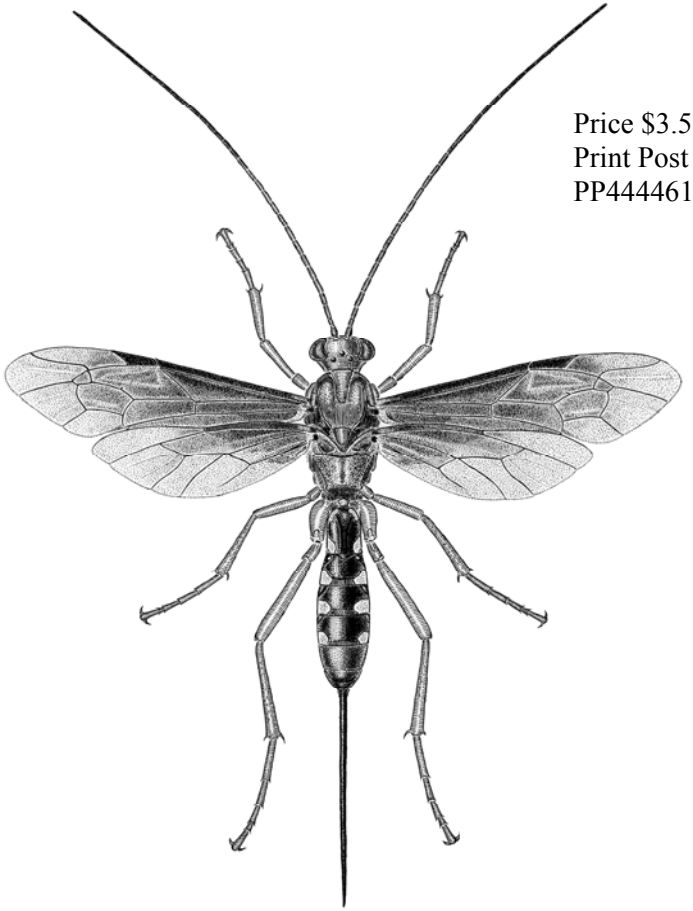
ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

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Front Cover Illustration: Ink illustration by William Manley of a female *Lissopimpla excelsa* (Costa, 1864) (Hymenoptera: Ichneumonidae: Pimplinae), a parasitic wasp (image copyright Qld Department of Agriculture, Fisheries & Forestry).

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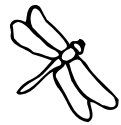



TABLE OF CONTENTS

The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held on the second Tuesday of each month (March to June, August to December). Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society. Membership is open to anyone interested in Entomology.

Contributions to the *News Bulletin* such as items of news, trip reports, announcements, etc are welcome and should be sent to the News Bulletin Editor.

The Society publishes **THE AUSTRALIAN ENTOMOLOGIST**. This is a refereed, illustrated journal devoted to Entomology in the Australian region, including New Zealand, Papua New Guinea and the islands of the South Western Pacific. The journal is published in four parts annually.

EMBLEM: The Society's emblem, chosen in 1973 on the 50th anniversary of the Society, is the king stag beetle, *Phalacrognathus muelleri* (Macleay), family Lucanidae (Coleoptera). Its magnificent purple and green colouration makes it one of the most attractive beetle species in Australia. It is restricted to the rainforests of northern Queensland.

Minutes of General Meeting

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park, on Tuesday, 12th March 2013 at 1 pm.

Chair: Geoff Thompson.

Attendance:, Justin Bartlett, Bradley Brown, Gary Cochrane, Pat Collins, Kathy Ebert, Bjorn Fellstadt, David Holdom, Alexandra Glauerdt, Judy King, Christine Lambkin, Gunter Maywald, Penny Mills, Geoff Monteith, John Moss, Mike Muller, Peter Osborne, Bill Palmer, Brenton Peters, John Purdie, Mark Schutze, Martin Shivas, Noel Starick, Alisha Steward, Bob Teakle, Desley Tree, Federica Turco, Jim Tuttle, Richard Zietek.

Visitors: Caroline Fewtrell, Andrew Manners, Anita Milroy, Adele Outteridge, Robyn Rizzo, Wim de Vos.

Apologies: Lyn Cook, Julieanne Farrell, Simon Lawson, Morris McKee, David Merritt, Susan Wright.

Minutes: The minutes of the last Annual General Meeting were circulated in News Bulletin Vol. 40 Issue 1, March 2012.
Moved that the minutes be accepted as a true record Federica Turco. Seconded: Noel Starick. Carried unanimously.

Nominations for Membership: The following nominations for Membership were received and approved by Council, and are put forward for election:
General Membership: Ulf Buchsbaum, Lustheimstrase 5, Munich, Bavaria, Germany D-81247. Nominated by Judy King, seconded by Geoff Thompson. James K. McCarthy, 2/49, Stafford St, East Brisbane, Q 4169 Nominated by Manon Griffiths, seconded by Helen Nahrung.
Joint membership: Martina and Andrew Mitchell, 2, Magnolia St, Holloways Beach, Q 4878. Nominated by Christine Lambkin, seconded by Judy King.
Student Membership: Liam O'Reilly, P.O.Box 396, Everton Park, Qld 4053. Nominated by Judy King, seconded by Geoff Thompson. Master Declan Leahy (age 8), 62 McGahan St Carina Heights, Qld 4152. Nominated by Judy King, seconded by Geoff Thompson. Mr Peter Osborne, 32, Inverpine Court, Petrie, Qld 4502. Nominated by Lyn Cook, seconded by Andy Wang.
All new members were elected unanimously.

Main Business

Annual Reports and Financial Statements
The Society's Annual Reports, Financial Statements and the Independent Auditor's report were published in News Bulletin Vol. 40 Joint Issue 10.

President
Treasurer
Secretary
Bulletin Editor
Permit Officer

There were no questions about the reports
Moved that the reports be accepted Christine Lambkin. *Seconded* Penny Mills. Carried unanimously.

Election of the Council for 2013
The following nominations have been received by Council and are now put to the meeting for election:

President	Simon Lawson
Senior Vice President	Bill Palmer
Secretary	Kathy Ebert
Business Manager	Geoff Monteith
Treasurer	Brenton Peters
News Bulletin Editor	Chris Moeseneder
Councillor	Federica Turco
Councillor	Penny Mills
Councillor	Bradley Brown

As nominations were required to be to the Secretary 6 weeks prior to this meeting and as there is only one nominee for each position a secret ballot is not required. All positions except Junior Vice President were voted on by members by show of hands. All nominees were elected unanimously. The position of Junior Vice President is held by Geoff Thompson.

The Retiring President, Geoff Thompson, on behalf of the Council and the Society, thanked outgoing Council members Justin Bartlett, Lyn Cook and Judy King for their contributions over several years. Judy and Justin have worked hard as our secretary and News Bulletin Editor respectively. Justin stayed on for extra service after expressing a wish to retire and is not quite off the hook yet. He has agreed to assist the new News Bulletin editor with distribution for a few months. In the absence of Simon Lawson, Geoff introduced the incoming Senior Vice President Bill Palmer. Bill thanked Geoff and invited him to deliver his Presidential address.

Geoff Thompson started working in entomology and illustrating insects in 1975. He has spent 31 years at Queensland Museum; 30 of those years in entomology and the last year in a new role as collection imager. His interests, including insects, illustration, printmaking, history of science and photography are all touched on in this talk.

Presidential address

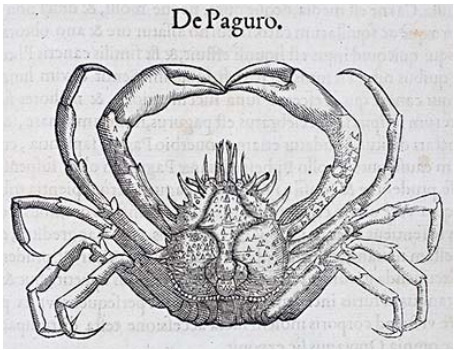
From Woodcuts to Cutting Edge - looking back and looking forward at insect imaging

Geoff Thompson, Queensland Museum

Scientific illustration has a long history and many famous artists have contributed great illustrations throughout the centuries. There have also been many technologies developed to record and to deliver the image to the viewer.

When looking at older illustrations advances in printing technologies are most noticeable. Milestones include; woodblock prints (1430s in Europe), intaglio techniques like engraving (1440s) and etching (c.1500), plus the planographic technique of lithography, invented in 1799. Refinements like stipple engraving (late 17th century) and chromolithography, printing colours from multiple stones (1835) are also important. Photogravure (1830) and colour halftone printing – invented late 19thC are very familiar to all but are rapidly being replaced by colour digital printing.

I have used the Queensland Museum Library (the oldest publicly-funded scientific library in Qld) to photograph most of my old illustration examples, as well as the State Library of Queensland (SLQ) copy of



Woodcut crab illustration from Rondelet, 1554, Qld Museum Library.

Mattioli but many old illustrations are now also available for copyright-free download from the internet.
In discussing this printed work I would like to concentrate on the artists, where they are known, particularly Australian ones.

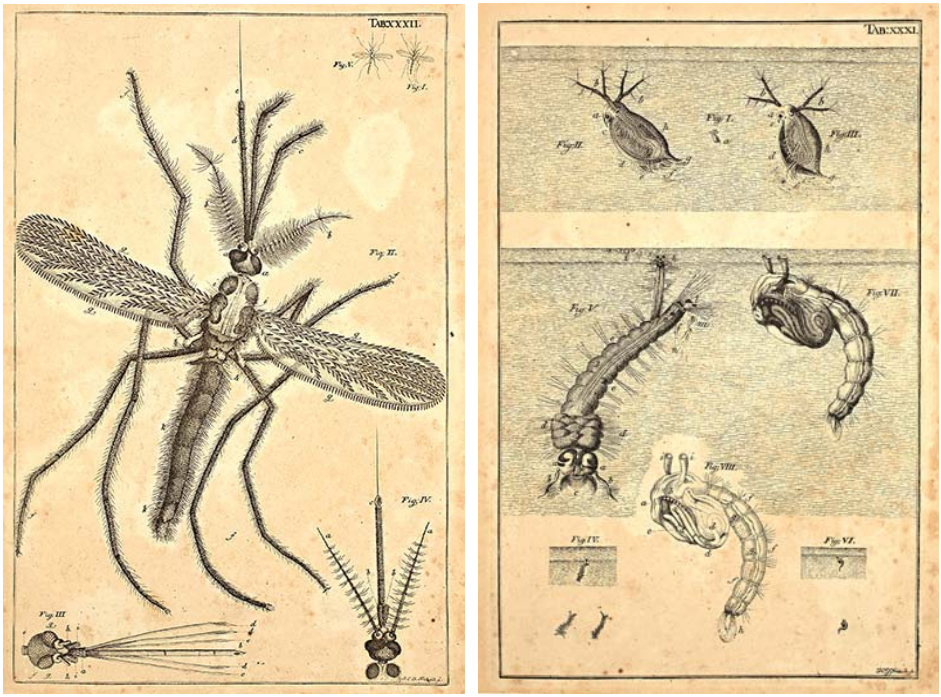
Queensland Museum Library's oldest book is Guillaume Rondelet (1507-1566) *The Book of Marine Fishes,* 1554. It contains

some very amusing whale illustrations, some fine invertebrates but covers marine organisms only. I can find nothing about who did the woodcut illustrations.

Not long ago SLQ bought a 1583 edition of Mattioli's *Discorsi*, a mainly-botanical commentary on an ancient work by Dioscorides (ca 40-90AD). Pietro Andrea Gregorio Mattioli, 1501-1577 was a physician to Holy Roman Emperors, interested in medicinal plants and some animals. The book was first printed in 1554 with no illustrations. The first Latin edition (Venice, 1554) is illustrated by small woodcuts by Giorgio Liberale of Udine. A Prague 1562 edition of his work was illustrated with 600 fine, larger woodcuts by Liberale and Wolfgang Meyerpeck. The artists were named in the many Venetian editions but the carver of the woodblocks was only identified as "G.S.". Evidence suggests the artists sometimes drew directly onto the wood, adapting for blemishes in the pear wood. In other cases the drawing was pasted on and carved through. These Venetian editions had over 900 plant blocks and nearly 100 animals.

"The English Leonardo", polymath Robert Hooke's *Micrographia*, 1665 caused a sensation when it was published. The diarist Samuel Pepys stayed up till 2:00am one night reading it. It was the first book to show microscopic views of well known organisms and objects. The insects fold-out in the book allowing higher magnification. Hooke was undoubtedly the artist himself.

Jan Swammerdam (1637-80) was a Dutch naturalist and early microscopist, who was the first to illustrate insect life cycles and dissections of insect anatomy. His *Book of*



Engraved plates showing mosquito life stages and *Daphnia* from Swammerdam, 1758, Qld Museum Library.

Nature was first published 50 years after his death. QM's copy is the first English edition, 1758. It is illustrated with Swammerdam's wonderful drawings reproduced in magnificent, large-format copper engravings.

Maria Sibylla Merrian (1647-1714) was probably the most famous entomological artist-author. She studied insect metamorphosis as a child and was the first to publish illustrations of it. At the age of 52 she and her daughter set sail for Surinam resulting in the magnificent work *Metamorphosis Insectorum Surinamensium*, 1705.

Pieter Cramer (1721-1776) was a wealthy Amsterdam wool merchant who amassed a large collection of butterflies and moths. He engaged the otherwise little-known artist Gerrit Wartenaar Lambertz to illustrate his collection in watercolour. The originals are in the Natural History Museum, London. The two frontispieces are by other artists; the first anonymous and the second by Jacobus Buys.

Dru Drury (1725-1804) was a wealthy London silversmith-entomologist, with a collection of 11,000 specimens. Moses Harris (1730-c.1788) is credited as artist on many of Drury's plates. He was an entomologist and illustrator who developed early theories of colour. He was generally responsible for drawing, engraving, and colouring all his own work.

John William Lewin (1770-1819) was the first professional artist and printmaker in Australia. Drury supplied him with insect collecting gear, copper plates and art materials (much of which did not survive the voyage). His first book was *Prodromus Entomology, Natural History of Lepidopterous Insects of New South Wales* (London, 1805). We have an early second edition, 1822, which has finer colouring than the first. These were the first plates actually drawn and etched in Australia.

Théodore Lacordaire (1801-1870) was a Belgian entomologist who travelled widely in South America. The images I have selected are from *Histoire naturelle des insectes, "Genera" des Coléoptères* (1854–1876), a 13-volume work which his death brought to a close. This work was eventually finished by Félicien Chapuis.

Bed bugs from Mattioli, 1583. Photo by the author. State Library of Qld

Hercule Nicolet (1801-1872) the artist credited on some of the plates, was a French-Swiss artist, lithographer, and entomologist. He was a well known lithographer in Neuchâtel and was closely connected to Louis Agassiz. Almost all of the plates of Agassiz publications were lithographed by him.

The plates of …*"Genera" des Coléoptères* are stipple engraved. Looking closely you can see they have been dolly wiped,

or to use the French term wiped "a la poupée". For example, a life-sized beetle may have printed brown legs and a black and green body. This means that greasy, different-coloured inks have been forced into the grooves on small areas of the copper plate and the excess carefully wiped off with minimal mixing of colours – truly masterly printing. After this the beetle images have been hand coloured with watercolour and even varnished in some cases.

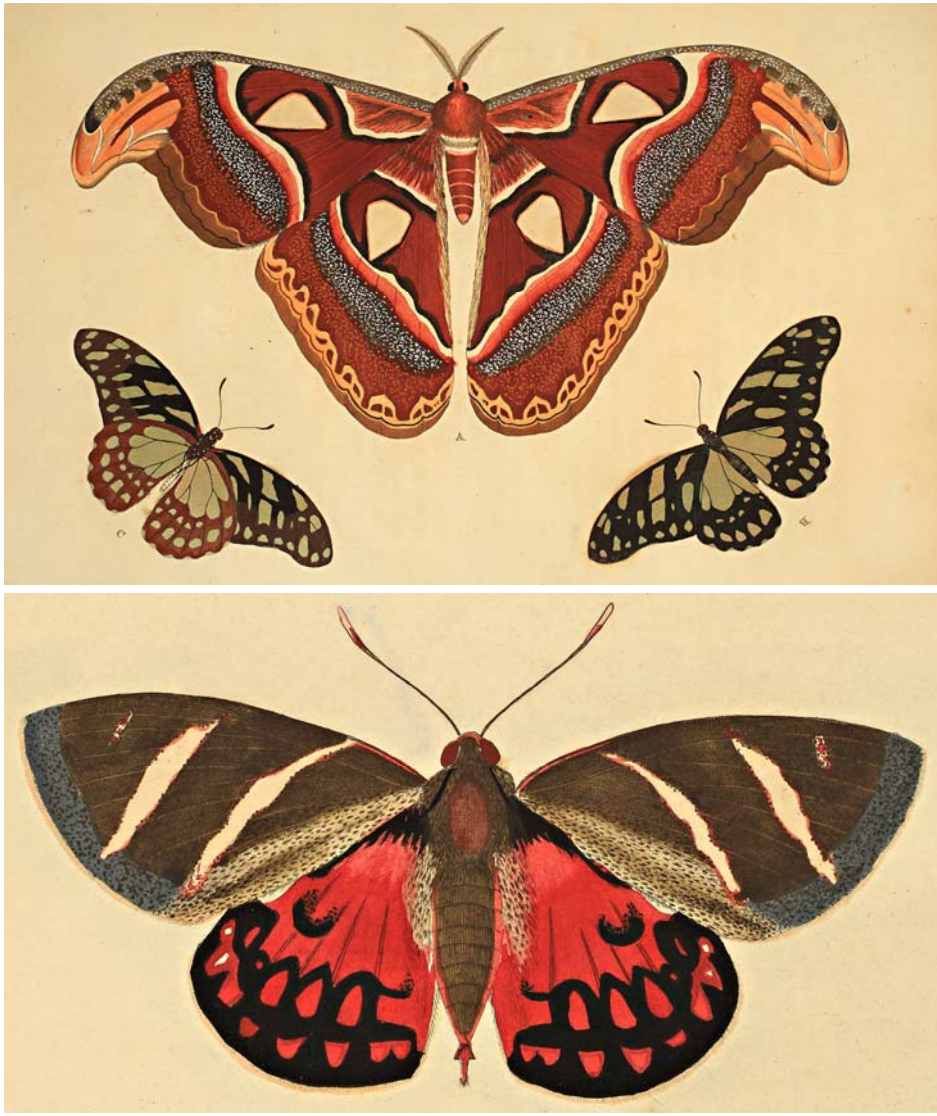


Plate 9 and detail from plate 18 from Cramer Vol. 1. 1779. Hand-coloured engravings. Qld Museum Library.

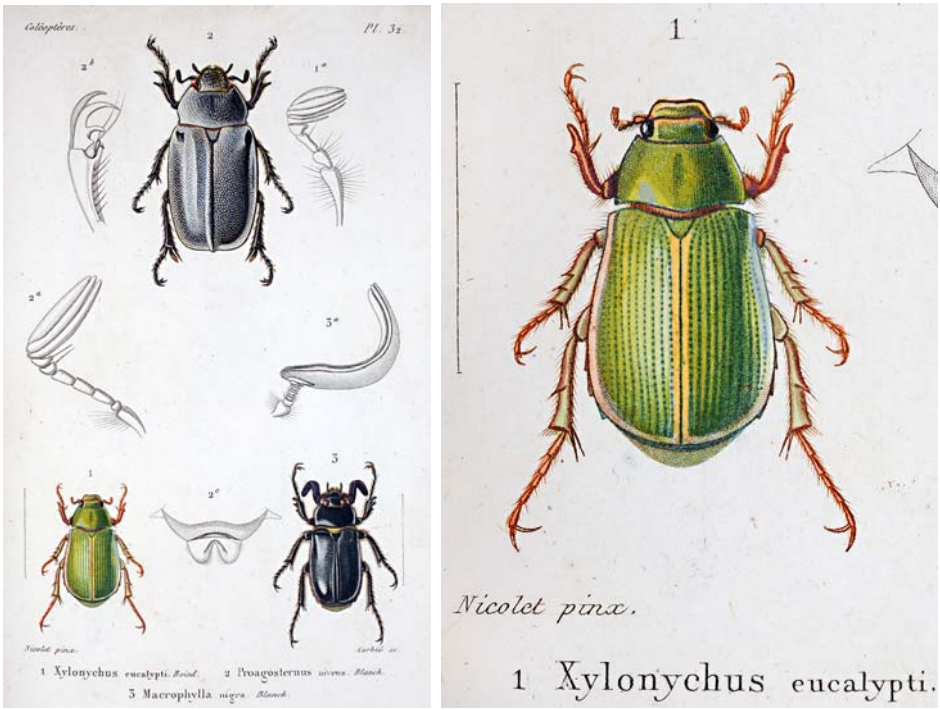


Plate 32 from Lacordaire 1854-1876 with detail of the Australian melolonthine *Xylonychus eucalypti*, showing stipple-engraving, dolly wiping and hand colouring.

The Scott sisters, Harriet (1830-1907) and Helena (1832-1910) were the daughters of Alexander Walker Scott (1800-1883). From 1846 the family lived on Ash Island in the Hunter River at Newcastle. There they had visits from Ludwig Leichhardt and many other scientists and artists. They lived there studying and drawing the native flora and fauna for 20 years. Helena married Edward Forde in 1864 and accompanied him on an expedition to the Darling River in 1865. They both contacted fever and Edward died in 1866. Wife and mother Harriet's death and Alexander's bankruptcy forced him and daughter Harriet to move to Sydney in 1866, where widowed Helena later joined them.

Both sisters were then forced to support themselves through their art. They illustrated many other scientific publications and even designed the first Australian-themed, wildflower Christmas Cards; Helena first in 1879 and Harriet in 1880. Harriet married Dr Cosby William Morgan in 1882 and became less active as an artist. Helena was still seeking work in her 70s.

Sylvester Diggles (1817-1880) was a Brisbane-based polymath; a musician, ornithologist, entomologist, teacher, artist and illustrator. He arrived in Brisbane in 1855, after two years in Sydney. He is famous for *The Ornithology of Australia* (1865-70) but his entomological work was never published.

His niece Rowena Birkett (1860-1915) lived in Diggles house at Kangaroo Point, where he taught her music and art. She coloured the plates of his *Ornithology* and

produced illustrations of insects which survive in a manuscript preserved by her family. At least one image in the album is a practice copy of the Scott sisters' work.

Joseph's Coat Moth, *Agarista agricola*, detail from plate 8 of Scott, 1864. Hand coloured lithograph by Helena Scott.

Pattie Tillyard (1880–1971) is best known in entomology for illustrating the works of her husband Robin J. Tillyard (1881-1937), particularly the magnificent colour plates of his *The Insects of Australia and New Zealand* (Sydney, 1926). She studied biology at Newnham College, Cambridge from 1900 before women could take degrees, only receiving hers after a policy change in 1921. She became a science teacher before coming out to Australia in 1909 (via 3 months with her brother in the Nile delta) to marry her "persistent suitor" Robin in Sydney. She was a stabilising supportive spouse. They had four daughters, living in Nelson, New Zealand and later in Canberra. Robin was killed in a car accident in 1937. Pattie continued to live in Canberra till her death, maintaining her life-long interest in women's issues.

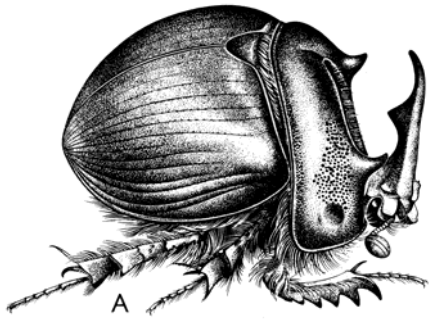
Frank Nanninga (1920-1999) was born in Medan, Sumatra, son of a Dutch banker. The family returned to the Netherlands where Frank studied at the Royal Academy of Art, den Hague, until interred as a hostage by the Nazis. By 1950 he was a commercial artist with one known exhibition at David Jones, Sydney. He worked at CSIRO Canberra 1963-1970, illustrating *The Insects of Australia.* He introduced scraperboard to Australian insect illustration and helped train many other illustrators. The magnificent colour plates were painted in coloured inks as printed, with multiple images per sheet. I think he deserves a fuller biography, as there is almost nothing written about this seminal Australian insect illustrator. I hope to prepare one.

Frank Nanninga c.1950 passport photo courtesy Paul Nanninga.

There *was* a whole stable of illustrators working on the first edition of *The Insects of Australia,* 1970 and its *Supplement,* 1974. Fewer were needed for *The Insects of*

Australia second edition 1991. Of course this short overview can't mention every insect illustrator, in Australia or overseas.

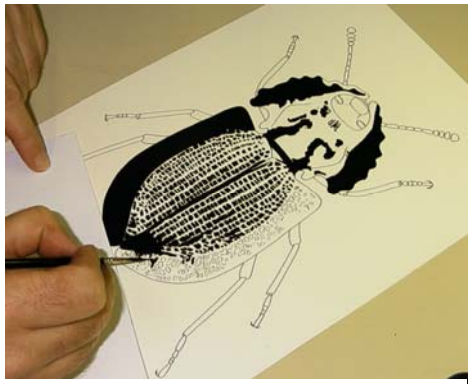
Sybil Curtis was one of that group of illustrators who worked on the first edition. She was born in Canungra SEQ and took her B.Sc. in 1967 at University of Queensland in Entomology and Geology. She was working for Tom Woodward on Hemiptera illustrations for *The Insects of Australia,* using tracing paper techniques and was hired to work for CSIRO in Canberra in early 1968. There she saw Frank Nanninga's scraperboard work and learnt to use that medium on the job. Sybil became a master of producing work that looked great when reduced for reproduction but not wasting time on excessive detail that would disappear when reproduced.

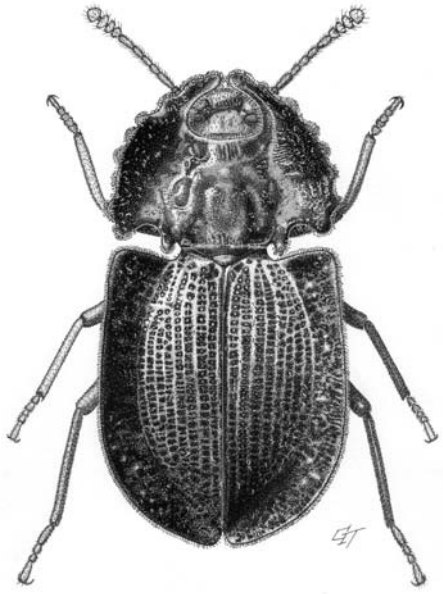


Scraperboard illustration by Frank Nanninga, *Blackburnium cavicolle* Bolboceratidae from CSIRO *The Insects of Australia* 1970. © CSIRO.

Sybil taught me traditional scraperboard technique in 1975, when I too started working for Tom Woodward at UQ Entomology Department. Scraperboard has a sprayed white-clay surface on a cardboard backing. Some comes pre-coated with black but we used white.

The technique starts with an accurate pencil outline, drawn using a camera lucida, a device with a mirror mounted on a stereo microscope, which allows the artist to see the pencil and drawing while looking at the specimen through the microscope. It only works on one side and because of the 5° angle of view the drawing has to be moved as you focus up and down. You have to find





The author painting darker areas on scraperboard illustration of *Aoupinia pseudohelea* Matthews, 2003. [Coleoptera: Tenebrionidae]. Top photo Susan Wright. Both © Queensland Museum.

reference points still in focus enough to reposition the drawing after refocussing up or down. Lighting levels on the specimen and paper must be carefully adjusted. Both look washed out and you have to frequently disengage the camera lucida in order to discern detail.

The outline is refined by tracing, folding down the middle and drawing the mean of the two lines. This removes viewing-angle distortions. The original outline is rubbed out on the inner surface of the folded tracing paper. Then the averaged outline half is copied to the other side and the result checked against the specimen. Appendages are added and the outline transferred to scraperboard. It is then inked in and the mapped dark areas painted with several thin coats of black ink. When this is dry small sharp tools are used to scrape white patches or lines to blend with pen and ink stipple and line shading on the lighter areas.

Christine Lambkin, who was a student when I was working for Tom Woodward, was also an illustrator. After graduating she became a teacher before illustrating spiders for Valerie Davies at Queensland Museum. We later ran a series of workshops before she left to work and study at ANIC in Canberra. She returned with a PhD as a curator and was my boss till last year, when my role changed to collection imager. Sybil also helped me run periodic classes at Queensland Museum until she retired.

In 2005 I won a Queensland-Smithsonian Fellowship to work with J. Marie Metz at USDA's Systematic Entomology Laboratory (SEL) based at the National Insect Collection, National Museum of Natural History, Smithsonian Institution, Washington DC. Marie was illustrator there from 2004 to 2009. Previously she had illustrated many therevid flies at the University of Illinois Urbana/ Champaign. Marie taught me how to illustrate digitally, drawing vectored outlines in Adobe Illustrator before rendering from scratch in Photoshop. She was most generous with all the methods she had developed since being taught by George Venable in 1999. George had pioneered digital scientific insect illustration, completing his first black and white digital illustration in 1994. Marie even gave me copies of her own Photoshop brushes and the secret of how to render eyes in Photoshop.

Anne Hastings has been illustrating at ANIC since 1983. She contributed scraperboard illustrations to the second edition of *The Insects of Australia.* She has also produced many other fine illustrations but I particularly admire her work on the *Anatomical Atlas of Flies*, a fabulous blend of deep-focus photography and digital illustration. http://www.ento.csiro.au/biology/fly/fly.php#

The reason we were still drawing insects by hand until relatively recently was largely due to the depth-of-field limitation on small specimens. Some time in the early 1990s, entomologists at The Natural History Museum, London, started to use manual cut and paste to overcome this problem and eventually approached software developers Synoptics for a digital solution. Synoptics tried to steer them towards proprietary solutions such as Adobe Photoshop but reluctantly agreed to show them a manual solution they had worked out. NHM ordered it immediately.

Phil Aitkin told me in a recent email that "The resulting system, named 'Montage', was rather expensive but apparently very effective. It was entirely manual; in-focus regions were delineated with the mouse, then combined into a 'montage' view." At the time he was heard to mutter a lot "We should be doing this automatically". Even-

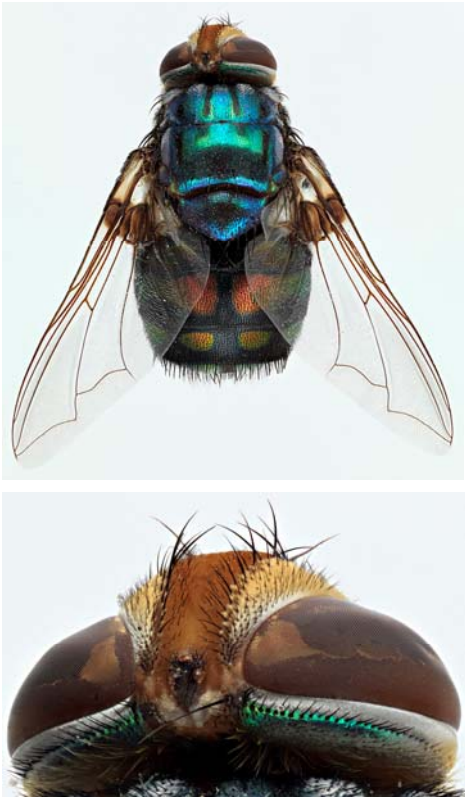
tually he was egged on by colleagues to "Go on then".

He continued "We had just put together a new software imaging toolkit and I was keen to see if it could be used to create the sort of application I'd designed it for. One lunchtime, I wrote a prototype and demonstrated it using a monochrome camera and a manual lens, pointing across a software engineer's desk. It took about 30 minutes. As far as I know, this was the first automated focus stacking software.

Over the next couple of weeks I wrote a complete, though primitive, application that was the first to be sold as '*Auto*-Montage' in late 1996. This work formed the basis of the algorithms of Auto-Montage for many years, although my colleague Alasdair Hayden-Wright took over the development of the GUI and re-implemented it more thoroughly and added focus motor control etc. Alasdair and I continued to collaborate on the development until I left Synoptics in 2011."

This software created a revolution in insect photography but the technology was expensive. Queensland Museum Entomology eventually acquired its first manual system in 2004. It was manual-focus stepped, slow and the optics were not first rate but we managed to create some very creditable images.

Part of my Queensland-Smithsonian Fellowship was to see and evaluate various deep-focus imaging systems. I visited Automontage imaging laboratories at California Academy and Harvard's Museum of Comparative Zoology. I also saw Roy Larimer's Microptics systems at the Smithsonian and at Roy's own labs in Maryland. At that time Roy was not montaging images but relying on high-depth-of-field optical systems. Later, as other, cheaper, focus-stacking systems became available Roy incorporated their use into his systems. After a legal issue Roy started a new company, Visionary Digital.



Tachinid fly habitus and detail, focus stacked with Zerene from Hasselblad 200-megapixel source images taken and processed on Visionary Digital BK-Plus Lab system. The pin and dust have been removed in Photoshop. Photo and post processing by the author. © Qld Museum.

In 2008 Roy installed one of his montaging systems for Prof. Gerry Cassis at UNSW and Gerry kindly invited me down for the installation and training.

In 2011 we won a contract from Atlas of Living Australia to purchase photographic

assets and use them to supply images of QM biological collections. Initially we were steered towards a Satscan drawer-scanning system. After consulting Roy and other photographer colleagues I successfully argued we could do the drawer imaging with a medium-format digital camera system and image individual types with a focus-stacking system. We purchased a Visionary Digital BK-Plus Lab system and a portable Passport system. We also purchased a Hasselblad H4D-50MS medium format camera that was later upgraded to a H4D-200MS, capable of producing a 200 megapixel image when used in 6-shot mode.

Our wonderful volunteers Maria Barragan, Margaret Innes, Kathleen Nugent, John Purdie and Noel Starick imaged 850 drawers in about three months. Myself, Karin Koch and Susan Wright also imaged about 300 Dipteran primary types and their labels from four families; Bombyliidae, Syrphidae, Tephritidae and Therevidae. Chris Lambkin organised a metadata entry system and had us put up smaller versions of the type images as part of Australian Faunal Directory contracts. e.g. http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/taxa/Palirika_decora

The Visionary Digital BK-Plus Lab system has an incredible fibre-optic flash lighting system with innovative extra devices. The Canon Live-view function has been integrated with Roy's own software to allow fine focus on screen. The camera is set to manual focus and the motorised lift can move it precise tiny distances up or down. Test exposures are taken first. Then you set top and bottom of focus, enter the lens and F-stop and the system tells you how many photos it needs to take. You can make adjustments to overlap settings if necessary. Then the system is triggered to take all the necessary images. They are exported as tiffs, imported into a stacking program and processed by the powerful computer into one sharp image. Scale lines have been calibrated for each setting of every lens and are added easily in Photoshop Extended.
The system came with Canon 7D and 5D Mk II cameras. I have used it to take display-quality images, sometimes in combination with the Hasselblad. I then use my Photoshop skills to take out pins, remove dust and sharpen the images, taking them to another level.

The Hasselblad drawer images do not require focus stacking as the camera lens has enough depth of field. Big images like this can be Zoomified, tiled into layers of small jpegs so that only the enlarged portions of the image are downloaded by the viewer's computer. Such versions of these images have the potential to be easily viewed on the web but there have been problems as with some other web image delivery. Atlas of Living Australia planned to upload to Morphbank, a large US repository for biological images and designed an Australian portal to do this. Problems of matching metadata to the Morphbank fields and loss of skilled workers to do this have slowed the process down. Though much smaller than the original images Zoomified images still require considerable, expensive server space to host.

The main problems I see for mass digitisation of specimen and drawer images are metadata entry, transfer of specimen data from collection databases to Digital Asset Management Systems (DAMS), firewalls, web upload, as well as archival server storage and web-hosting server space.

The web use of downsized images, as on the Australian Faunal Directory, has many practical advantages but does not use the full potential of the images, especially as broadband becomes more common everywhere and new viewing devices develop.

Developing technologies include remotely operable systems where a taxonomist can examine a specimen on the other side of the world, turning and zooming in as desired. Of course this requires identical, expensive systems at locations round the world. Arizona State University is currently coordinating a pilot project based on four systems.

Insects are too small for targets to be attached for some forms of 3D scanning but photogrammetry 3D views of insects and insect genitalia are already a reality. Dr Chuong Nguyen is experimenting with this at ANIC and some of his 3D models have been used by artist Prof. Eleanor Gates-Stuart in images projected on Canberra's Questacon building during Canberra's recent centenary celebrations.

Dave Cheung of the Natural History Museum of Denmark has used Magic 360™ to put up rotatable images of insect genitalia. http://dkbdigitaldesigns.com/semrotate/sem.html This requires about 36 rotated views at 10º intervals, a daunting task for focus stackers but more achievable with these scanning electron microscope images. This software allows you to rotate by dragging to the desired viewing angle and to zoom in on detail.

Focus stacking programs like Zerene and Automontage can produce a stereo pair that can be saved as a stereo image file, viewable on stereo TV or computer screens. This is time consuming to do but the results are impressive if you have the screens to view them.

I think the best current advantage of having imaging facilities to insect collections, apart from producing images for publication, is if somebody asks for an image of a type we can make a high-quality one, at the viewing angle they request, quickly. This can usually be done more quickly than packing up and sending a loan unless large numbers of types are requested. It also lessens the risks to the types.
Sometimes it's also been useful to send a jpeg of a drawer image to a person requesting a loan. They can assess whether they want to borrow material or even indicate a few specimens in the drawer that are of interest, saving sending the lot. One worker realised that he had already seen material and saved us sending a useless loan.

On the illustration front, George Venable tells me he is making pastiche digital illustrations of fruit flies in half a day, from images taken by Roy Larimer on a Visionary Digital system. http://www.pxlpwr.com/images/Gallery.html

He is able to repair and emphasise features like important bristles, as we used to by hand and even redraws the eyes with a natural colour. The resultant image has all the advantages of older formal illustrations with impressive detail and much less work. So perhaps there is still a place for real insect illustration in the future.

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A vote of thanks was given by Christine Lambkin.

Any other business:
1. Members were reminded about the Student Award. Two entries have been received so far.
2. Next meeting will be held on Tuesday 9th April.

The meeting closed at 2.05pm.

iStockPhoto, © Beatrice Misa

This article was presented at the Society's General Meeting on 11 December 2012

From death to dust – using insects to determine post mortem intervals in south east Queensland. Julianne Farrell

Forensic entomology and necrophagous insect succession have been extensively studied in southern Australia, but little is known of the forensically important insect taxa that inhabit carrion in the tropical & sub-tropical areas of Queensland, or in most other parts of northern Australia. There are no long-term studies in the published literature detailing seasonal and annual succession patterns of carrion-inhabiting insects in Queensland. This research aims to identify those insect species of forensic importance in south-east Queensland.

Using medical techniques, such as measurement of body temperature or analysing livor and rigor mortis in a corpse, post-mortem interval (PMI) can only be accurately measured for 2 – 3 days after death. In contrast, by calculating the age of immature insect stages feeding on a corpse and analysing the necrophagous species present, PMI's from the first day to several weeks and longer can be estimated.

In order to contribute to the resolution of legal issues it is important to accurately estimate how long a person has been dead. Estimating the time since death in a forensic case means interpreting the many variables that affect the decay rate of the human body. There are two methods used for estimating PMI:

1.) Comparative development rate. The basis of this method is that by comparing crime scene evidence with experimental data from the same laboratory-reared species, we can arrive at a conclusion about time of oviposition. As a consequence of development rates increasing with increasing temperatures, data relating to the development rates relative to a range of temperatures is needed for each forensically important species.

2.) Accumulated Degree Days / Accumulated Degree Hours. This method is derived from research on physiological energy budgets for crop pests. It can be applied to forensic sciences because insect growth responds to the daily or hourly temperature fluctuations. A key factor of insect physiological energy budgets is the maximum & minimum developmental & lethal limits. The amount of energy used to grow through successive stages is relatively constant for each stage of each species. This energy constant can be directly related to temperature, so the number of thermal units used during development can be calculated.

The use of human remains in forensic research remains illegal in Australia, so domestic pigs form the basis of my research into the carrion-feeding insects in southeast Queensland, the timing with which these taxa arrive at and depart from bodies, and how some of these species could be used to improve the estimation of post mortem intervals in the region.

Pigs have long been accepted as models for humans because an adult pig is similar in size to a human male head & torso; they are

relatively hairless, with similar skin thickness and texture; both are omnivores, containing similar gut flora, which drives the internal breakdown; and have similar tissue types, eg. pig valves are used in human heart surgery.

Seasonal and annual insect succession on decomposing pigs is being studied on a 10 hectare trial site on a property approximately 25km north west of Toowoomba. The site contains a mixture of open grassland & scrubby timber habitats. Pigs in grassland receive sunshine all day while the pigs in timber receive daily periods of shade – these variable habitats allow different species of insects to colonise the carcases.

Eight weaner or grower sized pigs are donated from a commercial piggery near Warwick every 3 months and placed under weld -mesh scavenger-proof cages. The pigs are visited daily for the first few weeks, then every 2-4 days until skeletonisation. Adult invertebrates are collected by sweep netting, pitfall traps, sticky traps, vacuuming and hand picking. Larvae are collected for rearing to adults on kangaroo-based fresh pet food. Puparia are also collected. Identifications are made using various taxonomic keys, or with assistance from Brisbane based entomologists.

To date, invertebrates from 23 Orders and 51 Families have been collected or observed from 56 pigs. Of those, there are four Orders and 20 Families of forensic importance (Figures 1, 2 and 3). Huge numbers of mites (Fig. 4) have colonised some of the pig carcases during the warmer months, skewing data sets for insect species. At least five mite (Acari) species have been identified, with some being phoretic on flies and beetles and feeding on first instar maggots, others are predatory on a range of microarthropods, and still others are associated with stored food products.

Figure 1. *Megaselia* sp. Image by Julianne Farrell.

Figure 2. *Chrysomya incisuralis* female. Image courtesy of Ken Walker, Museum Victoria.

Figure 3. *Diamesus osculans*, a predatory carrion beetle. Image by Julianne Farrell.

Figure 4. Acari sp. colonising pig head. Image by Julianne Farrell.

Comparisons with insect species collected from human remains from south east Queensland have been made through access to insect-infested human remains at the Brisbane mortuary during 2011 and 2012. These show that carrion insects that colonise pigs also colonise humans after death, so PMI estimates based on pig data are relevant for humans in the same region.
Opportunistic observations and collections from roadkill (mainly kangaroos *Macropus* sp. and feral pigs *Sus scrofa*) throughout inland eastern Australia have yielded the same range of taxa that occur in the experimental pig carcases and human remains.

A new, undescribed species of Trogidae: *Omorgus* has been regularly collected from the trial site (Fig. 5). Initial identifications were made by Dr Geoff Monteith, and specimens have been sent to Trogidae specialists in South Africa for identification and DNA comparisons with other Australian species. This species is of potential forensic interest to south east Queensland, as *Omorgus* sp. are scavengers, arriving during the later stages of decomposition where the larvae and adults feed on fur and skin.

Of the 17 species of Calliphoridae, three species of Muscidae and four species of Sarcophagidae collected from experimental pig carcases, 11 species bred on the carcases, and are thus considered forensically significant.

Calliphora augur, C. stygia, Chrysomya saffranea, *Ch. rufifacies, Ch. nigripes* and

Ch. varipes appear to be the most important colonising species in the region & most likely to be used in PMI estimations. These are also native species, but with the exception of *Ch. rufifacies*, little is known of the development periods of the other species.

Much more work will be required to determine development periods at a range of temperatures for most of the species listed in order for them to be used for PMI estimates.

Acknowledgements

Bach family, Reilly Pastoral Company, Geoff Monteith, Bryan Cantrell, Owen Seeman, Queensland Health Forensic & Scientific Services mortuary staff, Myron Zalucki, Andrew Whittington, Lyn Cook, and Jenny & Neil Anderson.

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Figure 5. A new Trogidae: *Omorgus* sp. Images courtesy of Ken Walker, Museum Victoria.

Entomological Society of Queensland 2013 $500 Student Award

This is an award by the Society to encourage entomological research. Entries are judged by a panel of three entomologists appointed by the President of the Society. The winner will be announced at the May
General Meeting and is then invited to present a summary of their research at the June Notes and Exhibits meeting of the Society.

Honours, Diploma and 4th year Degree students who received their qualification from any Queensland tertiary education institution in 2012 or 2013 may submit their entomology-based thesis or report for consideration.

Entrants need not be Society members. These reports can be directed to the Society's Senior Vice President at the address listed on the entry form. However, please note that a hard copy of your thesis/report does not need to be submitted, and the submission of a PDF version is encouraged. This should be emailed together with a signed copy of the completed entry form to Simon Lawson, simon.lawson@daff.qld.gov.au. Closing date for submissions is Friday 12th April 2013.

Entomological Society of Queensland 2013 Student Award Entry Form

Name _____

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_____

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Supervisor _____

Date of Examiners report or grading _____

Return address for thesis/report (if applicable) _____

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Signature _____ Date_____

Send a copy of your thesis/report with a signed and completed entry form to: Senior Vice President of the Entomological Society of Queensland, by email : simon.lawson@daff.qld.gov.au or by mail: Simon Lawson, DAFF Forestry, Level 3A West. Ecosciences Precinct, GPO Box 267, Brisbane Q 4001

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Nine general meetings held per year on the 2nd Tuesday of the respective month

MAR—Tuesday 12th	Geoff Thompson	AGM and President's Address
APR—Tuesday 9th	Michael Ramsden	Sirex wood wasps in Queensland
MAY—Tuesday 14th	Dr Mike Furlong	Plant responses to herbivory: complex interactions between parasitoids, predators and prey
JUN—Tuesday 11th	Notes & Exhibits / Student Award Presentation	
AUG—Tuesday 13th	Dr. Donald Nichols	Bell Minor associated dieback of eucalypt forests
SEP—Tuesday 10th		
OCT—Tuesday 8th		
NOV—Tuesday 12th		
DEC—Tuesday 10th	Notes & Exhibits and Xmas BBQ	

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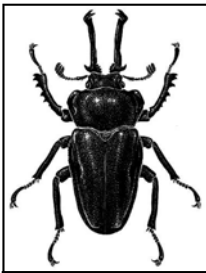

THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NOTICE OF NEXT MEETING

Tuesday 9th April 2013, 1pm

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Wood wasp woes: *Sirex* in Queensland

a presentation by

Michael Ramsden

~

Seminar Room 1
Ground Floor, Ecosciences Precinct
Boggo Road, DUTTON PARK

More venue details available at
http://www.esq.org.au/meetings.html

ALL WELCOME

NEXT NEWS BULLETIN

Volume 41, Issue 2 (May 2013)

CONTRIBUTIONS WELCOME

DEADLINE - Tuesday May 21st, 2012
Send your news/stories/notices to the editor
(chris.moeseneder@csiro.au)