**Name Saharan playa lakes and sabkhas**

**due Tues., Nov. 17**

As you well know, water quickly evaporates in a desert environment. Depending upon the balance between evaporation and inflow (via either surface runoff from rainfall or groundwater springs or both), water may exist at the ground surface, at least temporarily. Evaporation concentrates salt, and salts in the desert provide clues about water. The list below shows the kinds of features that can develop, in order of decreasing ratio between influx and evaporation.

* **lakes**
* **brackish lakes**: slightly salty water
* **saline lakes:** if a lake is saturated with respect to dissolved salt, additional influx and evaporation will be matched by precipitation of rock salt at the bottom of the lake.
* **playa lakes/sabkha lakes**: lakes in dry environments that wax and wane with water availability. They are typically surrounded by salt flats.
* **salt marshes/salt bogs/salt quicksand**: areas without enough water to make a salt lake. They are typically covered with a solid crust of evaporite salts that give the illusion of a solid surface. Stepping out or driving out can be catastrophic. If the crust holds, it's like driving on jello – a quaking bog. If the crust breaks, there's nothing to protect you from the underlying salt quicksand.
* **playas/sabkhas:** salt flats formed by complete evaporation of lakes and/or groundwater.

**\*\*\*I will expect you to know these terms when you come to class.**

Let's look at a couple of examples of lakes, salt bogs, and salt deposits in the Sahara.

**The Chott El Djerid in Tunisia**

Go to the collection of maps at the end of this assignment, and find the map of Tunisia and western Libya. The Chott El Djerid is a large playa lake in the northern Sahara. "Chott" means a depression with a salty lake or a dry salt lake bed. Find the Chott El Djerid on the map. Do a Google Image search for Chott El Djerid (also spelled *Jerid*). Explore some of the links. What have you learned about this particular Chott?

**The Qattara Depression of Egypt**

Go to the collection of maps at the end of this assignment, and find the map of Egypt and eastern Libya. Locate the Qattara Depression, which we’ve talked about several times already. The Qattara Depression is a spectacular geographic area that lies as much as 134 m below sea level. It is bounded on the northern side by an escarpment several hundred meters high, and the only routes into the Qattara Depression are from the southwest, via Siwa Oasis and the Qara spring, or from the northeast. Do a Google image search, and have a look at some of the pictures (and be sure that you’re actually looking at pictures of Qattara – all kinds of odd things come up when you Google Qattara)

Remind me what you know about the Qattara Depression and groundwater in the Libya-Egypt area.

The Qattara Depression is a *peculiar* area – go to Google Earth, and browse around the Depression a bit. I've also posted a couple of huge satellite images of the Qattara Depression on the bulletin board in the classroom. What struck you about the Google Earth images?

During World War II, the German Afrika Korps under the command of General Rommel wanted to push east, take over Egypt, the Suez Canal, and eventually Middle East oil supplies. The Allies, of course, wanted to prevent that. The Afrika Corps took Tobruk (in Libya – see the map) and pushed east toward El Alamein (also on the map). The British Long Range Desert Group (LRDG) and special forces waged campaigns behind the German lines. At one point just before the Battle of El Alamein, one of these special forces units was essentially trapped as the Germans pressed eastward, and the only route to Cairo lay directly through the Qattara Depression, a route that was widely considered impassable except on foot or camel, because heavy wheeled or tracked vehicles were too likely to break through the salt crust and bog down in the salt quicksand beneath.

Read the 1944 document "A Journey Through the Qattara Depression" (pdf on Blackboard), which describes the mission of the group of British soldiers described above and their escape from the Germans through the Qattara Depression to Cairo. Pay particular attention to the map on the second page of the article, and use it as you read the text.

What did you learn about conditions in the bottom of the Qattara Depression?

Huge tracts of the Qattara Depression floor are underlain by salt bog and salt quicksand. As is typical for salt bogs in desert climates, the salt bogs of the Qattara Depression have a solid crust of evaporite salts underlain by salt water-saturated quicksand. The elevation of the deepest part of the Qattara Depression is about 140 m **below sea level**. Combine the information on the Nubian aquifer map with what you have just read about the Qattara Depression, and explain why there are salt quicksand bogs in the Qattara Depression.

What other things struck you?

**The Taoudenni Salt Mines of Northern Mali**

Long term evaporation from a salt lake can produce deposits of rock salt. In northern Mali at Taoudenni (see map on the map pages), salt has been mined for well over 1000 years. In Medieval and Renaissance times, trade of Saharan salt south across the desert to West Africa and West African gold north across the Sahara was an important part of the economic picture of North Africa and the Mediterranean. Even today, the salt trade continues, and (believe it or not) camel caravans still make the 700 km (!) trek from the salt mines south to the markets of Timbuktu to sell salt.

The Taoudenni area lies in the middle of the hyperarid Sahara, and a lake no longer exists at Taoudenni, just the salt left behind to tell us that a lake was once there. Start by doing a Google Image search to find pictures of what the Taoudenni salt mines look like, and explore a few of the sites connected with the images. What did you learn?

Then, go to the following site, and read the description of a journey about 10 years ago taken by the British writer and reporter John Pilkington:

<http://www.pilk.net/update5.sahara.html>

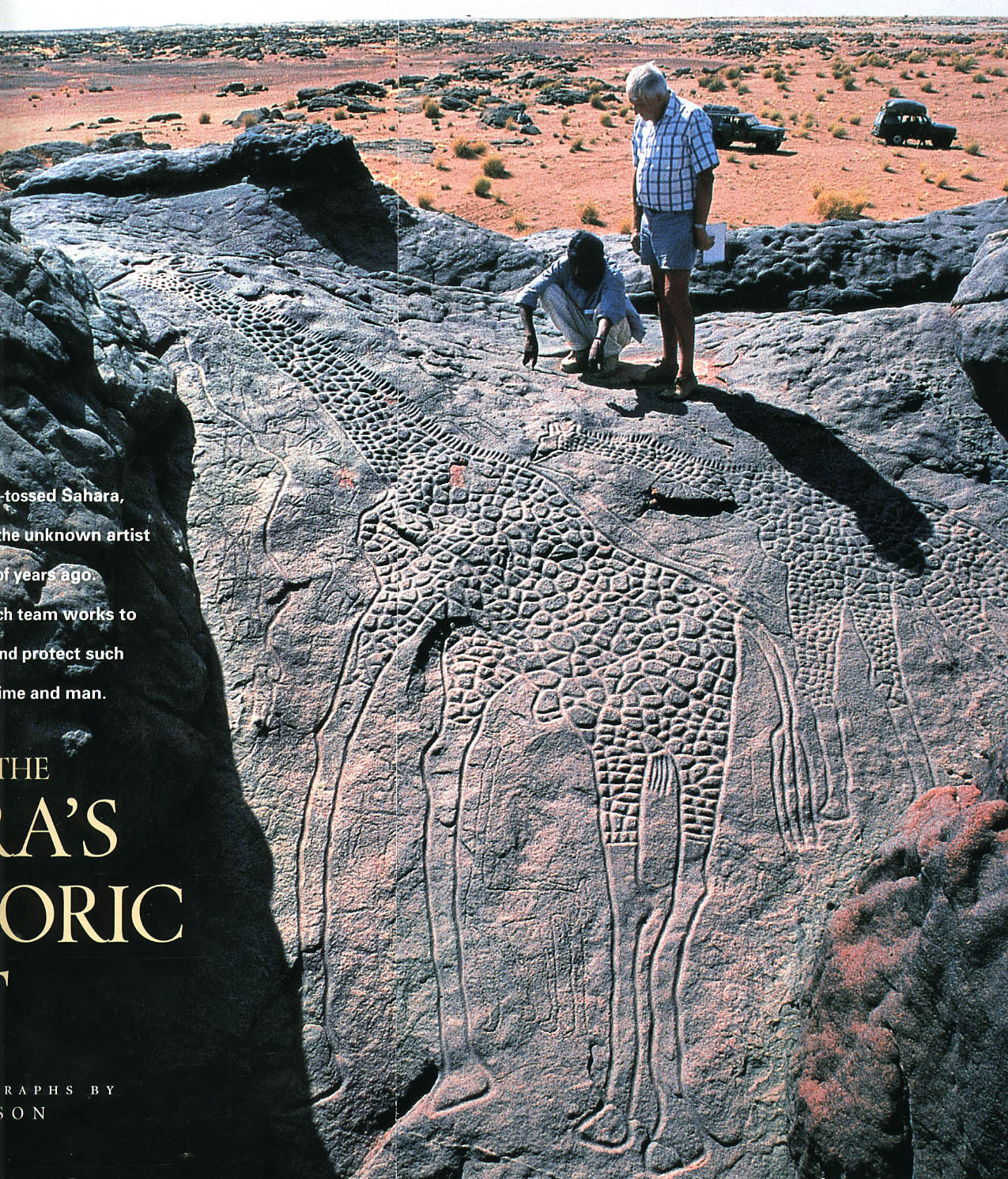
<http://www.pilk.net/info.sahara.html>

[Pilkington is a rather interesting guy – you can read about him on his web site at <http://www.pilk.net/biography.html>]

What did you learn from his recounting?

What struck you?

**The Stunning Rock Carvings in the Ténéré Desert in Niger**

Scattered throughout the Sahara, one can find prehistoric rock carvings (petroglyphs) made by human inhabitants long before the rise of Egyptian civilization along the Nile. These carvings commonly depict animals (*e.g.,* giraffes, ostrich, elephants) that are no longer seen in the hyperarid Sahara and depict human activity (herding cattle, for example) that is not possible in the modern Sahara. One of the most spectacular occurrences of petroglyphs anywhere in the world occurs in the northern part of the Ténéré Desert in Niger. These petroglyphs include literally hundreds of carvings of animals not currently found in this part of Africa and include the now-famous giraffe carvings shown at right.

The sand in this part of the desert is quite red, and, if you look closely at the image, you'll see that the rocks are, in reality, red. They are red sandstones, quite easily carved. The giraffe carving itself is dark gray because it has been around long enough for desert varnish to accumulate on the rock surface. So, we know these are quite old carvings.

Download and watch the movie *The Lost Art of the Sahara* (on Blackboard). Browse the Bradshaw Foundation web site (URL below), read the National Geographic News article (URL also below), and the article listed below. None of the three has much scientific detail, but they have nice pictures and quite a lot of general information about the site. You'll also see pictures of the Tuareg people (whom I have mentioned several times in class as being the nomadic camel-riding people who once traveled and traded between oases in the Sahara).

<http://www.bradshawfoundation.com/giraffe/>

<http://news.nationalgeographic.com/news/2001/10/1003_africarocks.html>

Miller, Richie, 2000, Saving rock art in Niger: State Magazine, September 2000 issue, p. 18-21 (posted as pdf on Blackboard)

What did you learn about the modern character of the area where the carvings are found?

What did you learn about the carvings themselves?

What do the carvings suggest about Saharan rainfall in the past?

