collected “clicker questions”
(NOT in order of presentation)
PCQ: maturity ... It has been proposed that the most mature rocks are mud-free. Is a mudrock mature?

- a) no, by definition.
- b) yes, because it takes a long time to convert an arenite to mudrock.
- c) no, because clay particles can be very young.
- d) yes, because there is only one grain-size present.
PCQ: which of these terms does NOT apply to this outcrop?

- a) breccia
- b) clast supported
- c) monomictic
- d) epiclastic
PCQ: True/false:

- a quartz arenite is less mature than a pure, clean feldspathic arenite

- **FALSE**
PCQ) What size is the coarsest sand?

Grain Size Scales for Sediments

The grade scale most commonly used for sediments is the Wentworth scale (actually first proposed by Udden), which is a logarithmic scale in that each grade limit is twice as large as the next smaller grade limit. For more detailed work, sieves have been constructed at intervals.

The (phi) scale, devised by Krumbein, is a much more convenient way of presenting data than if the values are expressed in millimeters, and is used almost entirely in recent work.

<table>
<thead>
<tr>
<th>U.S. Standard Sieve Mesh #</th>
<th>Millimeters</th>
<th>Microns (µm)</th>
<th>Phi (φ)</th>
<th>Wentworth Size Class</th>
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<td></td>
<td>4096</td>
<td>1024</td>
<td>-12</td>
<td>Boulder (-8 to -12φ)</td>
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<td>1024</td>
<td>256</td>
<td>-10</td>
<td>Cobble (-6 to -8φ)</td>
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<td>16</td>
<td>-8</td>
<td>Pebble (-2 to -6φ)</td>
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<td>4</td>
<td>1</td>
<td>-6</td>
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</table>

(From Folk, 1968)
PCQ) what was “provenance” again?

- a) the capital of Rhode Island.
- b) how long a sediment has been in the system.
- c) where the sediment originated.
- d) an obscure term referring to grain size.
Although this grain is mostly quartz, we don’t identify it that way because ...

- a) we cannot actually tell what it is.
- b) it is too large to concern us in this sample.
- c) it is a lithic grain, and can tell us about provenance.
PCQ:

- sketch this diagram
PCQ: WHICH OF THE FOLLOWING TERMS COULD CORRECTLY BE APPLIED TO THIS ROCK?

- 1) cataclastic
- 2) epiclastic
- 3) diamictite
- 4) volcaniclastic
PCQ: CLAY SETTLES SLOWLY IN WATER BECAUSE

• 1) clay particles are mostly water.
• 2) clay has a density of less than 1g/cc
• 3) floculation creates an upward force that keeps clay suspended.
• 4) clay has a negative gravity potential.
PCQ: WHAT KIND OF BEDFORMS WOULD YOU EXPECT TO SEE IN THE SAND AROUND THE WRECK OF THE TITANIC?

• a) no bedforms
• b) lower flow bedforms
• c) upper flow bedforms
• d) either upper or lower flow forms
PCQ: HOW DO I TELL OSCILLATORY WAVE RIPPLE MARKS FROM CURRENT RIPPLE MARKS?

- a) it is quite impossible.
- b) the stoss side angle is steeper than in current ripple marks.
- c) the stoss side angle is shallower in oscillatory ripple marks.
- d) the stoss and lee angles are similar.
PCQ: which of these terms does NOT apply to this outcrop?

- a) breccia
- b) clast supported
- c) monomictic
- d) epiclastic
PCQ: WHAT ARE THE AXES IN THE BOGG’S BEDFORM PHASE DIAGRAM:

- a) velocity and depth
- b) velocity and grain size
- c) grain size and depth
PCQ: WHAT KIND OF BEDFORMS WOULD YOU EXPECT TO SEE IN THE SAND AROUND THE WRECK OF THE TITANIC?

• a) no bedforms
• b) lower flow bedforms
• c) upper flow bedforms
• d) either upper or lower flow forms
PCQ: EVIDENCE FOR THE FLOW?

• a) lee sides slope to the left in direction of flow
• b) stoss sides slope to the left in direction of flow
• c) lee sides slope to the right in direction of flow
• d) stoss sides slope to the right in direction of flow
PCQ: if normal grading results from decreasing flow, why not attribute inverse grading to accelerating flow?

- write your short answer at the bottom of the clicker page. One sentence.
PCQ: in this photo

- a) red and green are cross bedding
- b) only red is cross bedding
- c) only green is cross bedding
- d) both are cross lamination.
PCQ: are these different from antidunes? How? How can you tell?

- a) antidunes do not form in coarse sand
- b) sedimentary context
- c) antidunes only build in one direction
- d) actually you cannot tell
PCQ: which way was downhill when the slope failed?

a) to the right  b) to the left  c) can’t tell
PCQ) What is an advantage to trace fossils over “regular” fossils?

- a) We get a record of biotic activity.
- b) We get a sense of ecosystem interaction.
- c) We get a record of a short interval of time.
- d) All of these are advantages.
PCQ: which of these media have laminar flow? Pick all that are ...

- a) water in a pipe
- b) water over a waterfall
- c) ice in a glacier
- d) wind
- e) lava
PCQ) SURF A RIVER?

• The wave in the river that makes surfing possible here is
  
  • a) from the ocean, just downstream.
  
  • b) is a hydraulic jump.
  
  • c) is due to turbulence in upper flow regime behind the surfer.
  
  • d) is due to a large underwater object just behind the surfer.
PCQ) turbulence enhances / increases erosion of sediment by

- a) directing flow toward the bed.
- b) increasing viscosity near the bed.
- c) increasing the local fluid density.
- d) none of these is true.
One of these features is true of all gravites:

a) Newtonian behavior during flow.
b) Reduced buoyancy of debris.
c) Thixotrophic behavior of flow.
d) higher viscosity than water.
One of these features is true of all gravites:

a) Newtonian behavior during flow.
b) Reduced buoyancy of debris.
c) Thixotropic behavior of flow.
d) higher viscosity than water.
PCQ) Turbidites, mud, and debris flows can be thought of as "event" beds because:

- a) Their arrival is always quite an event.
- b) They occur at a regular time interval.
- c) They represent a deposit that occurred in a short, discrete time interval.
- d) They always happen eventually.
PCQ) This feature is a:

- a) mudslide
- b) debrite
- c) mudflow
- d) slump

criteria?
PCQ: what are the two parts of a good sedimentary rock name?

- write them out ...
PCQ: True/false:

- A quartz arenite is less mature than a pure, clean feldspathic arenite.
PCQ: *maturity* ... It has been proposed that the most mature rocks are mud-free. But is a mudrock mature?

- a) no, by definition.
- b) yes, because it takes a long time to convert an arenite to mudrock.
- c) no, because clay particles can be very young.
- d) yes, because there is only one grain-size present.
PCQ: which of these terms does NOT apply to this outcrop?

- a) breccia
- b) clast supported
- c) monomictic
- d) epiclastic
PCQ: bedding or lamination? The upper unit in this block expresses:

- a) cross bedding
- b) cross lamination
- c) both
- d) neither
PCQ: these are standing waves in a stream, and indicate ...

- a) lower flow regime turbulence
- b) antidunes in the river bed
- c) oscillatory wave propagation
- d) a very deep river channel