

INTRODUCTION

> A former faculty member of U of T's Botany dept. from 1975 to 2009, Prof. Robert L. Jefferies (Fig. 1) primarily studied the interactions between snow geese and plants in the Arctic.^{1–6}

> i.e., Churchill, Manitoba; La Pérouse Bay, Manitoba; etc

- > On top of being a successful professor, he received the 2007 Nobel Peace Prize for his contribution on the 4th Intergovernmental Panel on Climate Change (IPCC) Assessment Report (Fig. 2).^{1,7}
- > Other notable achievements include cofounding the Hudson Bay Project, editing Écoscience, editing the Journal of Applied Ecology, and securing a multimillion-dollar grant for the Churchill Northern Studies Centre.¹
- From 1978 to 2009, Prof. Jefferies accumulated a collection of his and his graduate students' field and lab notebooks. These notebooks contain valuable long-term Arctic data on vegetation, weather, geese, and so on.
- > With the rise in science transparency and publicly available datasets, long-term Arctic data remain scarce.^{8,9}
- > **Objective:** To preserve Prof. Jefferies' extensive field and lab notebook collection for data mining purposes and future public use.



Figure 1. Prof. Robert L. Jefferies in the field.¹⁰



METHODS

Digitization

- > Several issues related to resolution, storage, image format, and guttering (i.e., blurring around the center of the inside spine and outer edges of the book) arose.¹¹
- > Using an Epson Perfection V39 flatbed scanner, I scanned pages as TIFFs.¹¹
- \blacktriangleright To prevent guttering, a ≥ 1 cm border was required around each page.¹¹
- > Following archival industry standard, the pages were scanned at 600 dots per inch (dpi) to maximize clarity and image quality (cont'd).¹¹

"Book, Book, Goose?": The R. L. Jefferies Legacy Project

METHODS (CONT'D)

Images were housed on a 5 TB external hard drive and uploaded to a secondary cloud storage to prevent data loss.¹¹

Metadata Development

I recorded the following metadata tags in an Excel file: notebook #, year, calendar dates, book type, book dimensions (1 by w), # of TIFFs, # of blank pages, guttered TIFFs, does the book contain data? (yes/no), data type, specimens, additional documents, sensitive information, and comments.

RESULTS

Of the 85 books scanned, 74.1% (63) were small field books and 25.9% (22) were large lab notebooks. The completed collection took 69.8 GB of storage and 4633 TIFFs, with an average of 5.19 MB/TIFF (field books) and 28.5 MB/TIFF (lab books). Some major data type themes that emerged were the following: transect data, weather observations (Fig. 3), and goose dropping counts. Interestingly, pressed plant specimens were discovered within 7.06% (6) of the notebooks (Fig. 4). However, many of the specimens did not have accompanying information. Squashed mosquitoes or flies were also scattered throughout some books (Fig. 5).

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	9/6/84	07:25	2.0	2-0	-1.0	3.0	H	NW	100
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	11/6/84	07:45	3,0	5-0	2.0	4.0	28cm	N37	100
	54/6/84	19:10	5.9	6-0	3.9	7.0	32 cm	N28	25
	12/6/84	07:45	3.0	5.0	0	4.0	26cm	N17	70
	12/6/84	19:40	6.0	8.0	3.0	8.0	25cm	NNW	8
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Figure 3. A scan of a 1984 weather log notebook recorded at La Pérouse Bay, Manitoba, Canada (unknown author).





Figure 4. A 1985/1986 *Ranunculus* gmelinii (lesser yellow water crowfoot) specimen pressed and labeled by Prof. Robert L. Jefferies.



Figure 5. A pressed *Culicidae* (mosquito) specimen by F. L. Gadallah in 1989.

- team members.
- new in the field of global change biology.^{9,12}

 - thought to be extinct.¹²
- landscapes at the time of recording.
- observations, into a single Excel file.
- researchers to access.
- researchers in the next century.

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CONCLUSION

> The Prof. Jefferies' notebook collection was successfully secured and preserved in a proper archival format for future use by the Hudson Bay Project

> This phenomenon of preserving and data mining field book collections is not

> A previous study analyzed flowering phenology and temperature data from this very notebook collection.⁹

> Likewise, after re-reading a field notebook, a group of researchers rediscovered new populations of a plant species that was previously

> As a result, the unused data in Prof. Jefferies' notebook collection make them valuable historical documents as they contain snapshots of the conditions and

> Next steps may include compiling long-term data, such as weather

> In the future, the digital and physical notebook collection will be permanently archived in the U of T library system for other global change biology

> Researchers should consider preserving and sharing their field notebooks as they may contain vital climate change data that could be used by future

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