

Valpo Rocks: Geological Specimens Database Project

Daniel Hautzinger, Samuel Gilfillan, Aaron Jaraczewski, Jonathan Robledo, Garrett M. Scheiber

Abstract

This project tasked us with creating a high-usability web application for the Valparaiso University Department of Geography and Meteorology and its geological collection. The application is made using HTML/CSS, PHP, and SQL to hold and display geological specimen data collected by the professors within the Geography Department. The purpose of this application is to allow students and professors to easily store and access data on the rocks and minerals that they collect. The students can input a unique code or keyword into a search bar within the application, or scan a unique QR code to search specimens of minerals within the collection. Once queried, the application displays the mineral's name, date of collection, whom it was collected by, the region of collection, a description of the mineral, as well as photos of the specimen(s).

The Specimens



Geography and Meteorology



The University Rock and Mineral Collection, as stored in the Department's Kallay-Christopher facilities.

Search Features

Users can search using:

- Names
- Types of minerals
- Identification Numbers

Type an ID to search for the Specimen

Valpo Rocks!

Search for an ID below:

X2020

Screenshots of running application

```
mysql_query($conn, $query);
require_once('connectvars.php');

$conn = mysqli_connect(DB_HOST, DB_USER, DB_PASS, DB_NAME) or die("whoops that didnt work");
$query = "SELECT * FROM rocks";
$data = mysqli_query($conn, $query);

$count = 0;
while ($row = mysqli_fetch_array($data)) {
    if (strpos($row['code'], $searchquery) !== false) {
        if ($count % 2 == 0) {
            echo "<tr style='background-color:#958874;'>";
        } else {
            echo "<tr style='background-color:#AFA18C;'>";
        }
        echo "<td>"; $row['code']; "</td>";
        echo "<td>"; $row['date_collection']; "</td>";
        echo "<td>"; $row['location']; "</td>";
        echo "<td>"; $row['collected_by']; "</td>";
        echo "<td>"; $row['sample_type']; "</td>";
        echo "<td>"; $row['general_type']; "</td>";
        echo "<td>"; $row['rock_mineral']; "</td>";
        echo "<td>"; $row['weathering_process']; "</td>";
        echo "<td>"; $row['notes_comments']; "</td>";
        echo "</tr>";
        $count++;
    }
}

echo "<center> <u> <p style='font-size: 1.5em;'> Found <b>"; $count; "</b> results for <b>"; $searchquery; "</b> </p> </u> </center>";
mysqli_close($conn);
```

Full Stack Software Architecture ("LAMP")

Code	Date Collection	Collection Location	Collection Coordinates	Collected by	Sample Type	General Type	Rock/Mineral	Weathering Process	Notes/Comments
X2020.01	unknown	unknown	unknown	Rock	Metamorphic - foliated	Schist	Both	This micaceous schist has been chemically weathered which has reduced its internal strength. Its rounded shape is likely due to some degree of abrasion by water transport. Small grains and fragments can be easily rubbed off which could then be transported by water. A fracture was intruded by magma which has solidified into what is likely granite. This intrusive igneous rock is more resistant to weathering than the surrounding schist as seen by its slightly higher relief (it sticks out from the rock) indicating it has weathered more slowly.	
X2020.02	unknown	unknown	unknown	Rock	Igneous - extrusive - pyroclastic	Volcanic Breccia		This piece of volcanic breccia shows the angular fragments entrained in the magma and alterations that surround some of the fragments as they were altered by the heat.	
X2020.03	unknown	unknown	unknown	Rock	Igneous - intrusive - felsic - plagioclasic	Pegmatite		This highly crystalline sample is possibly considered a pegmatite, a rock with very large crystals. The crystal forms of several different minerals including plagioclase feldspar can be seen in the overall quartz crystal.	
X2020.04	unknown	unknown	unknown	Mineral	Silicate	Quartz		This sample shows the infilling of a crack within a rock with quartz. This happens when groundwater rich in dissolved iron circulates through joints and faults and the iron bound forming mineral which slowly precipitates out. Most of the crack has been filled by growth from either side, but a small portion can be seen where the growth had not fully completed.	
X2020.05	unknown	unknown	unknown	Rock	Igneous - intrusive - felsic - pegmatitic	Pegmatite?		This small hand sample has very large individual minerals and is a fragment from either a very coarse grained granite or possibly even a pegmatite. This sample well shows the effect of increased formation time due to slow cooling on the size of crystal growth.	
X2020.06	unknown	unknown	unknown	Rock	Igneous - intrusive - felsic - plagioclasic	Granite?	Both	This highly weathered sample is likely granite, but the original material rock is unknown. The white coloration coating many of the mineral grains is kaolinite, a residual weathering product on likely wet feldspars. The rock is undergoing granitic disintegration as the intergrown crystals become separated as the rock weathers away. Note that the clear quartz crystals are largely unaltered.	
X2020.07	unknown	unknown	unknown	Rock	Sedimentary - clastic	Sandstone	Iron Accumulation	This sample is the iron cemented remains of a sandstone. The red-brown iron accumulated within a sandstone filling the pore space between the sand grains. Once the sandstone was exposed to weathering, the iron cemented nodules were more resistant and remained with the surrounding sandstone weathered away. Some portion of the lighter colored sandstone can still be seen in between the darker iron cemented nodules.	
X2020.08	unknown	unknown	unknown	Rock	Sedimentary - bioclastic	Limestone		This is a collection of bioclastic limestones. The fossils of ocean organisms can be readily seen in many of the samples including bivalves and corals.	

Acknowledgements & Tools

Jon-Paul McCool, Assistant Professor of Geography
Geography & Meteorology (Client)
Nick Rosasco, Computing & Information Sciences
(Advisor)



Database (MySQL) queried by PHP;
output as HTML with CSS formatting.
Content presented by Apache 2
webserver running on Ubuntu
GNU/Linux version 20.04

Future Features

- QR Code functionality
- Embedded reference images
- Google Sheet auto-sync capability
- 3D Model compatibility