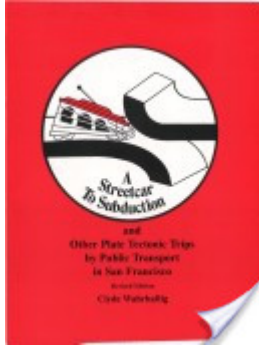


Bibliography and selected quotes



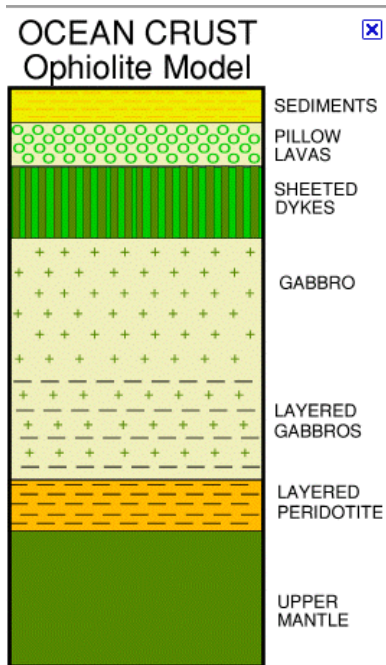
Wahrhaftig, Clyde, *A Streetcar to Subduction and Other Plate Tectonic Trips by Public Transport in San Francisco*. Washington, D.C.: American Geophysical Union, 1984

<http://en.wikipedia.org/wiki/Serpentinite>
http://en.wikipedia.org/wiki/Serpentine_group
<http://en.wikipedia.org/wiki/Olivine>
<http://en.wikipedia.org/wiki/Ophiolite>
<http://en.wikipedia.org/wiki/Brucite>

“In outcrop, rounded serpentinite blocks, typically 1 to 2 m (3 to 6 feet) in diameter, are surrounded by sheared, flaky serpentine called slickentite.”

- <http://www.nps.gov/goga/forteachers/upload/Franciscan%20Rocks%20poster.pdf>

"The term ophiolite was originally used by [Alexandre Brongniart \[1\]](#) for an assemblage of green rocks ([serpentine](#), [diabase](#)) in the [Alps](#); [Gustav] Steinmann [\[2\]](#) later modified its use to include serpentine, [pillow lava](#), and [chert](#) ("Steinmann's trinity"), again based on occurrences in the Alps." - <http://en.wikipedia.org/wiki/Ophiolite>



http://www.google.com/imgres?imgurl=http://www.le.ac.uk/geology/art/gl209/lecture2/image30.gif&imgrefurl=http://www.le.ac.uk/geology/art/gl209/lecture2/lecture2.html&usq=y0vnbvMO260ni4eoiuPkeDGcaxk=&h=450&w=345&sz=36&hl=en&star_t=33&zoom=1&tbnid=vsbzEtwsY8jzMM:&tbnh=131&tbnw=100&ei=aHhZTZCrC4P2swPZurGcDA&prev=/images%3Fq%3Dophiolite%26um%3D1%26hl%3Den%26sa%3DN%26biw%3D1020%26bih%3D568%26tbs%3Disch:10%2C1022&um=1&itbs=1&iact=hc&vpx=696&vpy=217&dur=2859&hovh=256&hovw=197&tx=36&ty=280&oei=WXhZTeC-DpS4sAP9rpi2BQ&page=3&ndsp=15&ved=1t:429,r:13,s:33&biw=1020&bih=568

- image of ophiolite sequence used for O'Phiolite coat of arms

“The ultramafic portion of the Josephine Ophiolite [...] has undergone partial to locally complete "serpentinization." This is a true metamorphic process, with the fundamental mineralogical change converting the olivine and pyroxene into various members of the asbestos family. This process generally involves the addition of water into the mineral lattices, with a corresponding increase in the overall volume of the rock. This enlargement requires some amazing efforts by the serpentine to fit more stuff into the same space, and results in extensive shearing and internal deformation of the rock.” -

<http://jersey.uoregon.edu/~mstrick/GeoTours/Josephine%20Ophiolite/JoOphiolite.html#Jum>

“The [Māori](#) of [New Zealand](#) once carved beautiful objects from local serpentine, which they called *tangiwai*, meaning "tears". Material quarried in [Afghanistan](#), known as *sang-i-yashm*, has been used for generations. It is easily carved, taking a good polish, and is said to have a pleasingly greasy feel. The *lapis atracius* of the [Romans](#), now known as [verde antique](#), or verde antico, is a serpentinite [breccia](#) popular as a decorative facing stone. [...] Serpentine [marbles](#)

are also widely used: Green Connemara marble (or Irish green marble) from [Connemara, Ireland](#) (and many other sources), and red Rosso di Levanto marble from Italy. Use is limited to indoor settings as serpentinites do not [weather](#) well.” - http://en.wikipedia.org/wiki/Serpentine_group

“Pebbles of serpentine along streams draining the west side of the Tetons have been cut and polished for jewelry and sold as *"Teton jade"*; it is much softer and less lustrous than real jade. The serpentine was formed by metamorphism of dark-colored igneous rocks lacking quartz and feldspar.” - http://www.nps.gov/history/history/online_books/grte/grte_geology/sec5.htm

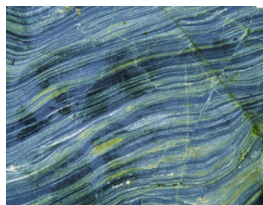
“An important characteristic of serpentinization is that the hydration reactions in the mantle rocks are exothermic – that is, they consume water and produce a significant amount of heat during the transformation of olivine to serpentine and magnetite. The amount of heat produced is directly proportional to the amount of water that is taken up to form the mineral serpentine. In fact, serpentinization consumes an average of about 300 kilograms (approximately 300 liters or 79 US gallons) of water per cubic meter of rock that is altered. At the same time, this process produces about 660,000,000 joules of heat per cubic meter of rock. In simple terms, the amount of energy produced by serpentinization of one cubic meter of rock (about 35 cubic feet) is enough to run a 100 watt light bulb for about 76 days!” - <http://www.lostcity.washington.edu/science/chemistry/serpentinization.html>
[http://en.wikipedia.org/wiki/Lost_City_\(hydrothermal_field\)](http://en.wikipedia.org/wiki/Lost_City_(hydrothermal_field))



image of serpentinite with chrysotile fibers
<http://geology.about.com/od/minerals/ig/silicates/minpicchrysotile.htm>

“It comes down to this. Serpentine is a unique mineral (and rock, serpentinite) that is uniquely Californian. It has a crystalline form that is called asbestos, but this particular form is not the one that is clearly linked to mesothelioma and other diseases. Large numbers of endemic species live on serpentine soils. Serpentine is related to the rocks that hosted the gold that made California a state. It is an appropriate state symbol.” – Garry Hayes Geotripper Blog
<http://geotripper.blogspot.com/2010/07/something-doesnt-feel-right-about-this.html>

Unique habitats often occur as “islands” surrounded by more common vegetation. Many of these isolated ecological communities exist because of the local geology. Complex intermixtures of rock types provide very distinctive soils that are home to rare plant life. [...] The soils are rich in heavy metals and barren of vital elements needed to support conventional plant life. They are shallow, low in calcium, high in magnesium, and do not hold water well. - <http://www.mdia.org/Serpentine%20Soil.htm>



Bands of blue and green in serpentinite
http://www.google.com/imgres?imgurl=http://www.corbisimages.com/images/67/F1A9EF10-C566-4BDE-8ED3-EADA43CCD4EB/67702.jpg&imgrefurl=http://www.corbisimages.com/Enlargement/67702.html&usq=_pQGPIu8GOcnlQbn52DutKkPBYPYhM=&h=444&w=640&sz=183&hl=en&start=166&zoom=1&tbnid=Z2Wef9SPc-9feM:&tbnh=121&tbnw=161&ei=5HtZTcSZJoyisAOC-ZijDA&prev=/images%3Fq%3Dserpentine%2Bmineral%26um%3D1%26hl%3Den%26sa%3DX%26biw%3D1020%26bih%3D568%26tbs%3Disch:1&um=1&itbs=1&iact=rc&dur=78&oei=sXtZTffLY2osAP1u-mvBQ&page=12&ndsp=15&ved=1t:429,r:2,s:166&tx=54&ty=98

Heraldry Bibliography and Selected Quotes:

Uden, Grant. *A Dictionary of Chivalry*. New York: Thomas Crowell, 1968

Brooke-Little, J.P. ed. *Boutell's Heraldry*. London & New York: Frederick Warne, 1970.

From *Boutell's Heraldry*: (p147) "An unmarried woman holding the office of Head of A College or Mayor may, while she holds such office, impale [display side by side] the arms of the college or corporation with her own on a lozenge [a small diamond shape used by women in lieu of a shield], the official arms occupying the dexter [right] side." It goes on to discuss the arms a woman would use when married, widowed, remarried or after a marriage is dissolved and how the arms are displayed when one or both of the spouses is a peer of the realm. And the revised edition of 1970 brings up the new circumstance not contemplated when Boutell wrote (1950) of a married woman wishing to use her own arms for her personal and professional realms. According to this 1970 edition, the pre-eminent heraldic scholar of our day, Arthur Fox-Davies (*The Art of Heraldry*. NY: Arno Press, 1976) has pronounced an accepted modern solution for a woman wishing to maintain her own professional arms once married.

Other Sources

Adobe Illustrator instruction and assistance for transforming hand-drawn shields provided by E. Gilliam.

Photos provided by E. Gilliam, Jen Mayer, and Michelle Stone.