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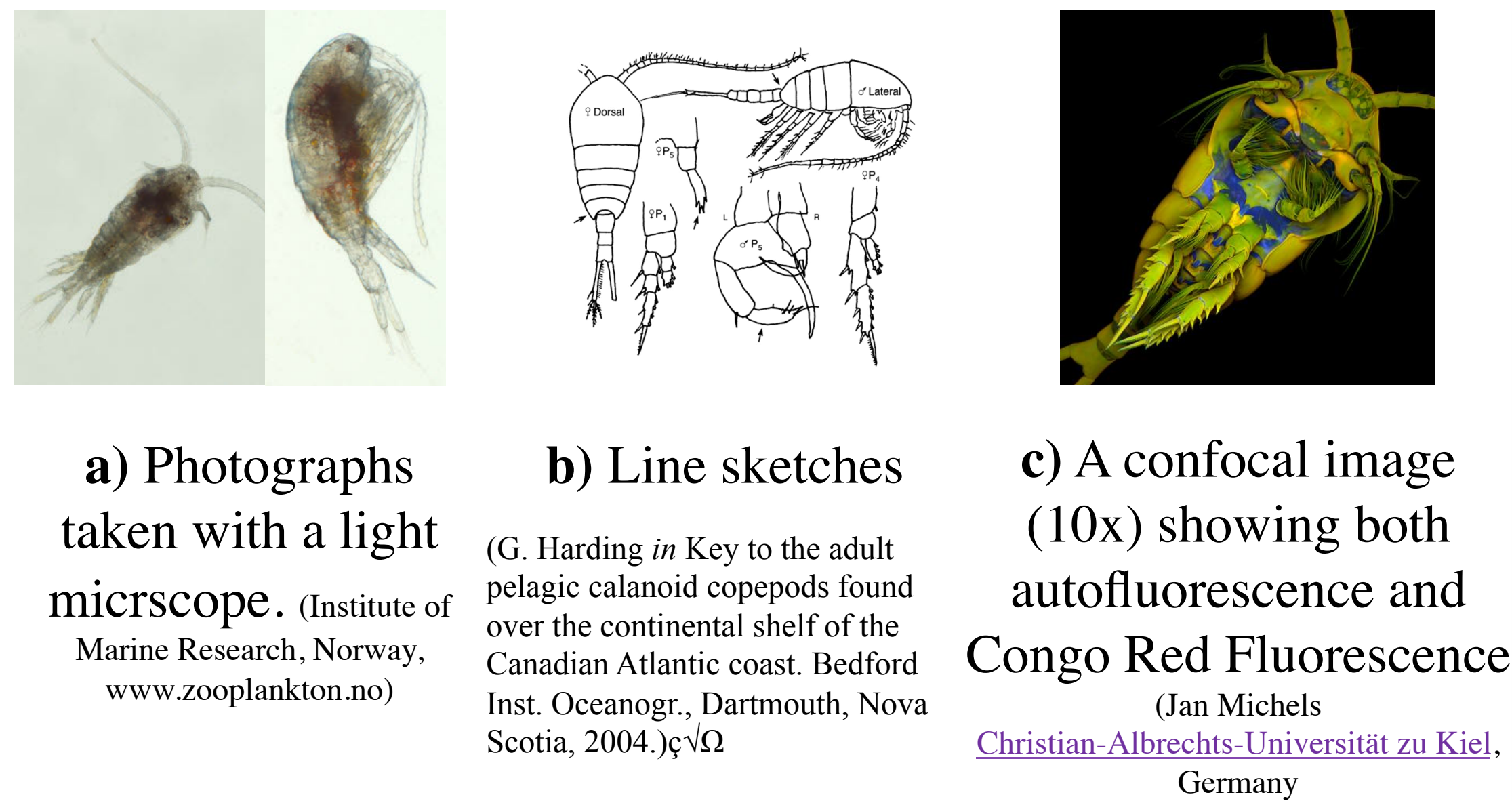
## Why do we need better images? Why do we need a regional guide?

- There is often a steep learning curve associated with ecological studies of zooplankton communities. The lack of accessible species identification resources (including high-resolution or “museum-quality” digital images) can limit the taxonomic resolution of collected data and published studies. Collecting data at coarse taxonomic scales (e.g. identifying organisms to Class vs. Species) can hinder ecological insight to key community dynamics.
- A “next generation” regional taxonomic guide to zooplankton will (a) be “cloud” or web-based, (b) be interactive, rather than dichotomous, (c) include high-resolution photos of whole organisms and key characters, (d) link to existing taxonomic and genetic databases, (e) include information on species’ distributions, (f) guide users through an efficient comparison of the relevant species, focusing on characters that most effectively distinguish an organism from the regional pool of species rather than the global set of closely related species.

## Case Study: Copepods

- Zooplankton is an umbrella term used to classify organisms that are weak swimmers in waters.
- We are studying a subset of zooplankton – the copepods (Phylum Crustacea)- in the Hudson River.

Examples of images available for copepods:  
The marine copepod *Temora longicornis*:



## Confocal Imaging

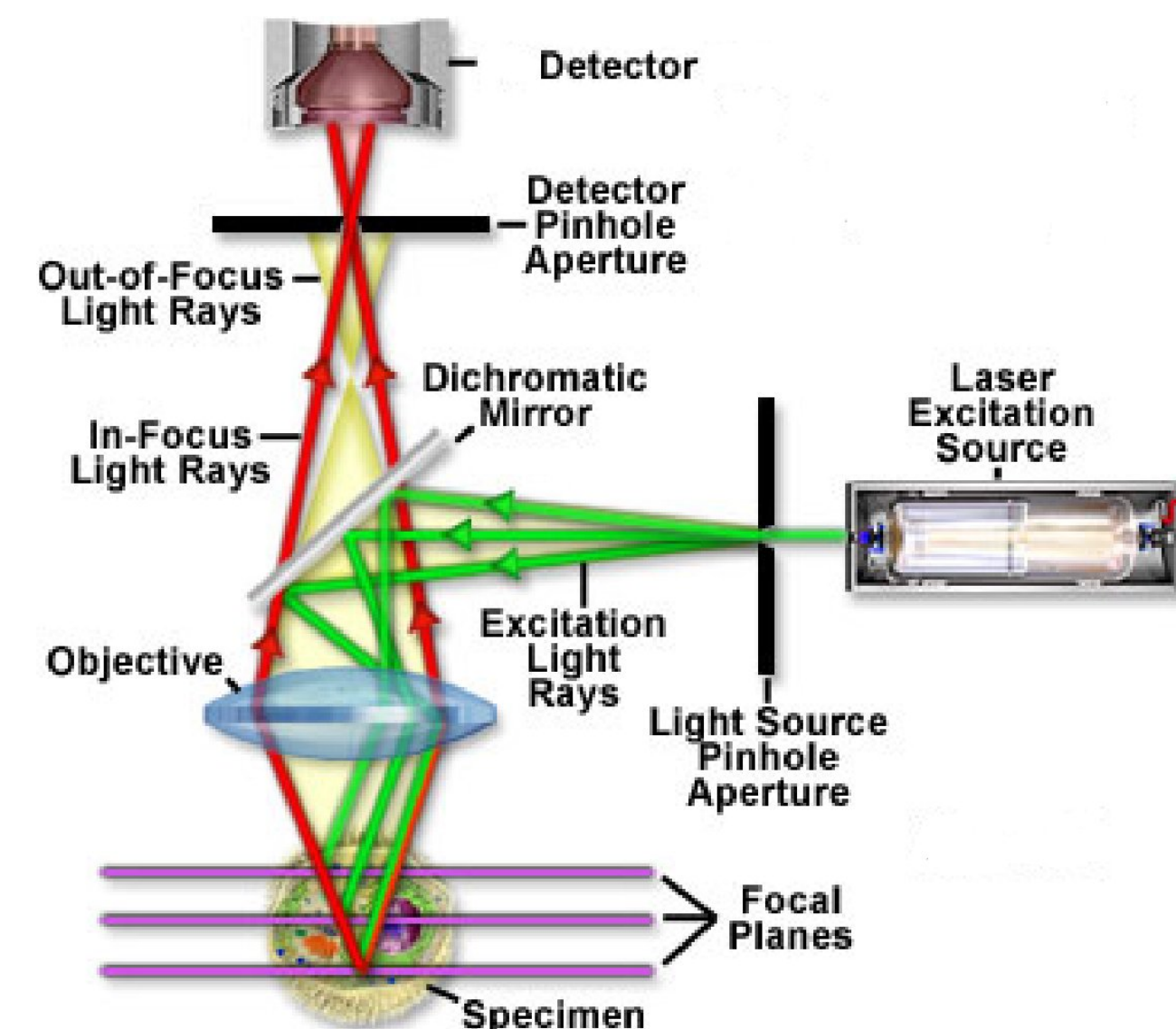


Fig 1. A schematic of laser scanning confocal microscopy. <http://www.microscopyu.com>

Pros	Cons
Produces high-resolution images (<10 μm with a specimen 1mm in size)	Equipment is expensive
‘Pinhole’ imaging means all areas of the resulting image are in focus	Time consuming to scan, you may have to scan in sections and stitch images together

## Protocol for imaging

(1) Copepods were taken from a formalin preserved sample collected in the mid-1970s.

(2) They were then stained in a Congo Red solution (1.5 mg/mL).



a) Stained copepods on slide b) Stained copepods under dissecting microscope

(3) Individual copepods were mounted on slides and imaged laser scanning confocal microscopy.

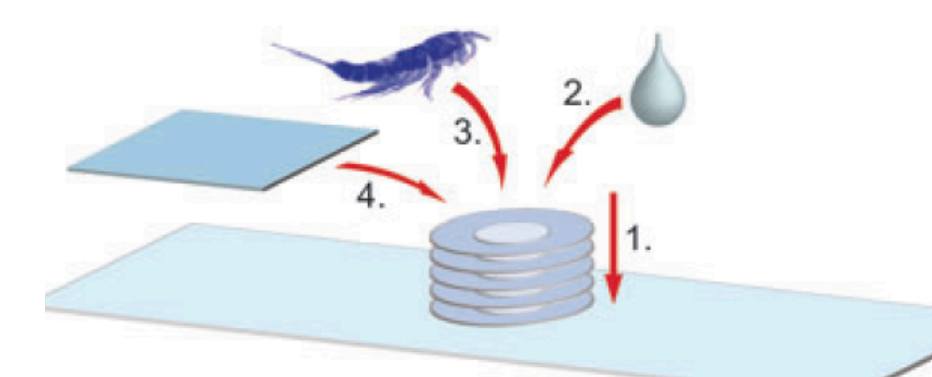
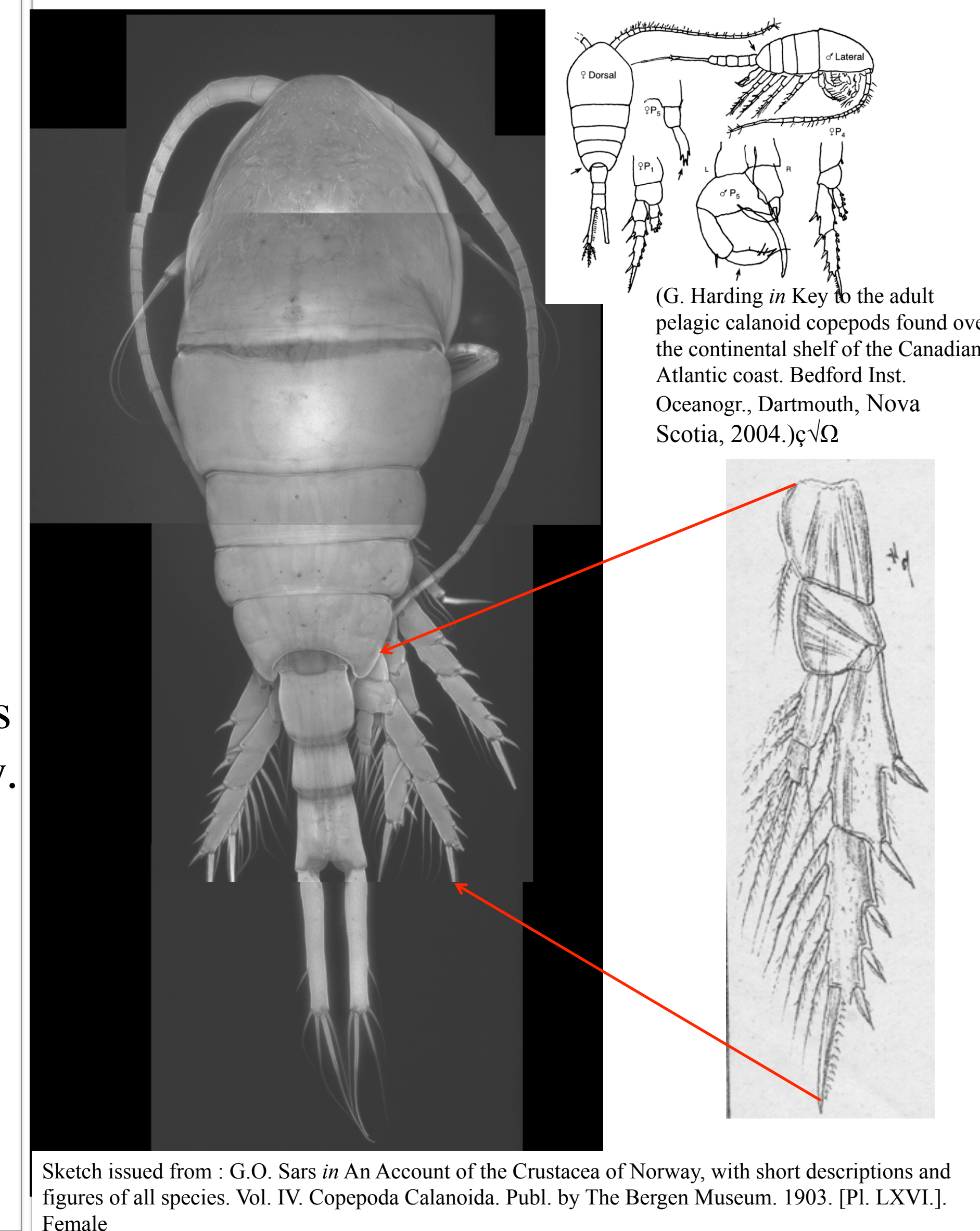


Fig 2. Individual copepods were mounted on glass slides inside small chambers constructed from reinforcement stickers (1), filled with glycerin (2) which the copepod afterwards went into (3) and lastly covered with a cover slip (4). Figure from Michels and Buntzow (2010) Journal of Microscopy 238(2):95-101.

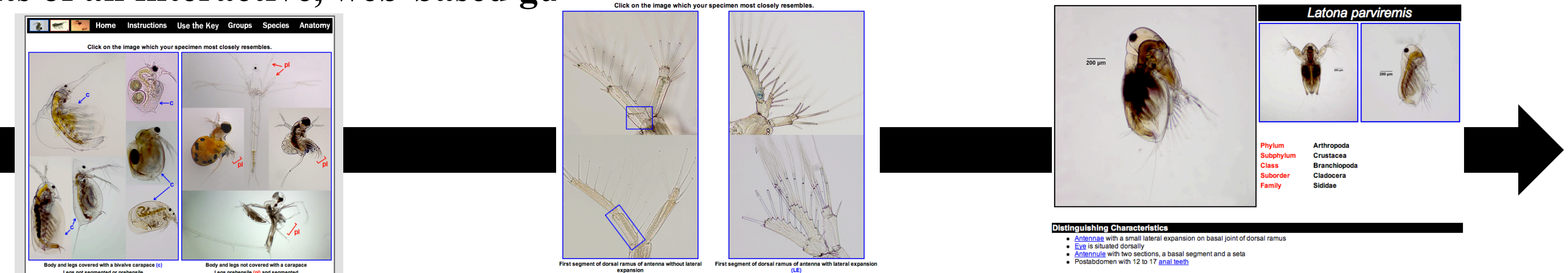
## Results



## Next Steps Towards “Next Generation” Guide to Zooplankton of the Hudson River

Elements of an interactive, web-based guide:

- Collect & produce images of common species of zooplankton from the Hudson River
- Create a database of species names, taxonomy, images, and key morphological characters that can be used for species identification
- Combine data sets in a web-based, interactive guide



Sample content from *An Image-Based Key to Zooplankton of North America* (<http://cfb.unh.edu/cfbkey/html/>)

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