

Glacial and permafrost exploration in the Dry Valleys during the 1957/58 IGY: The personal records of Troy L. Péwé

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Summary The Dry Valleys of Antarctica were studied in detail by Troy L. Péwé (Glaciologist – University of Alaska) during the 1957-1958 summer field season of the International Geophysical Year (IGY) (NSF No. Y/4.10/285). The goals of that expedition were to characterize the geomorphology and glacial history of the Dry Valleys and Ross Sea Region. Glacier movement and deposits, lake sediments, permafrost, and weathering features were studied and recorded. From this research, a unique and impressive collection of photographs, movies, rock and soil samples, and additional Antarctic archives remain in the personal collection of Troy L. Péwé (1918 to 1999). Péwé also reoccupied 20 photographic stations set up by Griffith T. Taylor in 1911, and included an additional 42 photographic stations in 1957. These archives are a unique historical record for assessing recent glacial and geomorphic change, future scientific investigations, and education during and following the International Polar Year (IPY).

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Introduction

During the International Geophysical Year Troy L. Péwé reoccupied the Taylor Dry Valley area for the first time since Griffith T. Taylor (British Antarctic Expedition of 1910-1913). In addition he visited Wright Dry Valley area to the north for the first time in history. His records were founded on an excellent baseline of observations, sketches, and photographs recorded and published by Taylor (Taylor 1922). Combined with Troy L. Péwé’s impressive experience of arctic research, his duplication of Taylor’s published works, and T.L. Péwé’s first accounts in the Wright Valley area make this archive especially unique and important. Troy L. Péwé summarized and interpreted the glacial history of the region in several publications; however, the impressive quality and quantity of the archives from this expedition remain largely unpublished.

Of particular importance are the precisely located, high-resolution photographs (Figure 1). Péwé revisited twenty

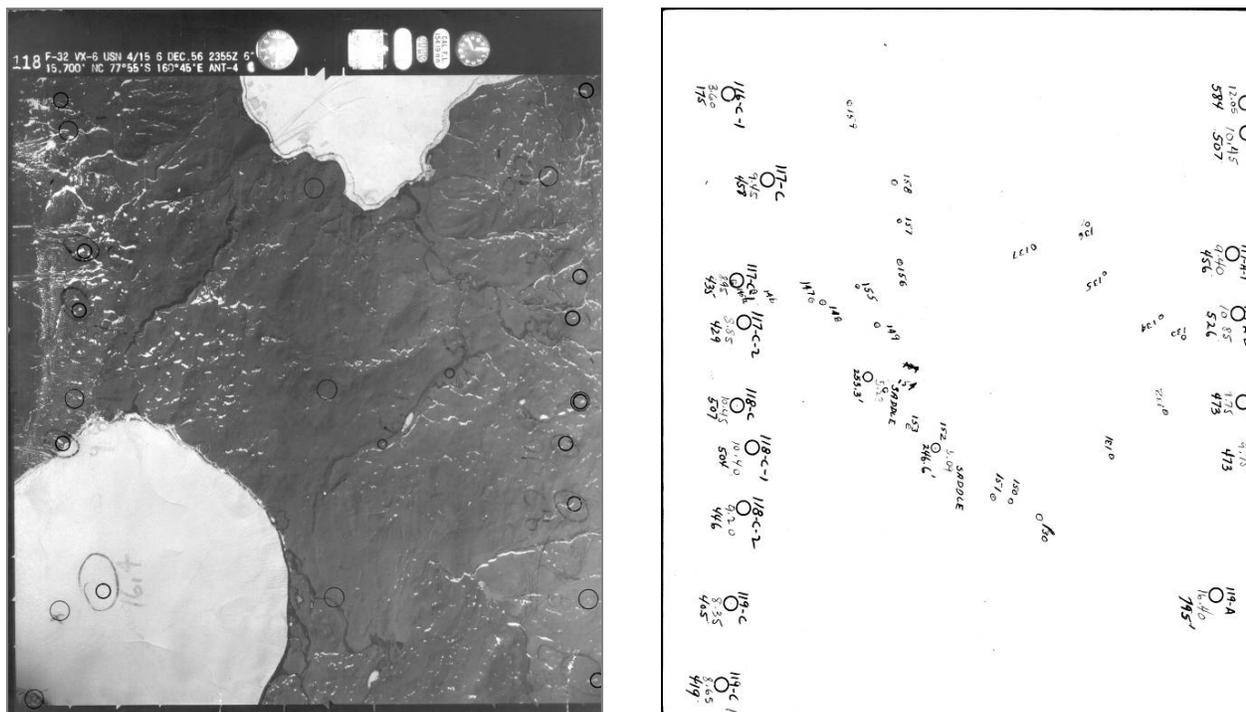


Figure 1. An example of field locations plotted on an unclassified orthographic aerial photograph by Troy L. Péwé. On the back side of each photograph are photographic, soil sample, and other field stations referenced in detailed field notebooks.

photographic monitoring stations set up by Griffith T. Taylor in 1911 during the British Antarctic Expedition in Taylor Dry Valley and Cape Evans (Figure 2). Four new stations were established to monitor rock weathering on Cape Evans



Figure 2. Taylor Glacier and Rhone Glacier (right background) in Taylor Dry Valley photographed by Troy L. Péwé on December 23, 1957 (Graphlex photographs No.1646-1648). This exact location was also photographed and sketched by Taylor (1922, Figure 68, page 66).

and six stations were established to begin evaluating the rate of formation of tafoni in the Dry Valleys (Figures 3 and 4). In addition, Péwé established 42 new photographic stations throughout the Dry Valleys. Of these, 25 permanent stations (many with rock cairns) were established on 15 glaciers, 11 of them not recorded in 1911 (Figure 5). Also, five stations



Figure 3. The “Dreadnought” debris cone and Lincoln Washburn in background in the Cape Evans area photographed by Troy L. Péwé on December 7, 1957 (Graflex No.1555). This exact location, including ice axe and silhouette, were photographed by Taylor on October 1, 1911 (1922, Plate 79, page 218).



Figure 4. Weathered granite erratic in the Taylor Dry Valley with George Llano for scale. This is one of the many new photographic stations established by T. L. Péwé in the 1957/1958 field season. Kodachrome photograph No.4569 taken by T. L. Péwé on December 14, 1957.

were located in ice-cored moraine topography to monitor changes, including one near Cape Evans (Table 1).

Troy L. Péwé’s purpose for reoccupying and constructing new photographic stations was to establish a basis for comparison and to record any changes in polar features that would respond to changes in climate. Following his work during the IGY, Péwé reported “no appreciable change” in glacier movement and “small amounts of rock weathering” in pairs of photographs taken in 1911 by Taylor and in 1957 by himself. Péwé’s goal was to revisit the Dry Valleys some 50 years later and compare changes in the geology, geomorphology, and glaciology in the Dry Valley area, especially through the use of the photographic monitoring stations.

Summary

The purpose of this presentation is to bring the photographic archive of Troy L. Péwé to the attention of the participants of the 10th International Symposium of Antarctic Earth Science (ISAES) in modern visual formats. It is also



Figure 5. Photographic station and cairn (not visible) in front of Blackwelder and Miers Glaciers in Garwood Valley. Graflex photographs No.1717-1719 taken by T. L. Péwé on January 18, 1958.

Table 1 The archives of Troy L. Péwé and their present locations.

Archive	Formats	Location Preserved
545 Kodachrome photographs	Originals	Residence of Mary Jean Péwé*
213 4x5-inch Graflex sheet photographs	Negatives	Residence of Mary Jean Péwé*
	Positives	Residence of Mary Jean Péwé* and possibly National Science Foundation
Detailed field notes with pin-point locations of each of the 364 field stations	Originals	Residence of Mary Jean Péwé*
	Copies	Byrd Polar Research Center at Ohio State University
Several rock and soil samples	Originals	Residence of Mary Jean Péwé*
And 16-mm high definition movies	Originals	Residence of Mary Jean Péwé*
Several annotated aerial photographs	Originals	Byrd Polar Research Center at Ohio State University

* Tempe, Arizona: For data access contact Mary Jean Pewe (mjpewe@asu.edu) or Rick Pewe (rick.pewe@4wheeloffroad.com).

the intent is to bring public awareness of the type of archive material, their formats, and their locations where stored (Table 2). With the International Polar Year here, it will be useful to revisit these photographic archives and discuss

Table 2 A list of the approximate number of photographic stations established by Griffith T. Taylor in 1911/1912 and Troy L. Péwé in 1957/1958 in the Ross Sea and Dry Valley regions. Photographic stations were established by Péwé to monitor changes in glacier termini, moraine topography, and cavernous weathering.

Geographic Areas	Approximate number of photographic stations by Taylor (Taylor 1922)	Approximate number of photographic stations set up by Troy L. Péwé in 1957/1958 (non published)	
		Graflex high definition black and white photographs	Kodachrome color photographs
Cape Evans	10	17	20
Taylor Valley	10	15	75
Wright Valley	0	10	40

discuss their relevance, importance, and applications in historical, scientific, and educational contexts.

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