Quicktime Virtual Reality (QTVR): A Wondrous Tool for Presenting Field Trips, Specimens, and Microscopy in Traditional and Web-based Instruction

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Quicktime Virtual Reality (QTVR) software is a tool that originated on the Apple platform and is now widely available for the PC. QTVR assembles overlapped digital images into media designed to simulate three-dimensional reality. We have been using QTVR media to significantly enhance our presentation of geology, both in the classroom and on the web and have devised new techniques within the genre. The ability to annotate moving images and show them in interactive three-dimensionality makes QTVR a candidate for the best new pedagogical advance since coffee. WhatÕs more, once the basic techniques are learned, the versatility of the software allows for innovation, based on the specific disciplines of interest.

Field trip stops and large outcrops are best represented using digital panoramas and scenes. A panorama is composed of one or more overlapped digital photos that have been stitched together to form a large seamless image. A graduated rotating tripod with leveling legs allows for accurate imaging of any large exposure or vista. A stitched QTVR panorama is presented as a frame view that can be panned across, up, or down, and zoomed into to investigate different areas of the image. High quality digital images (3 megapixel or greater) allow for continuous sharpness upon zoom but significantly increases the ultimate file size, an unavoidable trade off. A QTVR scene is a panorama with selected areas defined as embedded hot spots and linked to other media. Clicking on a hot link brings up a new view, including other panoramas with a different perspective, a more detailed field image, a map, a petrographic or microscopic image, explanatory text, web-links, animations, or movies. Particularly suited for web-based instruction. A virtual field trip can be created by linking multiple panoramas, images, and other files, wherein the user is able to move through the scene at will, investigating various features and gathering additional information and links to the web. QTVR panoramas and scenes can be embedded into Power Point presentations or run on a stand-alone Quicktime media player, allowing a lecture instructor to more realistically show the techniques of geological field observation.

QTVR objects are created by combining successive views of a rotated specimen to create a still image that can be rotated through different angles on screen by dragging the cursor across the object. Construction of a rotating axial specimen clamp allows small fossils and mineral specimens to be photographed at magnification under a binocular microscope, creating three-dimensional micrographic objects. Devices with horizontal and vertical axial rotation have been built. Such devices can be easily constructed using common parts but an angular scale (usually a protractor in whole or part) must be included in order to allow accurate rotations that insure image overlap. Individual frames composing the object can be enhanced or labeled prior to assembly using digital editing software such as

Photoshop. The labels will appear and then disappear as the object is rotated through the labeled frames. Digital images of petrographic thin sections taken using a rotating stage can be combined to create objects that allow the user to rotate the thin section image through different angles of polarized light and/or plane polarized light. Examples of QTVR media developed for teaching geology can be viewed and downloaded at http://people.hofstra.edu/faculty/J_B_Bennington/qtvr/qtvr.html.