property at Hazebrouck. This property was confiscated in the years after the French Revolution of 1789, and Macquart senior was forcibly retired. As a young man, our Macquart joined the army of the Rhine, and spent two years of the French Revolutionary Wars (1792-1800) as secretary and surveyor to General Marescot. His experience of active service gave him a detestation of war which he never lost. Some time around 1800 he returned to Lille when the family regained its former properties. He married in 1810 and

settled in part of a 14th century château in the little village of Lestrem on the River Lawe. This château was totally destroyed in 1918, during the closing stages of World War I, and a church school now stands on the site. From this comfortable base, with independent means and leisure, he immersed himself in local affairs and his entomological interests. In the summer he spent most of his time at Lestrem, collecting and enjoying country life, whilst winters were spent mainly in Lille, reading, studying his collections, and writing his papers and monographs.

Macquart was a founder member of the Société des Sciences, de l'Agriculture et des Arts at Lille, and held various offices in the society of which he was a greatly esteemed member. He was instrumental in founding the Muséum d'Histoire Naturelle in Lille, and his bust still adorns the main staircase of the Museum. In 1817 he became mayor of Lestrem, a post he held until 1830, when he resigned following the abdication of Charles X and his replacement by Louis-Philippe, the "citizen king". Thereafter he continued to serve on various committees, for example in 1833 to undertake property re-valuations, and in 1834 to oversee schools. From 1833 to 1842 he was elected to the general council of the Pas de Calais district of France.

Macquart began working on the local Diptera in the 1820s, and published a series of monographs. These decades were years of great expansion of French overseas interests. French naval explorers were opening up the Pacific, and on land colonial and other interests were being pursued in the Americas, in Africa, in India and in the Far East. Collections of natural history specimens were building up in the Muséum National d'Histoire Naturelle in Paris, and Macquart, when on regular visits to Paris and to the French Entomological Society meetings, began to work on the "exotic", i.e. non-European, Diptera. He saw himself as the successor of Wiedemann, and in the 1840s and 1850s published a series of monographs describing and illustrating some 2300 new species and founding some 150 new genera. Macquart was an extremely conscientious man and his work marks a considerable advance in methodology on that of his predecessors. It is easy to criticise his work without taking due note of its many merits and overlooking the fact that so much of the early exotic material reaching the Paris Museum was in poor condition and without adequate data. He appears also to have been a modest, kindly and generous man. Although he had profound differences with his compatriot A. J. B. Robineau-Desvoidy in his approach to Calyptrate systematics, he was very circumspect in the way in which he worded his criticisms and there is no trace of the vulgar feuds that disfigure some of the 19th (and indeed 20th) century entomological literature. He was also sincere in the respect and deference he showed to Meigen.

In 1839 and 1840 he visited Stolberg and negotiated the purchase of Meigen's Diptera collection and colour plates for the Paris Museum, and it was at this time that he agreed with the Museum authorities to begin work on the exotic Diptera. In 1845 he undertook a long tour with his family through southern France (including Chamonix) and Switzerland, collecting Diptera and visiting the many scientists with whom he had been in correspondence. He returned via Stolberg to find that Meigen had recently died.

Upon his death his extensive private collection of Diptera and his library were bequeathed to the Muséum d'Histoire Naturelle in Lille and the rest, unfortunately, is history. Without

an entomologist to care for it, the collection became infested with *Anthrenus* and there was massive destruction. Fortunately, however, the collection is still in the original cartons, with all the pins and labels still preserved in situ.

Conclusion

These biographical accounts are not pure anecdotage or self-indulgent historicity. We all blame the past for what we dislike in the contemporary world - whether it be in Dipterology or in science or in society in general. But there is much that we can admire in the past and much that we can learn from the past, and some basic insights into how the great Dipterists lived and worked, set against contemporary political and social conditions and their own personal circumstances, goes a long way towards explaining why they operated as they did and how features that we perceive as shortcomings entered into their work. We can also learn much about the *ad hoc* development of systematics and the random nature of progress. We must also recognise that we ourselves may one day be judged as harshly as we judge our predecessors, and our criticisms should be tempered by the realisation that even the most aggressive and vociferous among us may eventually end up as no more than footnotes in the history of Dipterology.

The Medieval period in European history was an age when scholarship and the arts were patronised by princes, aristocrats and the church. Society was feudal. Every individual had his allotted place, and therefore knew his position and function in society. Everyone had responsibilities upwards and downwards. The Reformation in the 16th century and the dynamics of economic growth swept all this away and replaced it with a more fluid society lacking the philosophical and moral certainties of the preceding centuries. The corollary of this was an increased emphasis on, and demand for, individualism and freedom. The 18th century, the so-called Age of Enlightenment, was the first that began to tackle the conflict that exists between the demands of individuals for freedom of expression and action, and the need of society for order and restraint without which it cannot function. This conflict between liberty and order continues unresolved today, with an ever more frenetic and selfish pursuit of material pleasure and happiness undermining social cohesion and order.

The rise of capitalism originated in the same impulse for individual freedom. The new patrons of art, music and science have been financiers and businessmen, and it has been the wealth created by their labours over the last two centuries that has underpinned research into our environment, of which systematic Dipterology is but one small facet. However, in the Western World we have suffered, and are still suffering, from the worst aspects of unrestrained capitalism - selfishness, greed, aggression, hypocrisy and corruption. I believe that the intense competitiveness engendered by this and now enshrined as one of the great virtues of captalistic democracy is both futile and destructive, as well as untrue. Achievement and progress come through symbiosis not competition. Indeed, the natural world itself holds together through symbiosis rather than competition. We are fortunate that in science we have the possibility of choice that is not open to the businessman and entrepreneur: do we compete or do we collaborate? As meetings such as the International Congresses of Dipterology and the Dipterists' Forum so amply illustrate, the choice is for co-operation and collaboration.

Finally, it is good to remember the lines that Karl Popper translated from the pre-Socratic Greek philosopher and poet Xenophanes of the 6th century BC:

> The gods did not reveal, from the beginning,
> All things to us, but in the course of time
> Through seeking we may learn and know things better.
> But as for certain truth, no man has known it,
> Nor shall he know it, neither of the gods
> Nor yet of all the things of which I speak.
> For even if by chance he were to utter
> The final truth, he would himself not know it:
> For all is but a woven web of guesses.

We should always bear in mind that certainty of knowledge is a theoretical and practical impossibility. This is as true of the larger questions as of smaller ones. Indeed, I would go so far as to say that certain questions are meaningless and simply not worth asking, because any proposed solution can be neither verified nor disproved. For example, to ask: "Does God exist?" is like asking: "Is it 5 o'clock on the sun?" There is no answer. Such doubts apply to many of the operations in which we indulge once we move away from the fundamental business of observation and analysis towards more abstract reconstructions and hypotheses. But that is not to say that we should not attempt them, for the twofold reason that they lead to more profound knowledge of the subject and they give intellectual satisfaction. But let us be aware of the limitations of such endeavours and be reasonable in our expectations. "Blessed is he who expects nothing, for he will never be disappointed."

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The second British record of *Cosmetopus dentimanus* (Diptera, Scathophagidae) - A female of this undistinguished scathophagid was swept by CMD from Twyford Moors, near Colden Common, Hampshire (41/473230) on 8 July 1994. Twyford Moors border the River Itchen, a botanically rich chalk stream. They are grazed, derelict water meadows whose old irrigation channels now provide areas of wetland vegetation. *Cosmetopus dentimanus* (Zetterstedt) was collected from a swampy area inundated with 10-20cm of water next to a major channel of the river. The dominant plants were *Carex acutiflorus*, *Iris pseudacorus* and *Agrostis stolonifera*, with smaller amounts of other typical fenland plants that included *Filipendula ulmaria*, *Galium palustre* and *Caltha palustris*. Other scathophagids caught at Twyford Moors were *Cordilura albipes* (Fallén), *C. impudica* Rondani, *Scathophaga furcata* (Say) and *S. stercoraria* (Linnaeus); a full list is given in Drake (1995 *English Nature Research Reports* No. 135.).

The first British record of *Cosmetopus dentimanus* was made by Peter Chandler and Alan Stubbs in 1970 at Leckford Abbas estate on the River Test (Chandler & Stubbs, 1974 *Entomologist's Record and Journal of Variation* **86**: 154-158.) and again at the same locality in 1974 (Chandler & Stubbs, 1975 *Entomologist's Record and Journal of Variation* **87**: 147-148.). The River Test is another chalk stream whose lower reach runs parallel to the Itchen about 15km to the west.

The species was originally described from a single male taken in Swedish Lapland in 1832 and subsequent records listed by Hackman (1956 *Fauna Fennica* **2**: 1-67.) and Andersson (1974 *Entomologica Scandinavica* **5**: 95-102.) come from Sweden, Norway, Finland, Siberia and the Swiss Alps. Hackman describes the species as sub-Arctic high boreal and boreo-alpine. Therefore it is surprising that it is also resident in southern England.

Cosmetopus is related to scathophagid genera with aquatic or semi-aquatic predacious larvae so it is likely that *C. dentimanus* is associated either with the river itself or, as apparent in this case, with wet areas bordering the river. As far as one can judge from the British experience and the Fenno-Scandinavian literature, it appears to be extremely scarce throughout its range.- **C.M. DRAKE**, English Nature, Northminster House, Peterborough PE1 1UA & **S.G. BALL**, 255 Eastfield Road, Peterborough, Cambridgeshire PE1 4BH.

Dipterists Digest 1996 **2**, 72-79

Merodon albonigrum, a new European species related to *Merodon geniculatus* Strobl 1909 (Diptera, Syrphidae)

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The genus *Merodon* is a large group with approximately 150 species distributed in the Palearctic and Ethiopean regions (Hurkmans, 1993). Strobl in Czerny and Strobl (1909) described *M. geniculatus* and a variety of this species, *M. escorialensis*, from Spain. After examination of the type material, Marcos-García (1989) revised the status of *escorialensis*, raising it to full species level. In comparison with specimens of *M. escorialensis* and *M. geniculatus* from Spain, an additional species belonging to the "*geniculatus*" group was found during faunistic investigations of the Balkan Peninsula. Our paper describes this species.

Diagnostic features of the *Merodon geniculatus* group

Broad and thick-bodied species; third antennal segment dark, with reddish area ventrally on inner side (Fig. 18); tergites with straight, oblique pruinose bands; tergite II non-tapering.

Male. Hind trochanter with a distinct spine bearing a tuft of hairs (Fig. 7-9). Male genitalia (Fig. 1-3): cercus with 1 or 2 distal prominences; anterior surstyle lobe with two extensions; aedeagus with dorsal sulcus on the theca.

Female. Hind trochanter with a group of long pale hairs.

Material examined

Merodon geniculatus. Spain: Menorca, Cala Macarella 12 x 1991, 1♂ and 1♀ leg and det C. Kassebeer (IBNS, CC); Menorca, Cala'n Bosch 3 x 1991, 1♂ and 1♀ leg and det C. Kassebeer (IBNS, CC); Strand bei Torre Guadiaro, 20 km NE Gibraltar, 1.iv.1988, 1♂ leg. Haeseler, det Claussen (CC).

Merodon escorialensis. Spain: Cofiñal, (Leon), 9.ix.1987, 30TUN4874, 1450 m.sn.m. 1♂ leg and det Marcos-Gracía; Pto. de Pandetrave (Leon), 13.xi.1987, 30TUN4874, 1562 m.s.n.m. 1♀ leg and det Marcos-Gracía (MG).

***Merodon albonigrum* sp. n.**

Description: Very similar to *M. escorialensis* and *M. geniculatus*, but differs in shape of hind tibia, colour of tergite II and male genitalia.

Diagnosis: Species with black abdomen and straight, white pruinose bands on tergites II-IV. Male: hind tibia swollen in apical half, shorter than hind femur and without apical spur (Fig. 8); male genitalia (Fig. 2): cercus with one central prominence.

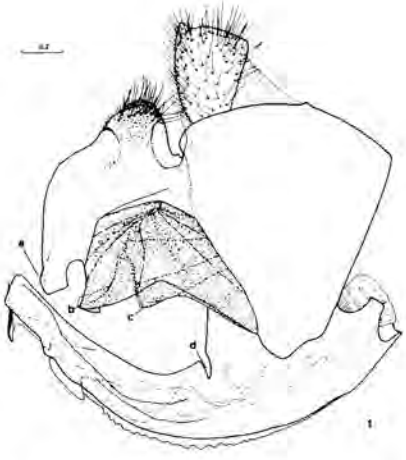

Fig. 1: ***Merodon geniculatus*** **(Spain), male genitalia, lateral view: (a) ventral extension of anterior surstyle lobe; (b) apical extension of anterior surstyle lobe; (c) minis and membraneous structure; (d) thecal sulcus. Scale in mm.**

Fig. 2: ***Merodon albonigrum*** **(paratype: Macedonia), male genitalia, lateral view. Scale in mm.**

Merodon sp. n.

Male. Head: Antennae brown. Third segment slightly elongated, 1.5 times as long as the second segment; on inner side with red-yellow to red-brown area ventrally (Fig. 18). Oral margin shiny, bare. Face black and whitish dusting, sometimes with a shiny central line between oral margin and base of antennae. Frons with dense white dusting. Vertex dark-dusted. Occiput dusted dark-grey. Hairs on head whitish, except for black hairs on ocellar region. Vertex angle 50°. Ocellar angle 55°. Ratio between length of eye-approximation and vertex height 0.4.

Thorax: Mesoscutum finely punctate, shiny, dark metallic-green, covered with erect, pale-yellow hairs and one transverse band of black pilosity at the level of the wing insertion; grey-dusted longitudinal stripes present on mesoscutum just anterior to the transverse sulcus (sometimes two central stripes reach the end of mesoscutum). Scutellum shiny, with pale hairs. Pleurae slightly grey-dusted, covered with pale-yellow hairs. Wings pale-greyish with dark veins. Squamae pale-yellowish. Halteres yellow.

Legs. Femora black with pale apical end. Tibiae pale in first third and apically, with dark median band. Tarsi pale, tarsal segments V, IV, and sometimes III, partly darkened dorsally. Hind trochanter armed with a distinct, dull spine covered with long, dense, pale hairs (Fig. 8). Hind femur slightly swollen, convex ventrally in basal fourth (Fig. 8). Hind tibia swollen in the apical half, without apical spur at the apical end (Fig. 11). Leg hairs: front and middle legs predominantly pale haired but with short black hairs and some longer ones; hind femur with short black hairs and long pale hairs: some of the long hairs in the distal fourth are black, especially on inner side (behind triangular process); hind femur with bare ventral stripe (Fig. 14); hind tibia pale-haired with some short black hairs.

Abdomen: dark, oval and short, as long as mesonotum. Tergites II-IV with white pruinose transverse band interrupted in the middle on tergites II and III. Posterior margin of all tergites whitish. Tergites covered with pale hairs but with short, appressed black hairs in the middle (on black areas). Sternites shiny, with pale, long, erect hairs; shape of the sternite IV as Fig. 16.

Male genitalia: Cercus with one apical prominence in the middle of the distal extremity (Fig. 2). Anterior surstyle lobe in lateral view with a semi-circular area between apical and ventral extensions. Apical extension of right anterior surstyle lobe (Fig. 4b) in ventral view elongated, arched with torsion end; ridge on inner face of surstyle with small sharp process (Fig. 4x). Aedeagus with sulcus on theca (Fig. 2).

Female. Similar to the male except for the following characteristics: Antennae paler. Frons shiny, white-dusted laterally. Legs paler; hind trochanter without spine, but with a group of long pale hairs; hind tibia less swollen in the apical half. Pruinose bands on the tergites more distinct than in the male.

Type material. Holotype: ♂ Serbia, Dubasnica, gorge of the Lazareva Reka 700m, EP-77, 13.viii.1994, leg. Vujić (PMB coll. 595773, Inv. No. 13).

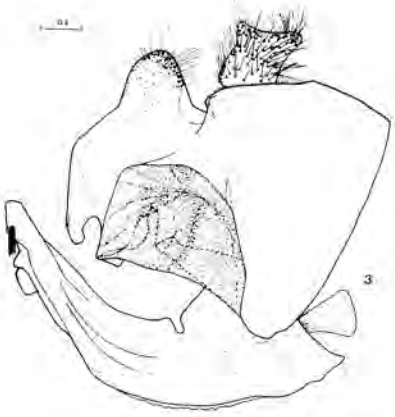

Fig. 3: *Merodon escorialensis* (Spain), male genitalia, lateral view. Scale in mm.

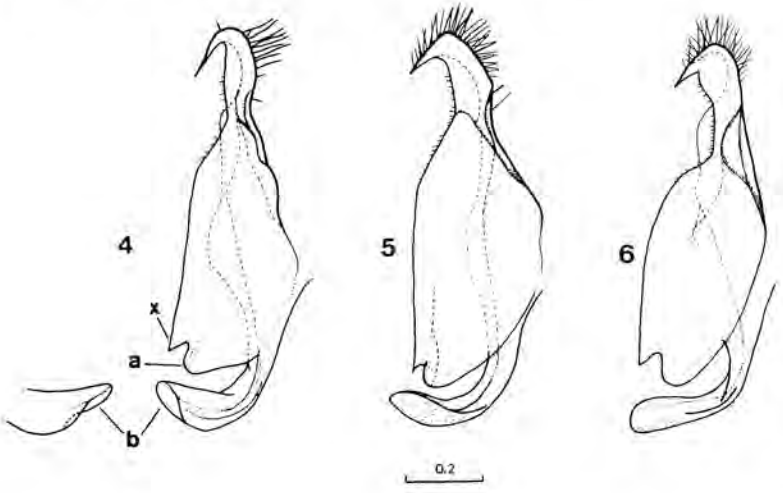

Fig. 4-6: left surstyle (and apical part of right surstyle, in Fig. 4), ventral view: (4) *Merodon albonigrum* (paratype: Macedonia); (5) *M. geniculatus* (Spain); (6) *M. escorialensis* (Spain). (a-b) as in Fig. 1; (x) process of ridge on inner face of surstyle. Scale in mm.

Paratypes. Locality and data as holotype 3♂♂ 1♀ leg Šimić & Vujić (IBNS, PMB: Allotype, Inv. No. 14); Croatia: Krka 18.viii.1899, 1♂ leg & det Langhoffer: *Merodon cinereus* (published in: Langhoffer, 1917-1923) (NHMZ); Macedonia: Oteševo (Dojran lake) 29.viii.1958, 1♂ leg Glumac (det. Hurkmans: *Merodon geniculatus*) (IBNS); Mavrovo 1-3.viii.1961, 1♀ leg Glumac (det Hurkmans: *Merodon cinereus*) (IBNS).

The holotype and allotype are deposited at the Natural History Museum in Belgrade, Yugoslavia (PMB). Most of the paratypes are preserved in the collection of the Institute of Biology, Novi Sad, Yugoslavia (IBNS), except 1♂ in the collection of the Croatian Natural History Museum, Zagreb, Croatia (NHMZ). Material examined is kept in the collection of C. Claussen, Flensburg, Germany (CC) and the collection of M. A. Marcos-Gracia, Alicante, Spain (MG).

Etymology: The name *albonigrum* is derived from the Latin words albus and niger, meaning white and black: *M. albongirum* has white bands on the black abdomen.

Distribution and biological data: *M. albonigrum* has only been found in the Balkan Peninsula, where it occurs at altitudes below 700m. The habitats of *M. albonigrum* belong to the Biome of pastures and woodlands on rocky grounds of Oromediterranean mountains and the Biome of Submediterranean Adriatic, mostly Oak woodlands Matvejev & Puncer, 1989). At the type-locality (a gorge of the Lazareva Reka), specimens of *M albonigrum* were collected in a community of *Syringo-Carpinetum orientalis*. Many tertiary reclics have been discovered in this gorge, which has the highest sides of all canyons in eastern Serbia (Mišić, 1981). Many plant and animal species have survived the cold periods of the Wurm glaciation within this type of community which belongs to the Biome of Oromediterranean mountains. In the post-glacial period a lot of them are present in refugia in the middle-mountains (as this gorge is). These species are now endemics with a narrow range (Matvejev & Puncer, 1989 and *M. albonigrum* may be similar.

Adults were found in meadows, near the dry river bed of Lazareva Reka. They alight on limestone rocks and fly fast among meadow vegetation. The period of flight activity is during August.

Discussion

The three *Merodon* species considered appear to form a distinct monophyletic group. They are well defined by external and genital morphology. Although these species are very similar they can be distinguished by a complex of characters:

- *M. albonigrum* has a dark abdomen. Tergite II in *M. geniculatus* and *M. escorialensis* have yellow-red lateral spots.

- The shape of the hind tibia is different: swollen apically, shorter than hind femur and without apical spur in *M. geniculatus* (Fig. 9,12); less swollen in the apical half, shorter than hind femur and without apical spur in *M. albonigrum* (Fig. 8,11); and almost straight, slightly shorter than hind femur and with apical spur in *M. escorialensis* (Fig. 7, 10.1).

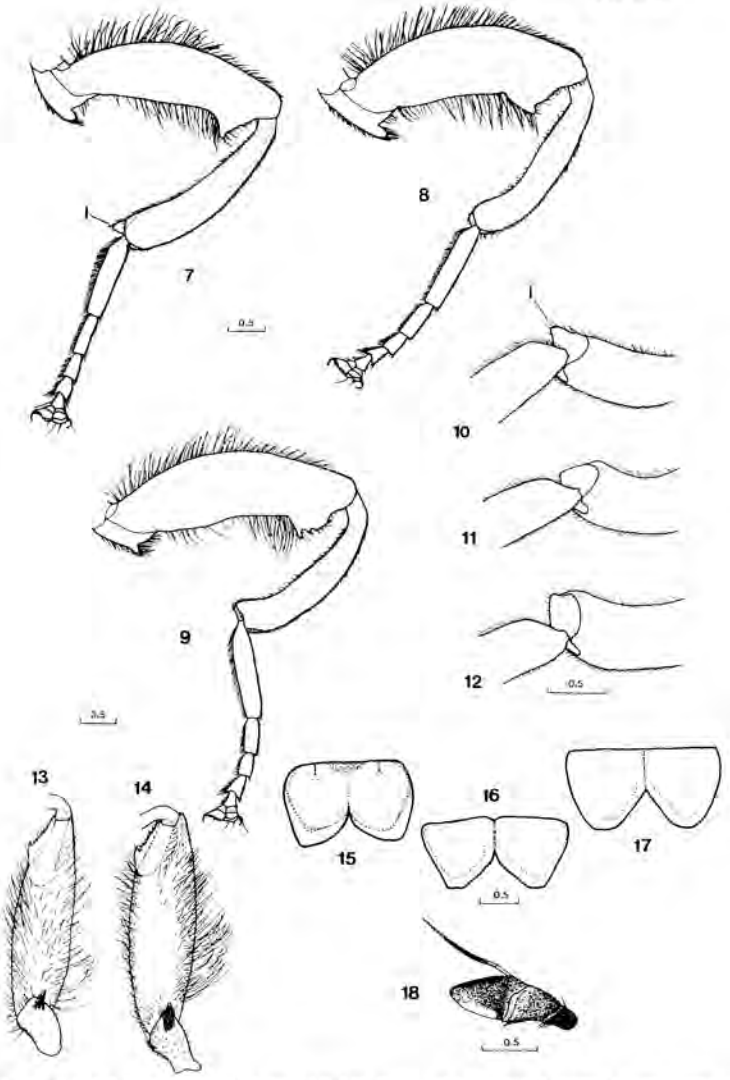

Fig. 7-18: (7-9) hind leg, lateral view; (10-12) hind tibia, apical part, latero-anterior view; (13-14) hind femur, ventral view; (15-17) sternite IV; (18) antenna, internal surface. (7,10,13,15) *Merodon escorialensis* (Spain); (8,11,14,16,18) *M. albonigrum* (paratype: Serbia, type-locality); (9,12,17) *M. geniculatus* (Spain). (1) apical spur of hind tibia. Scale in mm.

- Pilosity of legs: pale in *M. geniculatus*; pale with some short black hairs in *M. escorialensis*; black and pale in *M albonigrum*; pilosity of hind femur in male: *M. albonigrum* has long black hairs on apical fourth and *M. escorialensis* has only some short black hairs on top of the hind femur; hind femur ventrally without long hairs in *M. geniculatus* and *M. albonigrum* (Fig. 14) and with long hairs in some specimens of *M. escorialensis* (Fig. 13).

- Male genitalia.

- Cercus: *M. escorialensis* has two distal prominences (Fig. 3); with one ventral prominence in *M. geniculatus* (Fig. 1) and a central one in *M. albonigrum* (Fig. 2).

- Anterior surstyl lobe: ventral extension in lateral view elongated, broadened to the tip in *M. geniculatus* (Fig. 1:a), shorter and rounded in *M. albonigrum* (Fig. 2) and elongated, but pointed in *M. escorialensis* (Fig. 3).

- Ventral triangular part of minis and membraneous structure between basale of hypopigium and posterior lobe of surstyle in lateral view clearly visible in *M. geniculatus* (Fig. 1:c) and not visible in *M. albonigrum* (Fig. 2) and *M. escorialensis* (Fig. 3).

Marcos-Gracía (1989) mentions some other differences between *M. geniculatus* and *M. escorialensis*: the shape of the hind trochanter spine (tubercle) and sternite IV in the male, and the apical angle of the vertex triangle and ocellar triangle. Most of these characters are intermediate in *M. albonigrum*: the hind trochanter spine is more similar to that of *M. escorialensis* (Fig. 7-9); and the shape of sternite IV is close to *M. geniculatus* (Fig. 15-17).

Variability in group: the hairs on the mesoscutum are all pale in *M. geniculatus*, but in some specimens they can be black on each side at the level of wing insertion, but not with a complete band of black hairs across the disc. The mesoscutum in *M. albonigrum* always has a transverse band of black hairs between the base of wings. *Merodon escorialensis* has both types of pilosity. The dusting of the head and mesoscutum may be different ranging from an entirely dusted face, to face with shiny central band without dusting; frons dusting may be whitish to dark-grey; mesoscutum dusting is somewhat variable.

Merodon geniculatus and *M. escorialensis* are restricted to the Iberian peninsula and probably to north-west Africa. A *Merodon* sp. near to *M. geniculatus* is known from Morocco, (Claussen, 1989). In this area *M. escorialensis* was collected only in high mountains, while *M. geniculatus* prefers habitats at low altitudes (Marcos-Gracía, 1989).

Merodon albonigrum is only known from the Balkan Peninsula, at lower altitudes in refugial communities which belong to Biomes of Oromediterranean mountains and Submediterranean woodlands. This species can be considered as a thermophilous endemic surviving in the gorges and middle-mountains at the central and southern part of the Balkan Peninsula.

The ancestral form of all three species of this group presumably had a Mediterranean distribution in the preglacial period. During the Pleistocene, glaciation probably divided its

range into separate parts. Speciation took place in these isolated areas. This paper demonstrates that there are now at least three species existing in restricted ranges.

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Further records of *Psychoda surcoufi* (Diptera, Psychodidae) -

Psychoda surcoufi Tonnoir is one of the most distinctive moth-flies because of its pale colour coupled with a distinctive dark, zigzag band across each wing. It is scarce in Britain: Freeman (1950 Diptera, Psychodidae. *Handbook for the Identification of British Insects* **9(2)**) records only one male, from Lancashire, and Withers (1989 Moth Flies. Diptera: Psychodidae. *Dipterists Digest* **4**) added the Isle of Wight, Surrey and Yorkshire as locations, whereas many of its less distinctive congeners have been more widely reported.

On 26.xi.1994 I took one female (the subgenital plate is distinctive and confirms the identity inferred from general appearance of the insect) in a garden in the town of Ampthill, Bedfordshire (TL 034380). In the past I found the insect in some quantity at Robertsbridge, East Sussex. My first encounters were of single examples in April and May 1961 then, in November, I found many of the adult insects around and under a pile of wet, rotting sacks in an outhouse (TQ 737246). The following year I found several under sodden garden rubbish in September close to the original location. - **PATRICK ROPER**, South View, Sedlescombe, Battle, East Sussex TN33 0PE.

Dipterists Digest 1996 **2**, 80-81

The occurence of *Dolichocephala thomasi* (Diptera, Empididae) in Scotland.

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Dolichocephala thomasi was first distinguished from other similar species in the genus by Wagner (1983) on the basis of one male taken in August 1981 at Kaufunger Wauld, Wengebach in Germany. It belongs to the *Dolichocephala ocellata* group within the genus which is distinguished by the presence of large clear spots within the cells of the otherwise darkened wing membrane. Wagner (1983) considers that the *D. ocellata* group now contains three species, *D. ocellata*, which is possibly a Mediterranean species, *D. austrica* which is a species of the Alps and *D. thomasi* which is present in northern Europe. This does not however take into account the description and records of *D. ocellata* mentioned in Collin (1961) which do seem to refer to the true *D. ocellata* and therefore extend its distribution into southern Britain. Collin lists records of *D. ocellata* from near Oxford, the Isle of Wight, Dorset and Sussex.

Since the original description of *D. thomasi* there have been few published records of this species. Jonassen (1992) recorded *D. thomasi* from Norway on the basis of one male and one female caught in a Malaise trap between 10 June and 16 July 1990. He also refers to another record in the literature from Poland.

During an insect survey of the native pinewood within the Glen Strathfarrar NNR, Inverness I found amongst Malaise trap samples a single male specimen of *Dolichocephala* which I did not recognise. It had distinctive large clear spots on the wing (Fig. 1) unlike the commoner species such as *D. irrorata* and *D. guttata*. Using Collin (1961) the specimen keyed out to *D. ocellata* but did not fit the description exactly. This combined with the fact that the Strathfarrar specimen lay far outwith the range of previous *D. ocellata* records prompted me to send the specimen to Peter Chandler who kindly identified it as *D. thomasi*.

Subsequent to this original specimen I have found *D. thomasi* in Malaise trap samples taken in two other native pinewood sites, Shieldaig in Wester Ross and Glen Tanar in Deeside. I am not convinced however that there is any link between *D. thomasi* and the native pinewood habitat. The discovery of this species at these sites was probably more related to the presence of small woodland streams nearby.

It is also interesting to note that the capture sites are widely distributed in the Scottish Highlands from Aberdeenshire in the east, Strathfarrar in the Central Highlands to a west coast site in Wester Ross. It's small size and drab appearance has probably meant that it has been overlooked in the past and in reality it may be well distributed along small woodland watercourses throughout the Highlands.

Capture details

(Malaise traps at all sites emptied on a monthly basis); Strathfarrar NNR; NH3338; Inverness, native pinewood, 1♂, Malaise trap, June 1988; Glen Tanar NNR, NO4891; Aberdeen, native pinewood, 1♀, Malaise trap, July 1990; Shieldaig Woods; NG8251; Wester Ross, native pinewood, 2♂, Malaise trap, July 1991.

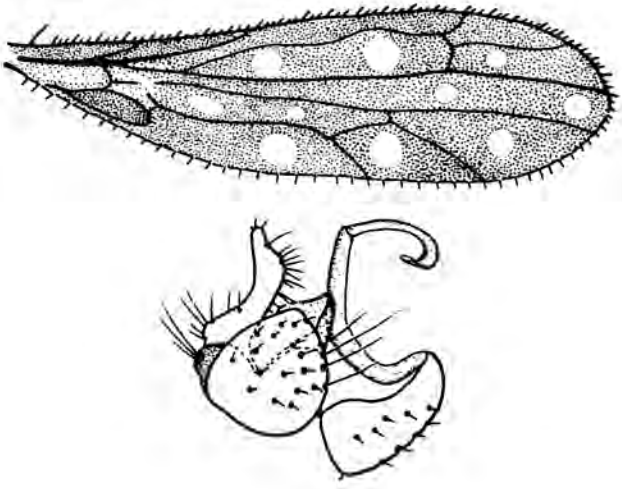

Fig. 1 Dolichocephala thomasi; Wing and ♂ hypopygium (after Wagner 1983)

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Dipterists Digest 1996 **2**, 82-83

On the major peaks in hoverfly numbers during August 1991 at Peterborough

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In some seasons there is a super abundance of certain hoverfly species. It is not always easy to interpret what is going on. On the one hand a species can have a very good year or two, appearing in exceptional numbers, beyond normal annual fluctuations, purely as a result of breeding success locally or over much of its range (a phenomenon that can occur in many insects). However, the occasion can arise when there appears to be a sudden influx of large numbers of individuals from else where, a mass movement on a local or even international scale. *Episyrphus balteatus* is the species of hoverfly that most often shows this phenomenon of super abundance, undoubtedly a resident that can hibernate in small numbers. it is a very adaptable species and may well be capable of home-based population explosions when its aphid prey is plentiful (aphids also undergo enormous fluctuations in breeding success) but it is well known to be capable of major migration.

August 1991 was an occasion when *Episyrphus balteatus* appeared in enormous numbers. My garden monitoring (*Dipterists Digest* 10: 26-39), which showed only minor peaks in 1990, fortunately intercepted the critical period and gives a basis for analysis of the 1991 major influx of this and certain other species.

Results are given here for the most significant 6 week period, starting in mid-July before the influx and running through to the tail-off in early September (after which I was absent for a period).

Table 1. The weekly counts for selected species during the critical summer period.

	JULY			AUGUST			SEPT
Week beginning	21	28	1	8	22	29	1
Episyrphus balteatus	1	53	+350	259	153	40	8
Metasyrphus corollae	-	-	3	3	2	2	-
M. luniger	1	1	4	6	4	4	2
Sphaerophoria scripta	2	1	2	17	5	3	5
Syrphus ribesii	1	1	2	21	11	60	24
Scaeva pyrastri	-	-	2	2	1	1	-
Eristalis arbustorum	-	1	2	5	18	4	6

At this crude weekly level several important points start to emerge.

(a) *Episyrphus balteatus* did suddenly appear in numbers, but there was a build-up rather than coming all at once. There was a progressive tail-off though the figures remained very high for at least 3 weeks. It is important to note that it had been very seldom

seen earlier in the season as potential parents.

(b) *Scaeva pyrastri* appeared at about the same time, though in low numbers. Overall this migrant had a good year in Great Britain but it was not plentiful in Peterborough. This species was not recorded in the garden in 1990. Another classic migrant, *Metasyrphus corollae* was in low numbers (little better than 1990) and the more resident *M. luniger* was similar with regard to the previous season's numbers.

(c) Other species noted for taking part in migration include *Sphaerophoria scripta* and *Syrphus ribesii*, both of which had later peaks. Hence they were out of phase with *E. balteatus*, reflecting slower or secondary migration fronts if local breeding is not to be inferred. *Eristalis arbustorum*, a non-aphid species, showed a rather similar pattern (much scarcer in the garden in 1990). If secondary migration fronts were involved, there could have been some boosting of numbers of *Episyrphus balteatus*, assisting its prolonged super-abundance, but no obvious boost was observed.

It is now necessary to consider the value of supplementary notes relating to the simple weekly maximum numbers, a lesson learnt from the previous year. Actual dates were recorded for major influxes and subsequent changes were monitored in more detail. Dates were also noted for exceptional records of species not expected to occur in the garden.

Episyrphus balteatus was not seen at all in the early part of the week beginning 28th July. Both 28th and 29th were surveyed, but by circumstance not the 30th. However after breakfast on 21st the garden seemed alive with *E. balteatus* and 53 were counted. On 6th August there were 200 and on 8th, 350 at 'ground' level but many more (c. 150 on the latter date) were estimated to be out of reach on the foliage of a lime tree. The decline in numbers was gradual until a crash in late August.

Sphaerophoria scripta showed a gradual build up to 17 on 16th August from a figure of 5 the previous week. It then crashed to 3 by 27th August, yet a few days later was back to 13, thence it rapidly tailed off again. This could reflect a very mobile situation, or a quirk of recording times, but I am inclined towards the first interpretation since the garden was being very regularly monitored to see what was happening.

Syrphus ribesii, as with *S. scripta*, showed the same pattern of initial build-up in mid August (maximum 11 August), followed by a decline and second peak. In this case it was the second peak that was the impressive one. From 8 on 28th August, and similar numbers on 29th, the next day the count was 60. Nearly all appeared to be *s. ribesii* (*S. vitripennis*, a rarity for the garden, had been identified in early August). There was a slow decline into early September. The absence of recording during mid September means that the subsequent history was missed but by the week beginning 22 September, it was seemingly present. In the remainder of the season, at best the maximum count was one *S. ribesii*.

There is further evidence of co-incidence of movement patterns. On 27 August there were single records of Painted Lady butterfly, *Cheilosia vernalis* and *Sphaerophoria rueppellii*. These were the first ever records of these hoverflies in the garden. (A *S. rueppellii* was

again seen the following week; the only other Painted Lady of the year was in the week beginning 22 September.) The other remarkable record was a male of *Helophilus trivittatus* on 21 August (not an obvious migrant, but could possibly breed in fenland ditches). It is of interest that these 'influxes' did not precisely coincide with the notable influxes of the species previously discussed.

Table 2. The dates of significant counts for various species are given. The absence of data for a date does not mean absence, except in the right hand column.

	E. balteatus	*S. scripta*	Painted Lady *Syrphus ribesii*	*C. vernalis* *S. rueppellii*
30 July	53			
6 Aug	+200			
8 Aug	+350			
11 Aug			21	
16 Aug	259	17		
21 Aug	153			
27 Aug	40	3		1 of each
28 Aug			8	
30 Aug	16	13	60	

During 1991 *Melanostoma scalare* was only seen on two weeks. The maximum count in the first week of May was 1. In the week beginning 21 July, there was an occasion when 6 males were seen hovering on the sunny side of lime and apple trees at c. 1 metre over long grass at 6.30pm BST but this species was not otherwise seen during the summer. Such a species is best regarded as a resident in the garden but chance plays a part in the completeness of monitoring. Some of the fluctuations in the above species may perhaps be due to chance in intercepting variations in flight activity but the underlying patterns with exceptionally abundant species seem clear. The 1991 season as a whole was a much better one for hoverflies, and even 3 species of conopids were recorded during August. Also two specimens on the tachinid *Alophora obesa* were seen at once.

What these observations mean is open to debate. Clearly there was no single influx experienced at Peterborough. Also, whilst an influx may appear a sudden event, suggesting migration, the build-up can continue for several days in some cases. If migration were over some distance, allowance would have to be made for the fact that not all individuals will move at the same speed, all be it that weather conditions may only provide a short period for major advances. However, it is also necessary to allow for the possibility of largely synchronised mass emergence of species that bred within the garden and nearby. Clearly sone species are not resident in urban Peterborough and were moving through, stopping to refuel at garden flowers (species such as *Sphaerophoria rueppellii* and *Helophilus trivittata* are surprising records for the district as a whole). Interpretation of observations needs to take account of all possible factors, and a wider network of garden monitoring stations would greatly help. the occurrence of unlikely species in a garden is perhaps a useful perspective against which to evaluate countryside site-lists, including those from reserves which include rarely-sighted species.

Dipterists Digest 1996 **2**, 85-89

Beyond the Red Data Book

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Much entomological endeavour is devoted to the recording of rare or local species. What are the more successful species, the survivors of future environmental change? Over the past few years, I have been counting and identifying flies from samples taken in four contrasting habitats. In all four surveys there is a surprisingly consistent relationship between the size of the sample, or number of flies examined, and the number of species identified. It was of interest to find out how many species were common to all four surveys to try to account for this consistency.

Habitats surveyed

For six years, 1987-1993, I ran a Malaise trap in my garden in Norwich (Laurence, 1993, 1995). The School of Biological Sciences in the University of East Anglia carried out three surveys between 1988 and 1993, using water and pitfall traps. The first survey examined the effect of burning and cutting on the fauna of a *Phragmites* swamp at Hickling, Norfolk (Ditlhogo *et al.*, 1992; Laurence *et al.*, 1992), the second the effect of coppicing on the invertebrates in Felsham Hall Wood, Suffolk, ancient woodland also known as Bradfield Woods (Gibbons, 1991; Rackham, 1986), and the third survey was of species of invertebrates at different altitudes from 200 to 800m on Cadair Idris in Gwynedd, North Wales. In addition, I have also collected Diptera regularly in the Northern Isles of Orkney and Shetland (Laurence, 1988, 1991, 1992a, 1992b). This extreme and exposed northern area of the British Isles could be used for comparison, with its impoverished island fauna, with species from the more localised habitats of suburban garden, *Phragmites* marsh, ancient woodland and mountains further south. Species common to all or several of these habitats may be regarded as the most widely dispersed and adaptable flies in the British fauna.

The total number of species identified from the Norwich garden was 289, from the Hickling swamp 309, from the Suffolk woodland 318, from the Welsh mountain 191, and from both Orkney and Shetland 376. As the same person undertook the identifications, the same errors can be expected in the totals. The families Cecidomyiidae, Phoridae, Ephydridae, Agromyzidae, Chloropidae and Anthomyiidae were rarely identified much beyond genus. The majority of identifications were based upon examination of the male genitalia but in some genera, *Culicoides*, *Sylvicola* and *Pegoplata* (*Nupedia*), females were obtained without males.

Flies present in all five surveys

Psychodidae *Psychoda albipennis* Zett.
Ceratopogonidae *Culicoides obsoletus* Mg. group (both *C. chiopterus* Mg. and *C. scoticus* Downes & Kettle from Orkney)
Anisopodidae *Sylvicola punctatus* Fab.
Sciaridae *Lycoriella auripila* Winn., *Bradysia nitidicollis* Mg.
Syrphidae *Episyrphus balteatus* Deg.

Sphaeroceridae *Lotophila atra* Mg., *Minilimosina vitripennis* Zett.
Opomyzidae *Opomyza germinationis* L.
Drosophilidae *Scaptomyza pallida* Zett.
Calliphoridae *Calliphora vicina* Rob.-Des.
Scathophagidae *Scathophaga furcata* Say, *S. stercoraria* L.
Anthomyiidae *Pegoplata* (*Nupedia*) *aestiva* Mg./*infirma* Mg. (both species with "boxing glove" surstyli known from Shetland)

Although all five habitats enclosed standing water, none of these species has truly aquatic larvae.

Flies present in four out of the five surveys

Trichoceridae *Trichocera regelationis* L.
Tipulidae *Limnophila nemoralis* Mg. s.l.
Psychodidae *Psychoda phalaenoides* L.
Anisopodidae *Sylvicola cinctus* Fab./*fenestralis* Scop. (both species known as males from Orkney)
Bibionidae *Bibio lepidus* Loew.
Sciaridae *Schwenkfeldina carbonaria* Mg., *Ctenosciara hyalipennis* Mg., *Bradysia fimbricauda* Tuom., *Scatopsciara vivida* Winn.
Empididae *Platypalpus agilis* Mg., *P. longicornis* Mg., *P. nigritarsis* Fall., *P. pallidiventris* Mg.
Lonchopteridae *Lonchoptera lutea* Panz.
Syrphidae *Metasyrphus corollae* Fab., *Melanostoma mellinum* L., *Platycheirus albimanus* Fab.
Dryomyzidae *Dryomyza anilis* Fall.
Heleomyzidae *Suilla variegata* Loew
Sepsidae *Sepsis fulgens* Mg.
Sphaeroceridae *Ischiolepta pusilla* Fall., *Spelobia clunipes* Mg., *S. palmata* Rich., *Telomerina pseudoleucoptera* Duda
Tachinidae *Siphona geniculata* Deg.
Muscidae *Polietes lardaria* Fab., *Orthellia viridis* Wied., *Phaonia errans* Mg., *Helina impuncta* Fall.

Again there is an absence of species with truly aquatic larvae and a number of species known to breed in dung are present in both lists of species. Seven species were absent from the garden sample, three species from the marsh, four species from the woodland samples, eight species from the mountain and seven species from the islands, indicating an even distribution of negative records between the five surveys. The species listed above appear to be highly adaptable species with a wide habitat range.

Flies present in three out of the five surveys.

Trichoceridae *Trichocera annulata* Mg., *T. hiemalis* Deg.
Tipulidae *Nephrotoma quadrifaria* Mg., *Tipula oleracea* L., *Erioptera trivialis* Mg., *Pedicia immaculata* Mg.
Psychodidae *Boreoclytocerus ocellaris* Mg., *Psychoda grisescens* Tonn., *P. minuta* Banks, *P. trinodulosa* Tonn.
Chironomidae *Chironomus aprilinus* Mg. s.l.

Bibionidae *Dilophus febrilis* L.
Sciaridae *Trichosia pilosa* Staeg., *Plastosciara brachyptera* Kieff., *Epidapus atomarius* Deg., *Lycoriella mali* Fitch, *Bradysia brunnipes* Mg., *Scatopsciara nana* Winn., *S. tenax* Winn., *S. vitripennis* Mg.
Scatopsidae *Swammerdamella brevicornis* Mg. (*S. acuta* Cook from Cadair Idris)
Rhagionidae *Rhagio scolopacea* L.
Empididae *Platypalpus longiseta* Zett., *Bicellaria pilosa* Lundb.
Dolichopodidae *Sciapus platypterus* Fab., *Dolichopus plumipes* Scop., *D. ungulatus* L., *Chrysotus gramineus* Fall., *Campsicnemus armatus* Zett.
Lonchopteridae *Lonchoptera furcata* Fall.
Syrphidae *Syrphus ribesii* L., *S. vitripennis* Mg., *Platycheirus clypeatus* Mg. s.l., *Pl. scutatus* Mg., *Helophilus pendulus* L., *Eristalis arbustorum* L., *E. intricarius* L., *E. pertinax* Scop., *E. tenax* L.
Heleomyzidae *Tephrochlamys rufiventris* Mg.
Sepsidae *Sepsis flavimana* Mg.
Sphaeroceridae *Copromyza equina* Fall., *Crumomyia nitida* Mg., *Sphaerocera curvipes* Latr., *Chaetopodella scutellaris* Hal., *Coproica lugubris* Hal., *Minilimosina gemella* Roh., *M. v-atrum* Vill., *Opacifrons coxata* Stenh., *Pteremis fenestralis* Fall., *Pullilimosina heteroneura* Hal., *P. moesta* Vill., *Spelobia luteilabris* Rond., *S. rufilabris* Stenh., *S. talparum* Rich.
Sarcophagidae *Sarcophaga carnaria* L.
Calliphoridae *Calliphora vomitoria* L.
Fanniidae *Fannia canicularis* L.
Muscidae *Morellia aenescens* Rob.-Des., *Phaonia viarum* Rob.-Des., *Helina duplicata* Mg., *H. laetifica* Rob.-Des., *Mydaea scutellaris* Rob.-Des., *Myiospila meditabunda* Fav., *Macrorchis meditata* Fab., *Coenosia pumila* Fall., *C. tigrina* Fab., *C. tricolor* Zett.

No syrphids, other than *E. balteatus*, were found on the Welsh mountain. Again, several species are associated with animal dung and some species here, such as *Chironomus aprilinus* and the eristalines, have aquatic larvae or, *Boreoclytocerus ocellaris*, *Rhagio scolopacea*, *Bicellaria pilosa*, *Campsicnemus armatus* and *Minilimosina gemella*, are associated particularly with damp places. Analysis of the distribution of habitats between the species gives no clear indication of habitat selection.

The more rarely recorded species

This leaves us with 994 species of Diptera identified from only one or two of the five collections examined, or 90% of the total species recognised. Some families contained species which proved to be very frequent in collections from one habitat but absent in all the others. Although there was standing water in all the habitats, only eight species out of 85 species of chironomid identified by the male genitalia were found in more than one collection. Similarly, only four out of 38 species of mycetophilid (mostly non-mycetophilines), three out of 16 species of scatopsids and three out of 14 species of male *Fannia* were recorded in more than one of these surveys, suggesting some specialised habitat requirements and/or restricted ability to disperse, although many species have a known wider distribution in the British Isles. It may be objected that the trapping procedures are very

selective and that in consequence many common species were overlooked. This may be so. In the woodland, the pitfall traps which contain a small volume of alcohol were much more effective at catching species of *Suilla*, sphaerocerids and the syrphids *Portevinia maculata* Fall. and *Brachyopa scutellaris* Rob.-Des., but these genera also appeared in the water traps. Position of the traps would also be important. In the woodland, 32 and then 36 water traps, and the same number of pitfalls, were placed in different ages of coppicing. In the marsh, 30 water traps were placed in an area of *Phragmites* covering 150 x 120m. On the mountain, 12 water traps were maintained at 200, 400, 600 and 800m altitude. Spring, summer and autumn collections were made. So the collecting was intensive and flies seen in flight were collected by the traps. A black Malaise trap caught more than twice the number of Diptera than a white trap when these were exposed in the same position on alternate days. Consequently a black trap was used for most of the collection beneath a tree in the suburban garden.

One not surprising conclusion from the five surveys is that wetland habitats, both marsh and peat moorland, and the ancient woodland, support local populations which are not found elsewhere. These habitats have a fragility that deserves their conservation. But some species are very robust. The fauna of the Northern Isles has demonstrated that, since the last glaciation, many flies are capable of dispersal across the seas. Even the suburban garden has produced a Red Book species in the dolichopodid *Neurigona abdominalis* Fall. But where can we find the larvae of the ubiquitous *Pegoplata (Nupedia)* species?

Acknowledgements

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Antichaeta brevipennis (Diptera, Sciomyzidae) in West Cumbria -

A male of the RDB 2 (vulnerable) sciomyzid fly, *Antichaeta brevipennis* (Zetterstedt), was collected by my colleague, Stephen Judd, on 28.vii.1993, during a survey of invertebrates at Sellafield, West Cumbria. This survey was commissioned by the Environmental Advisory Unit (now SGS Environment), on behalf of British Nuclear Fuel. The specimen was collected on the ground, amongst mud and wet litter, at the base of tall *Deschampsia cespitosa* tussocks, in an uncut and unimproved, spring fed, grazing marsh on the River Ehen flood plain, close to where it enters the Irish sea (NY 0105). Extensive sweep netting of the site, produced no further specimens.

Antichaeta brevipennis has been recorded from about a dozen widely distributed wetland sites in Britain, including northern ones in Yorkshire and Elgin, Scotland, but most are in southern and eastern England. There are only seven post-1960 records (Falk, 1991, A review of the scarce and threatened flies of Great Britain, Nature Conservancy Council, Peterborough).

The ground dwelling behaviour of this species might be responsible for the paucity of records. It is not possible to associate the Sellafield specimen with a particular molluscan host but the following potential species from the flood plain were identified:- *Anisus leucostoma* (Millet), *Oxyloma pfeifferi* (Rossmassler), *Discus rotundatus* (Muller), *Arion ater* (L.), *Candidula intersecta* (Poiret), *Cepaea nemoralis* (L.) and *C. hortensis* (Muller).- **T. H. MAWDSLEY**, Entomology Section, Liverpool Museum, National Museums & Galleries on Merseyside, William Brown Street, Liverpool L3 8EN.

Chrysotus concinnus (Diptera, Dolichopodidae) in North Lancashire -

I visited Gait Barrows NNR, North Lancs. (VC60) for a short collecting trip on 7.vii.1994. During this visit I obtained one male and two females of *Chrysotus concinnus* (Zetterstedt). These appear to be new records for this species in north-west England.

I am grateful to Jonathon Cole for confirming my identification of these very small flies and also drawing my attention to some other records of the species. He had taken it in Dumfries and Galloway in July 1979 and tells me that there are a few other Scottish records. Fonseca (1978, **Handbooks for Identification of British Insects**, **9(5)**) gives records from countries in southern England only. It would appear that the species is widespread but probably overlooked owing to its small size.

I must also record my thanks to Mr R. A. Petley-Jones and English Nature for granting me permission to visit Gait Barrows.- **DR NEVILLE L. BIRKETT**, Beardwood, Carter Road, Grange-over-Sands LA11 7AG.

Dipterists Digest 1996 2, 90-91

A review of records for *Scenopinus niger* (Degeer) (Diptera, Scenopinidae) in Wales

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Scenopinus niger is a rare fly in the British Isles, with very few recent records (Drake, 1991). Outside of Wales, records are scattered across southern England from Devon to Suffolk, plus single reports from Elginshire in Scotland and Co. Down in Ireland. It is associated with old trees and larvae of the family are known to feed on other insects (Kelsey, 1969). Drake (1991) mentions a puparium found under oak bark in Windsor Great Park, Berkshire. Adults are usually found from late May to early July, although Drake also refers to a late August date.

It was first discovered in Wales by Peter Skidmore, at Rhyd y Creuau, Wales (SH8057) in the Conwy Valley south of Llanrwst, Denbighshire (VC 50), on 6 July 1975, and the specimen is held in the collections at Doncaster Museum. There have been only four subsequent records from the Principality of which three are my own and in each case is based on a single adult fly from an historic parkland. My three specimens are currently in my personal reference collection, but material will be transferred to the National Museums of Wales at Cardiff in due course.

The four recent records are as follows:

Powis Castle Park, Montgomeryshire (VC 47) SJ216064. Specimen within cuboidal red-rotten heartwood of a lying oak hulk on 9 June 1990. The "red-rot" almost certainly due to the activity of the fungus *Laetiporus sulphureus* (Bull. ex Fr.) Murr.; presumably recently emerged from puparium, although this was not observed. Beetles present within the same red-rot included the anobiids *Dorcatoma chrysomelina* Sturm and *Xestobium rufovillosum* (Degeer) and the dermestid *Ctesias serra* (F.) The record and some of the details have been published previously (Alexander 1991).

Erddig Park, Denbighshire (VC 50) SJ335483. One specimen taken in Bryn-y-cabanau Wood by B. Formstone (pers. comm.) on 9 June 1992. Another specimen settled on the exposed heartwood of a standing dead beech trunk in a sheltered sunny glade on the upper edge of Big Wood, on 24 June 1993. The wood was full of exit holes of the anobiid beetle *Ptilinus pectinicornis* (L.), and there were many Hymenoptera active around the trunk and probably breeding in it, including the sphecid *Ectemnius cavifrons* (Thomson), a chrysidid, and various Parasitica. Both woods lie on old river cliffs along the valley of the Afon Clywedog.

Dynefwr Park, Carmarthernshire (VC 44) SN618223. The specimen settled on the trunk of a large living oak tree within the Inner Cow Park and hence outside of the present SSSI boundaries, on 27 June 1994. The fly was close to a large hole giving access to a hollow interior and much rotten heartwood. It was the only insect noted.

All three areas are rich in saproxylic invertebrates generally, and amongst the richest in Wales, but none of these records come from areas which have been designated SSSI by the former Nature Conservancy Council or the Countryside Council for Wales (CCW), although all merit serious consideration for such designation. The Dynefwr Park site is close to an SSSI and forms part of the same parkland system. CCW are currently part way through a project to identify the most important parklands in Wales.

My thanks to Martin Drake for information from the Larger Brachycera Recording Scheme, to Bryan Formstone for details of his record, and to Adrian Fowles for comments on an earlier draft.

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Vanoyia tenuicornis (Diptera, Stratiomyidae) new to North Wales -

Fieldwork for the National Trust's Biological Survey of the Erddig Estate near Wrexham has revealed a remarkably rich insect fauna. One of the more outstanding finds was *Vanoyia tenuicornis*, a species only known in Wales from a handful of sites along the south coast and not known from the adjacent Cheshire and Shropshire Plain natural area (Drake, C. M. 1991 *Provisional Atlas of the Larger Brachycera (Diptera) of Britain and Ireland*. NERC (ITE), Huntingdon).

Two individuals were swept from wood melick (*Melica uniflora* Retz.) along the upper edge of Big Wood (SJ 330485) and a third from dog's mercury (*Mercurialis perennis* L.) in shaded woodland on the alluvial flat below, 24.vi.1993.

Big Wood is an area of ancient river-cliff woodland overlooking the Afon Clywedog. It includes a series of calcareous seepage fens with extensive open soft wet substrate and patches of pendulous sedge (*Carex pendula* Hudson), great willowherb (*Epilobium hirsutum* L.) and giant horsetail (*Equisetum telmateia* Ehrh.). These form clearings within the woodland.

Other Diptera recorded in the wood included *Oxycera rara* (Scopoli), *Beris fuscipes* Meigen, *B. geniculata* Curtis, *B. vallata* (Forster) (Stratiomyidae), *Scenopinus niger* (Degeer) (Scenopinidae), *Dioctria baumhaueri* Meigen (Asilidae), *Brachypalpoides lenta* (Meigen), *Xylota sylvarum* (L.) (Syrphidae) and *Dolichopus claviger* Stannius (Dolichopodidae).-

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Dipterists Digest 1996 **2**, 92-94

The Hoverflies (Diptera, Syrphidae) of Białowieża Primeval Forest

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The Białowieża Forest complex totalling 1240 km² straddles the Polish-Belorussian border, with the western part consisting of 580 km² belonging to Poland. Geographically it lies between longitudes 23°31'-24°57'N. The forest is the largest natural forest area lying in the European Lowland and is a unique natural site closely related to primeval forests. In 1977 Białowieża Primeval Forest became a UNESCO Man and Biosphere Reserve, and in 1979 it was classified a World Heritage Site.

Białowieża Primeval Forest lies in the mixed deciduous-coniferous forest zone, where spruce, pine, oak, alder, maple, ash and hornbeam are typical species of tree, and where most types of tree stands contains at least some mix of spruce. The forest flora consists of 990 species of vascular plants, 308 species of mosses and liverworts, 200 species of lichens and more than 1000 species of fungi. In the Polish part of the forest 11,000 animal species occur, with invertebrates (including insects) being the largest group or approximately 8,500 species. The largest area covers dry forest ground, but streams and marshes can be found throughout the forest. The most common of the 113 described plant communities is oak-linden-hornbeam forest covering 46% of the total area. Some small peat bogs can be found in the pine forested areas. The forest soils are mainly sands and post-glaciation gravels with scarce fragments of dune sands occurring at its southern borders. There is a strict reserve, Białowieża National Park covering just over 47 km², which is not accessible to visiting tourists. The climate of the forest is a sub-continental one, characterized by long periods of snow cover, averaging 92 days, and a growing season of only 185 days. Mean July temperature is +17.6°C, whilst in January it is -4.3°C. Mean annual rainfall is 626mm.

Our aim, in July 1994, was to sample the hoverfly community of the Białowieża Forest, to perform several experiments on hoverfly mimicry and to assess the feasibility of future field studies in the forest.

The Syrphidae were collected over a period of 10 days, between 18 July 1994 and 28 July 1994, from the National park and from areas along disused railway tracks running through the forest. It was sunny during the study period, with temperatures of between 26-35°C. The hoverflies were generally caught during the early part of the day, between 7.00 and 14.00 hours CET, using an entomological net. Some specimens were identified on site, whilst others were brought back to Nottingham University, (UK) for identification.

Table 1 lists the species found and summaries the data associated with them. Codes used to define the associated plant species (letters **A** through **N**), the habitat (numbers **1** to **6**) and the relative abundance (**o**, **c**, **a** and **l**) are clarified below.

Table 1. Syrphidae of Białowieża Primeval Forest and associated plant, habitat and abundance data.

	List of Species	Found On	Found At	Abundance
1	*Ceriana conopsoides* (Linnaeus, 1758)	J	1	o
2	*Cheilosia carbonaria* Egger, 1860	A	2	c
3	*Cheilosia illustrata* (Harris, [1780])	A	1	1
4	*Cheilosia impressa* Loew, 1840	A	1	o
5	*Cheilosia velutina* Loew, 1840	A	1	1
6	*Cheilosia vernalis/zetterstedti* (Fallén, 1817)	J	1	1
7	*Chrysogaster solstitialis* (Fallén, 1817)	A	1	o
8	*Chrysotoxum bicinctum* (Linnaeus, 1758)	J	1	1
9	*Epistrophe nitidicollis* (Meigen, 1822)	A	2	o
10	*Episyrphus balteatus* (De Geer, 1776)	A,I	1,2,3	a
11	*Eristalinus sepulchralis* (Linnaeus, 1758)	A	1	o
12	*Eristalis abusiva* Collin, 1931	C	5	1
13	*Eristalis anthophorina* (Fallén, 1817)	A	6	1
14	*Eristalis arbustorum* (Linnaeus, 1758)	A,C,D,E	1,2,5	a
15	*Eristalis horticola* (De Geer, 1776)	A,C,E	1,2,5	a
16	*Eristalis intricaria* (Linnaeus, 1758)	A,C	1,5	o
17	*Eristalis pertinax* (Scopoli, 1763)	A,E,F	1,2,5,6	a
18	*Eristalis tenax* (Linnaeus, 1758)	A,C,J	1,2,5,6	a
19	*Eupeodes corollae* (Fabricius, 1794)	E	1	a
20	*Eupeodes latifasciatus* (Macquart, 1829)	G	1	o
21	*Eupeodes luniger* (Meigen, 1822)	E,H	1	1
22	*Eurimyia lineata* (Fabricius, 1787)	A,E	1,5	o
23	*Ferdinandea cuprea* (Scopoli, 1763)	I	4	1
24	*Helophilus hybridus* (Loew, 1846)	C,E,J	1,5,6	c
25	*Helophilus pendulus* (Linnaeus, 1758)	E,F,J	1,6	c
26	*Heringia heringi* (Zetterstedt, 1843)	A	1	1
27	*Melangyna umbellatarum* (Fabricius, 1794)	J	1	1
28	*Melanostoma mellinum* (Linnaeus, 1758)	A,C,E	1,5	a
29	*Meliscaeva auricollis* (Meigen, 1822)	A,C	1	o
30	*Meliscaeva cinctella* (Zetterstedt, 1843)	A,G,J	1,2,5	c
31	*Myathropa florea* (Linnaeus, 1758)	A,C,J	1	a
32	*Parasyrphus annulatus* (Zetterstedt, 1838)	J	1,5	o
33	*Parasyrphus lineola* (Zetterstedt, 1843)	A,D,E	1	c
34	*Parasyrphus nigritarsis* (Zetterstedt, 1843)	A	1,2,5	1
35	*Parasyrphus vittiger* (Zetterstedt, 1843)	A,J	1	o
36	*Platycheirus albimanus* (Fabricius, 1781)	J	1,5	o
37	*Platycheirus clypeatus* (Meigen, 1822)	A	6	o
38	*Rhingia campestris* Meigen, 1822	K	1,2	o
39	*Scaeva pyrastri* (Linnaeus, 1758)	A	1	o
40	*Scaeva selenitica* (Meigen, 1822)	A,J	1	o
41	*Sphaerophoria menthastri* (Linnaeus, 1758)	A,G,J	1	a
42	*Sphaerophoria scripta* (Linnaeus, 1758)	C,E,G	1,2	a

43	*Syritta pipiens* (Linnaeus, 1758)	A,E	1,2	a
44	*Syrphus ribesii* (Linnaeus, 1758)	A,C,G,L,M,N	1,2,3,5	a
45	*Syrphus vitripennis* Meigen, 1822	A,E	1	a
46	*Temnostoma apiforme* (Fabricius, 1794)	C	5	1
47	*Temnostoma meridionale* Krivosheina & Mamaev, 1967	C	5	1
48	*Temnostoma vespiforme* (Linnaeus, 1758)	A	3	1
49	*Volucella bombylans* (Linnaeus, 1758)	C	5	o
50	*Volucella pellucens* (Linnaeus, 1758)	A,C	1,2,5	c
51	*Xanthandrus comptus* (Harris, [1780])	A	1	1
52	*Xanthogramma pedissequum* (Harris, 1776)	E	1	1
53	*Xylota segnis* (Linnaeus, 1758)	J	1	1

FOUND ON
A = White flowered Umbelliferae with narrow leaflets, e.g. Wild Carrot (*Daucus carota*)
B = White flowered Umbelliferae with broad leaflets, e.g. Hogweed (*Heracleum sphondylium*)
C = Tiliacae, Lime (*Tilia* sp)
D = Flying among/resting on Grass spp
E = Convolvulaceae, Field Bindwood (*Convolvulus arvensis*)
F = Compositae, e.g. Oxeye Daisy (*Chrysanthemum leucanthemum*)
G = Rubiaceae, Bedstraw (*Galium* sp)
H = Geraniaceae, Cranesbill (*Geranium* sp)
I = Flying among woodland tree spp
J = Flying among various herbacous plants
K = Caryophyllaceae, Red Campion (*Silene dioica*)
L = Leguminosae, Ribbed Melilot (*Melilotus officinalis*)
M = Dipsaccaeae, Field Scabious (*Knautia arvensis*)
N = Leguminosae, Yellow and Purple Lucerne (*Medicago sativa*)
FOUND AT
1 = Along a disused (3 months) railway track at Grudki Station
2 = Tree lined lake side by Hotel Iwa
3 = Restricted Reserve in mixed woodland by a stream
4 = Near Bison Reserve in mixed woodland
5 = Along road verge in Białowieża village
6 = Wetland meadow on outskirts of Białowieża village
ABUNDANCE
o = Occasional
c = Common
a = Abundant
1 = 1 specimen caught

We thank Dr J. Behnke, who organised the trip; Pawel Gorski and Barbara Mokrzycka who kindly assisted; Jerzy M. Gutowski, who allowed us to sample inside the restricted reserve with him; and also Dr A. Maibach who helped identify the specimens at Nottingham University. We also thank the Carr Scholarship Trust for help in financing this trip.

Dipterists Digest 1996 **2**, 95-96

Chalcosyrphus eunotus (Diptera, Syrphidae) female found in Gloucestershire

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On 14 May 1995 five members of the Gloucestershire Invertebrate Group were recording in an area of broadleaf woodland at Weston Park, on the Cotswold escarpment near Saintbury. The site is a wooded stream valley, with ash, wych elm, hazel and field maple predominating.

During the afternoon we saw a hoverfly sunning itself on a hazel (*Corylus*) leaf. The hazel was alongside a path, not far from, but not adjacent to, the stream. We were not able to identify the hoverfly instantly, but it was clearly a honey bee mimic which looked as if it belonged to the group which are ancient woodland indicators. I took two photographs of the hoverfly, but we were unsuccessful in our subsequent attempts to catch it.

When the slides had been processed it was clear that the hoverfly which we had seen was a female *Chalcosyrphus eunotus* (Loew). This would appear to be the first British record of a female of this species: according to Stubbs and Falk (1983) all examples of the species taken in Britain so far have been males. I have not heard of any subsequent captures or sightings of females.

Without the benefit of a specimen to examine it was obviously important to check the photographic slides carefully to ensure that the identification was correct, especially since there is no description in English of a female *C. eunotus*. Fortunately, however, comparison of the hoverfly in the photographs with the illustration in Stubbs and Falk (1983) and with the single example of the species (a male of course) in the Natural History Museum collection, showed that the female differs from the male only in the usual features that distinguish the gender, such as the separation of the eyes and a somewhat broader abdomen. The pattern of markings on the thorax and abdomen were almost exactly like those of the male *C. eunotus*.

As a precaution the photographs were also carefully compared with females of other species, especially those of *Brachypalpus laphriformis* (Fallén), the only British species with which a possible confusion could arise. Differences between the female *C. eunotus* seen at Weston Park and females of *B. laphriformis* are given in Table 1.

According to Falk (1991) *C. eunotus* is only known from six sites in Berkshire, Dorset, Herefordshire and Worcestershire. Its presence in Gloucestershire is therefore not entirely unsurprising. The puparium is described by Maibach and Goeldlin de Tienfenau (1992) from material found in an artifical breeding site of decaying sawdust. The natural breeding site is still to be discovered but is likely to be under bark of fallen trees and branches. Speight (1989) includes *C. eunotus* in a list of species useful in identifying forests of international

importance for nature conservation.

Table 1. Comparison of major morphological characters for female *C. eunotus* and *B. laphriformis*

	C. eunotus	*B. laphriformis*
Thoracic dorsum	Dullish black with vague but clearly visible grey longitudinal stripes, as illustrated in Stubbs and Falk (1983).	Shiny metallic bronze; any stripes very faint.
Abdomen	A pair of trapeziform faint grey spots on tergite 2 exactly (in shape, size and position) as illustrated in Stubbs and Falk (1983). Visible portion of tergite 1 of same greyish colour, and a fainter pair of greyish spots on tergite 3. The grey colour on tergites 1 and 3 was also apparent on the male specimen in the NHM collection.	Tergites without spots.
Legs	Mainly black except for knees; in particular the mid tibiae are black. Hind femur noticeably less arched than in either sex of *B. laphriformis*.	Extensively yellow, including all tibiae and basal segments of all tarsi. Hind femora more arched than those of *C. eunotus*.
Wings	Clear except for yellowish base. Blackish veins, with inner cross vein r-m conspicuously blackened.	Suffused brown; veins brown.

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Dipterists Digest 1996 2, 97-99

A further record of *Scaeva albomaculata* in Britain and a note on the K G Blair collection of British Diptera

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The most important component of the entomological collections looked after by Hampshire County Council Museums Service (HCCMS) is the collection of Dr Kenneth Gloyne Blair (1882-1952). This collection, which includes Blair's diaries and library, was originally donated by his widow in 1953 to the Red House Museum at Christchurch, one of HCCMS's founder museums.

Blair is probably best known for the three moths which commemorate his name (Blair's Mocha, *Cyclophora puppillaria* Hubner, Blair's Shoulder-knot, *Lithophane leautieri* Boursin, and Blair's Wainscot, *Sedina buettneri* Hering) and his many publications on coleoptera while a member of staff at the British Museum (Natural History) from 1910-44. However, he collected extensively in all the major orders of British insects and there are approximately 4460 specimens of diptera remaining in his collection.

Since 1990, HCCMS has invested several thousand pounds, many hours of staff time and the services of Marcus Oldfield (a freelance entomological conservator based at the Booth Museum, Brighton) in a programme of conservation, re-storage, re-determination and re-organisation of the Blair collection, a programme which still has many years to run.

Blair's diptera were until recently stored in wooden store boxes, many of which were extremely vulnerable to attack by museum beetle and indeed some had already suffered to varying degrees. Consequently, this material has received priority conservation treatment. The families listed in Table 1 have also been re-determined and re-stored in new Hills-type cabinets, where they are amalgamated with material from other collections in a running series in checklist order. The remaining families will be treated in a similar way as staff time and the relevant expertise becomes available.

It was while re-determining the syrphid collection that the author recognised that a discoloured specimen stored amongst the *Scaeva pyrastri* (L) obviously did not belong to this species. The specimen is a female with a wing length of 9mm and was collected at Freshwater, Isle of Wight, on the 16.vi.1949.

Although not *S. pyrastri*, the specimen readily keyed out to *Scaeva* using Vockeroth (1969) on the basis of having distinct eye hairs, a bare metasternum and wing membranes with very sparse scattered microtrichia, entirely absent from extensive areas in the apical third. Using Kuznetzov (1985), the bright yellow lateral stripes on the mesonotum and the fact that the three pairs of lunules on tergites 2-4 do not extend on to lateral margins of the tergites, easily confirmed the specimen as belonging to *Scaeva (Scaeva) albomaculata* (Macquart, 1842).

Table 1 Diptera families which have been conserved, re-determined and re-stored at HCCMS, as at December 1994.

	British species (specimens)		
Family	Blair Coll.	Total HCCMS	GB species
Stratiomyidae	32 (215)	36 (549)	46
Xylomyiidae	1 (11)	2 (17)	3
Xylophagidae	2 (6)	2 (11)	3
Rhagionidae	7 (74)	7 (144)	18
Tabanidae	19 (281)	21 (445)	30
Asilidae	20 (168)	24 (400)	26
Therevidae	1 (1)*	5 (31)	13
Scenopinidae	0 (0)*	0 (0)	3
Acroceridae	1 (1)	2 (11)	3
Bombyliidae	0 (0)*	6 (33)	9
Pipunculidae	0 (0)*	21 (46)	76
Syrphidae	80 (502)	214 (3185)	267
Conopidae	9 (29)	12 (170)	24
Tephritidae	39 (210)	49 (408)	73
Platystomatidae	2 (8)	2 (23)	2
Otitidae	9 (35)	11 (115)	21
Micropezidae	3 (8)	6 (31)	9
Megamerinidae	0 (0)	1 (3)	1
Tanypezidae	0 (0)	0 (0)	2
Psilidae	6 (22)	11 (59)	27

* = Specimens formerly represented in collection but destroyed by museum beetle at some time in the past.

According to Stubbs and Falk (1983) and Speight (1988), *S. albomaculata* has only been recorded once before in the British Isles at Jevington, Sussex on 2.viii.1938 as reported by Wainwright (1942). The species is purported to be migratory and is not infrequent in the Mediterranean area, especially at higher altitudes (Van der Goot 1964).

It is perhaps surprising that Blair did not recognise the significance of the specimen as he was one of the editors of Entomologists Monthly Magazine when Wainwright had reported the first specimen seven years earlier. He had also been involved with producing reviews of new species to the British fauna (Benson *et. al.* 1940, Blair 1948) and had himself reported the discovery of the asilid *Laphria gilva* L. (Blair 1938), three specimens of which survive in his collection. In addition, as a resident of the Isle of Wight from the mid-1940's he seemed to be always alive to the possibility of new or unusual records from the island (Blair 1946, 1952).

The K G Blair collection and the other biological material cared for by HCCMS, as listed in Bateman et al (1993), may be consulted on weekdays or on the first Saturday of each month, by prior appointment.

Acknowledgements

I am very grateful to Steven Falk for bringing the paper by Kuznetzov to my attention some years ago when I was trying to determine a specimen of *Scaeva (Scaeva) rossica* Kuznetzov collected by me from the then Yugoslavia. HCCMS is indebted to the South Eastern Museums Service (SEMS) for grant aiding part of the conservation programme described in this paper.

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