PREPARING LINE DRAWINGS USING Adobe Illustrator – USEFUL HINTS!

Version 2

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Conventions used in these notes

Words you are likely to see on your Illustrator screen or buttons to push are in SMALL CAPS
> indicates steps in a drop-down menu series
CTR_ and ALT_ are Windows keys (control and alt) used in combination with other keystrokes or (left) click
✓ means check a box

Setup – hardware and software

Coleman (2003) described with step-by-step instructions how to prepare pencil line drawings for scanning and input to Adobe Illustrator, how to set up preferences in Adobe Illustrator and the equipment needed, a Wacom pen tablet. He also recommends preparing plates for illustration at twice final size (the traditional approach with ink) but this is unnecessary as drawing lines are not reduced in thickness for final printing.

Coleman (2006) described how to prepare photographs from microslides and how to use these as the basis for illustration. His method uses stacks of photos taken as a series at different focal planes as layers in Illustrator. Software is available such as:
Automontage (expensive)
    http://www.synoptics.co.uk/syncroscopy/automontageshort.asp or
CombineZM (shareware) http://www.hadleyweb.pwp.blueyonder.co.uk/CZM/Manual/Install.htm
to integrate photos taken in this way into a single photo to overcome the depth of field problem.

A Wacom pen tablet and grip pen are essential. Coleman recommended an A3 sized tablet but an A4 is perhaps easier to use and more compact. The latest model Intuos®3 Graphics Tablet comes with a grip pen and has programmable buttons and strips on the pad. Download the drivers from the Wacom website to customise and make full use of the buttons and strips (MY COMPUTER > PROGRAMS > WACOM TABLET > WACOM TABLET PROPERTIES). The lower end of the pen button is RIGHT CLICK, upper end is DOUBLE CLICK. Left and right touch strips can be programmed to zoom and scroll.

Adobe Illustrator® is required software. It is more economical to purchase Adobe Creative Suite® CS (educational price) which includes Photoshop, Acrobat Professional (pdf reader with editing, commenting, and OCR facility) plus other programs including Adobe Bridge. Illustrator may appear differently on different machines – ensure you download the latest update to be compatible with these instructions and conventions.
Adobe Bridge® is an independent file management system (similar to windows explorer) that is included in the Adobe Creative Suite® package. Once you have created your Illustrator files you can use Adobe Bridge to manage and access them from a central location. You can browse files, create and manage folders, and add metadata or keywords. The work area includes a favourites panel, metadata panel, keywords panel and preview panel that can be readily resized. You can begin your session in Illustrator by opening Bridge first, browsing through your directory of images then double clicking the image you wish to work on which will open up the appropriate Adobe program depending on the file type.

Follow Coleman to customise Illustrator and its tools. Coleman recommended doing outline drawings at 1 pt; I prefer 0.75 pt.

After setting up the standard drawing lines in the ACTIONS window, highlight the 'DRAWING' button (set of actions), then click the arrow ►at the top-RHS of the ACTIONS window and SAVE ACTIONS as

'drawing.aia' file in your Illustrator directory. This file can be loaded into Illustrator on another machine.

Then click the arrow ►at the top-RHS of the ACTIONS window and check ✓ BUTTON MODE. The newly created actions will appear as single lines at the bottom of this window (I have not found the keyboard shortcuts useful). The buttons can then be clicked to instantly reformat a selected path (which doesn't happen without button mode checked).

The DEFAULT actions are of little value when tracing drawings so can be eliminated by dropping into the trash. This manoeuvre cannot be recovered.

Scanning

Scan images as grayscale (not B&W). 300 dpi is plenty but you made need to increase contrast.

Selecting a tool and useful manoeuvres

The PENCIL tool is ideal for free-hand drawings but the PEN tool is better for setae or regular curves.

Double-click on the PENCIL tool to adjust FIDELITY (to 2 pixels) and SMOOTHNESS (to 4%) (Small values ensure the pencil responds better). Ensure OPTIONS boxes are not checked.
Hold the mouse down on the PENCIL tool, move to the tiny arrow ► (TEAR-OFF) right of the PENCIL, SMOOTH and ERASE tools, and place this new window. The tools do what they say to lines.

CTR_click to end a path with the PEN tool

SELECTION tool – used to point to a path or to draw a box and include several paths. LASSO tool does same thing. SHIFT_SELECT (not CTR_SELECT) selects more than one path in sequence.
Select and drag moves a path
ALT_select and drag moves a copy and leaves original (useful for arranging a series of objects or text that can then be edited)

DIRECT SELECTION TOOL – used to add anchors and levers to remodel a path. Lines and anchors can be moved; levers can be rotated (changing lengths alters the way the lines respond). Ensure the path is not otherwise selected before using DIRECT SELECTION TOOL (click on space before)

Zoom – magnify area to be drawn (draw box with any tool while CTR_SPACEBAR depressed on keyboard or tablet)
or (using keyboard) CTR_+ to magnify; CTR_- to shrink
or (using slide on tablet) tap ends or slide finger along or move pen along right edge of slide
CTR_0 (zero) resizes the image to screen size

HAND TOOL ✋ – any current tool (pencil for example while drawing) can be converted to the HAND TOOL ✋ (to relocate the drawing on the screen) by depressing SPACE on keyboard or tablet (lower button)

Right click on selected path(s) (lower button on grip pen) – enables several useful manoeuvres (clicking on a step in the first window ensures the next stays open)
  UNDO PATH
  GROUP/UNGROUP (useful for moving or copying several paths as one)
  TRANSFORM > MOVE (not useful)
  TRANSFORM > ROTATE
  TRANSFORM > REFLECT (OK to make mirror image; COPY to retain original and mirror image)
  TRANSFORM > SCALE (enlarge or reduce – this does not change line point weights)
  ARRANGE > Choose option (especially SEND BACK) if images 'disappear' or aren't selected when you think they should

DELETE on keyboard deletes selected paths (this may be required more than once for complex paths). A quick way to undo a series of steps you have just done is using the short cut keys CTR_Z. This works in the same way as the EDIT>UNDO in the menu bar.

The Spray Can is used to make fields of many similar objects, such as stipple or prickles or fine setae whose exact positions are not important.

Draw a single instance (at the desired size) of the object you wish to repeat. Open the symbols window (WINDOWS > SYMBOLS). Pick up and drag your object into the symbols window alongside the default images. Ensure it is highlighted (has double box around).

Select SYMBOL SPRAYER TOOL from the tools menu and spray the selected objects over the page, preferably in short bursts. Experiment with the SYMBOL SHIFTER, SYMBOL SIZER and SYMBOL SCRUNCHER tools (revealed when clicking and holding on SPRAYER TOOL)

Steps to make individual line drawings

FILE > NEW document and set dimensions specified by your target journal

FILE > PLACE scan of pencil drawing

Move drawing to centre of page using SELECTION TOOL

Double-click bar on LAYER 1; tick DIM IMAGES to 50% (default) or increase to 70% if your original pencil drawing is already faint. At this step you are aiming to dim the image enough that you can distinguish your pencil lines applied in Illustrator from the original scan.

LOCK layer 1 (check second box on layer bar)

CREATE NEW LAYER (third icon at bottom of layer window) (with layer 1 locked it is possible only to draw in LAYER 2 – default red paths)

Check the small NONE box under the FILL/STROKE icon on TOOLS window to ensure FILL cell has a red line through it

Select PENCIL tool, click desired ACTIONS box, and trace your image in sensible segments called *paths.*
 Alternatively, select PEN tool, click desired ACTIONS box, dot start point, lift and move to end point, drag to manipulate handle, repeat for complex curves, and end by CTR_click

FILE > SAVE ai file

Tapered double-line setae

Use PEN TOOL to draw required curve along one side of seta: start with single point at base of seta, move pen to end and use levers to create curve (longer levers are best), CONTROL CLICK to stop pen action.

Select line

Open ROTATE TOOL and click carefully on end of seta to place green point of rotation. Depress ALT key while rotating copy of original.

Unselect lines, open DIRECT SELECTION TOOL and align ends of base of setae if necessary

Unselect lines, select both ends by drawing box around ends, join (right-click option or CTR_J), group (right-click option or CTR_G)

Copies may be distorted (lengthened or shortened) by moving one corner of the object bounding box (Ensure HIDE BOUNDING BOX is not checked in the VIEW menu).

Tapered solid setae

Open two windows (and put tabs into same window box):

1. WINDOW > BRUSHES

2. WINDOW > BRUSH LIBRARIES > ARROWS_STANDARD

Follow Coleman to CREATE NEW ACTION (Check arrow-button on RHS of Actions window and turn BUTTON MODE off if you see no CREATE NEW ACTION or other icons; turn BUTTON MODE on later to compress this window)

Name action "solid seta"

Set STROKE to 0.04 pt

Click long arrow in second row of ARROWS_STANDARD window (this window must remain open)

Setae are best drawn using the PEN TOOL – always start at the base

Changing between solid seta and simple line appears hit-and-miss. To change a solid seta (tapered) to a simple line (even width), check the ACTIONS button for desired line and check REMOVE BRUSH STROKE (bottom left of the BRUSHES window). To change a simple line to a solid seta, just check the SOLID SETA button.

Setae may be copied many times and then distorted using the selection tool (see comment above)

To rotate a seta, place its base in the correct location, select the ROTATE TOOL, click on the base (to centre the green dot), then move the other end to the angle required (the tool does not have to be on the seta).

Bilaterally symmetrical illustrations

Draw one half as usual
Select all, group and reflect copy (RIGHT CLICK, TRANSFORM, REFLECT, COPY)
Use SELECTION TOOL to place copy correctly
Tidy up using ROTATE and join as needed

Editing and cleaning individual line drawings

CTR_Z to undo last line
Initial editing is best first done with the scan on LAYER 1 visible to check alignment then toggle visibility of scan off (EYE icon on layer) to check for joins, bumps and gaps
SELECTION TOOL to move whole path
DIRECT SELECTION TOOL to move part of a path: move line directly or manipulate handles (ensure the path is not already selected)
LASSO to select ends of 2 adjacent paths then RIGHT-CLICK (CTR_J) to join
SMOOTH TOOL to smooth joins
When image is complete RIGHT-CLICK (CTR_G) to group paths selected by lasso or selection tool
When printing, toggle LAYER 1 visibility off and print only visible layers (PRINT menu). Remember, if drawings are assembled according to Coleman's instructions at twice page size print with CUSTOM SCALE set to 50%

Assembling illustrations

Ensure individual components are copied and pasted to the final plate after paths are grouped
Use CTR_F6 to switch between plate and original open files
SELECTION TOOL and ROTATE TOOL are essential tools – there is no limit to the amount of shuffling that can be done
VIEW > SHOW GRID is helpful to align drawings
To alter the desired size OBJECT (OR RIGHT-CLICK) > TRANSFORM > SCALE and enter value (line weights are not altered unless printing using a custom scale other than 100% (Coleman's instructions are predicated on all work being done on drawings twice intended size but this is not necessary)
Save a copy in pdf format for review purposes but DO NOT SEND PDF FILES TO THE TYPESETTER. Pdf files can be saved without editing capabilities and reduced in size (FILE > REDUCE FILE SIZE in Adobe Acrobat Professional)

References

Coleman, C.O. 2003. "Digital inking": how to make perfect line drawings on computers. *Organisms, Diversity and Evolution* 3: Electronic supplement 1-14.
Coleman, C.O. 2006. Substituting time-consuming pencil drawings in arthropod taxonomy using stacks of digital photographs. *Zootaxa* 1360: 61-68.