

INSECT DIGITAL PHOTOGRAPHY WORK STATION

Mike Taylor, World Museum Liverpool, 11th February 2012

I have been experimenting with the photography of set insect specimens for over ten years, initially using film cameras. Following a demonstration to the British Entomological and Natural History Society they published details of my technique. (Taylor.M.J. 2001.BJENH,**14**: 193-206), I then adapted the method for use with digital cameras. (Taylor.M.J. 2004.BJENH,**17**:25-33).

In 2002 I made a set of equipment for World Museum Liverpool, see photograph Fig 1, this is available in the Entomology section of the museum.



Fig 1

As increasing numbers of specimens were being collected in Chios each year and the volume of digital photography increased and recognising the occasional need to send high quality images to specialists whilst insects of interest were still 'on the wing', I decided to make a set of equipment for use in Chios.

I simplified the design, placing the side mirrors into fixtures on the front legs of the Work Station.

Fig 2, shows the dimensions of the Chios equipment, used to photograph the *M.pruni* female featured in Fig 3. Plates 1 and 2 show photographs of constructional details.

I easily sourced the materials including the electrical equipment in Chios for a total cost of less than €100. The first step is to mount the fluorescent tubes on a rectangular piece of thick plywood,

leaving a clear edge about 20mm wide, where it rests on the ledges on the support structure. The support structure is then made to suit the lighting unit. The camera and specimen support is then made and fitted with the camera in the operating position. The legs of the support structure are then cut to the correct length to allow free movement of the camera and specimen stage under the lighting. The front legs are then fitted with the mirrors and the camera monitor screen fitted below the edge of the lighting unit to shade the monitor in the operating position. In setting up the equipment try to ensure the relative dimensions of the items as specified in the drawing at Fig 2.

I easily made my equipment in Chios part time over the course of four or five days. A university Lab Technician should easily be able to produce a set of equipment in less than a week.

The key aspects of the Work Station are the choice of fluorescent tubes, and the positioning of and size of the side mirrors in relationship to the Camera and Specimen Stage and the overhead lighting.

The camera used is a Nikon 995, now out of production but which was produced in large numbers from about 2002, it originally sold for about £700. It has a twisty body with a small front profile which facilitates the use of mirrors in directing overhead lighting onto the lower areas of the specimen stage. However the crucial advantage of this camera is its internal focusing via a fixed non-extending front lens element, coupled with availability of zooming even at the closest focus distances. The best feature of this camera however is the manual focus arrangement for which the operator can preselect a precise focal distance. Close up 20mm, 30mm, 40mm.....e.t.c. can be selected, later versions e.g. Nikon 4500 changed to the 'useless' pictorial bar and 'slider' position selection...somewhere between a 'flower and a mountain'!!!!

These cameras are readily available on E-bay for from £40 to £100 depending on condition.

I use manual focus, ISO 100 and aperture priority, always stopping down for maximum depth of field. My equipment in the UK has a more sophisticated insect stage position adjustment using a rack and pinion mechanism for accurate focussing. There is a small shade piece on the lower surface of the light box immediately above the camera screen to give a bright image for focussing. In operation up to twenty specimens per hour can be photographed depending on the mix of specimen sizes being processed.

The fluorescent tubes used give perfect lighting colour temperature for use with the Nikon 995 factory set colour balance. No colour correction being required, See Fig 3. As all specimens are mounted on Photographic Grey Card there is a good colour reference contained in all images so that manual colour corrections can be easily used, as can 'Auto Colour Correct'. Sometimes the use of different colour printers using slightly different dyes can give prints with some colour bias even from the same digital images. When printing I use an HP Officejet Pro K550 using 'Cartridge World' refills, printed on 'Cartridge World' 'Matt Coated Supersharp Double Sided 210gsm Paper, or Folex IP Top Color Duo 130 paper for double sided printing.

The preparation of specimens for photography using this technique is important. If very close detail is required particularly if using a supplementary lens. e.g. Raynox MSN200, which can achieve max field widths of 9mm, orientation of the specimen when pinned to the Photographic Grey Card has to be taken into account when pinning the specimen. At very close focus distances small specimens pinned to long single pins upon which labels are to be subsequently placed is not an option. All the material which I collect for World Museum Liverpool are pinned using Micro Pins, they are then staged on plastazote strip which is then long-pinned upon which labels are placed.

Using this method it is easy to remove witness of the micro pin head post photography using the Photoshop Clone Stamp Tool, see Fig 3 photograph of female *Merodon pruni*.

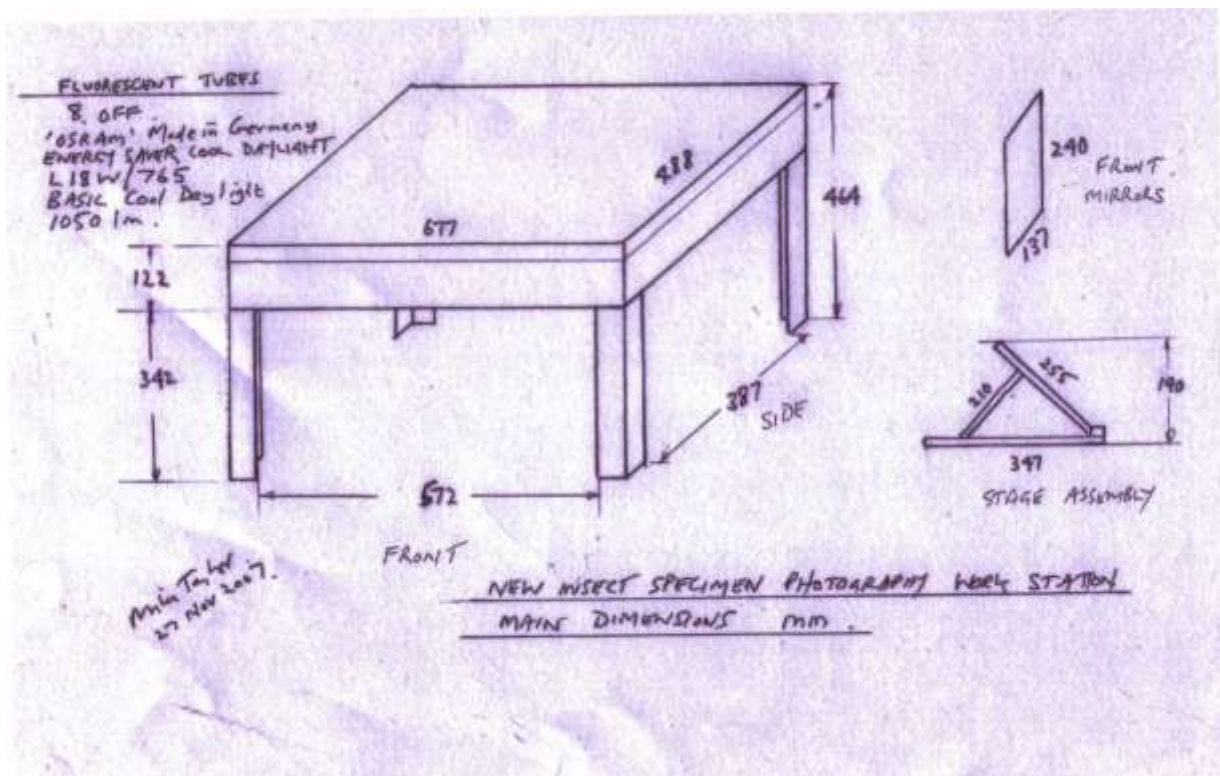


Fig 2



Fig 3. Female *Merodon pruni* .Rossi.1790.(Diptera, Syrphidae).
Wingspan 31mm, Length 17mm.

Plate 1 INSECT DIGITAL WORK STATION, CONSTRUCTION DETAILS



Light box support table



**Light box and front left mirror in position
right mirror removed**



View from inside of front left mirror



Front left mirror from front



Detail of upper corner assembly



View of rear right leg and light tubes

Plate 2 LIGHT BOX AND CAMERA / SPECIMEN SUPPORT STAGE



View of light box assembly



**View of work station in operation, using
An early camera/specimen stage prototype**



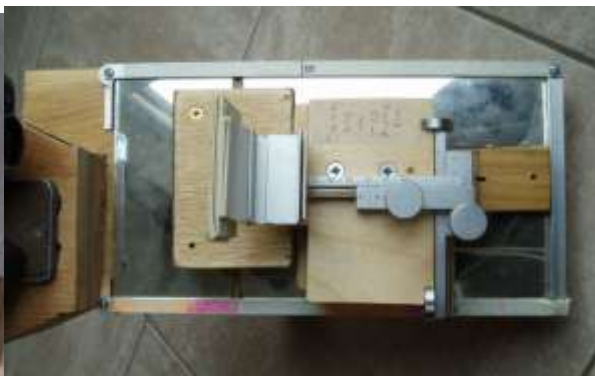
**Camera on prototype stage with insect
Specimen in position for photography**



**Final developed version of camera/specimen stage
using a microscope two axis stage**



**Detail of microscope attachment provision
with microscope stage detached from saddle**



**Plan view of stage ramp showing microscope
stage clamped on to its support saddle in mid
ramp location.**

QUALITY OF THE IMAGES PRODUCED BY THIS TECHNIQUE

The main objective in developing this equipment was to be able to produce high quality, consistent, repeatable images, requiring a minimum time to process a specimen.

The use of 'blanket' illumination, particularly by using ring-flash equipment was rejected because the resulting images were incapable of producing realistic representations of metallic or iridescent colours, membrane colour interference patterns and reticulation, or pollination patterns, satisfactory representations of these characteristics requiring the use of directional lighting.

Most of the development of the equipment was concentrated on achieving the correct degree of directional lighting by means of the 45° angled specimen stage ramp and the two front leg mounted mirrors. The function of these two mirrors is to direct 'fill in lighting' onto the lower part of the specimen stage from behind and below the specimen.

The equipment developed is easy to use as there is space and freedom of movement for the operators hands around the camera / specimen stage during operation.

The positioning of the stage under the lighting is not critical due to the generous size of the light box, a tolerance of + or – 10cm in relation to the central position giving perfectly satisfactory results.

Close examination of Fig 3, shows a very satisfactory outcome with respect to overall modelling, pollination patterns, wing reticulation and shading, definition and depth of field. Fig 4 Metallics.



Fig 4. Male, *Calosoma sycophanta*. L.1758.(Coleoptera Carabidae).

Archive of High Quality Digital Photographs of Set Insect Specimens

Since developing my photographic techniques for the photography of set insect specimens, I have now created a library containing several thousand images. This library includes species from many orders, Lepidoptera, Diptera and Hymenoptera are well represented, with a smaller content of 'Other Orders'. Nearly all specimens were taken in Chios, and the Lepidoptera also includes substantial content from Lesvos.

The photographs below are examples of Lepidoptera from this archive. Photo Notation:- in the figure for *Ethmia candidella*, Sp is specimen wingspan, Lg is length, [1646] is European Catalogue Number, A7713 is specimen number, 2435 is the digital image reference number. All specimens will eventually be placed in the collections of World Museum Liverpool.

Reference to my Website Section:- Checklists of Chios Flora and Fauna : Combined Chios and Lesbos Lepidoptera Checklist, shows the quantity of digital Lepidoptera images available and their reference numbers, in the right hand column.

I am generally prepared to allow free use of my images by authors and researchers subject to acknowledgement of my authorship of these images in resulting non commercial publications. Enquiries to me at:-

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100 Sample Lepidoptera Images from the archive:-



