CHATTERED, BATTERED and SHATTERED

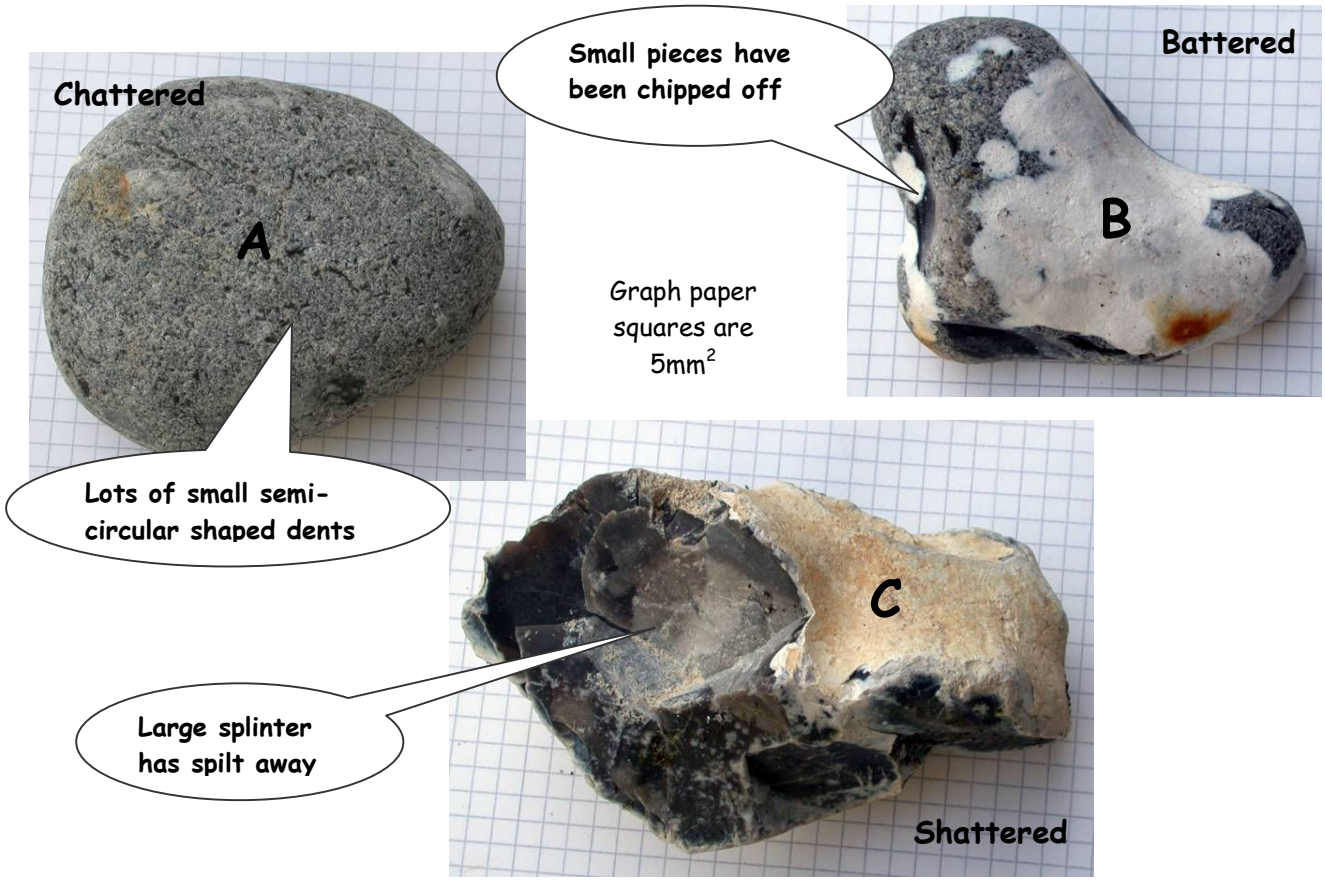
1. HOW DOES FLINT FROM THE CLIFFS BECOME SHINGLE?

Flints that have fallen from the cliffs are smashed against each other by the waves. Corners are knocked off and the sharp edges slowly become smoothed and rounded. At the same time the flints are reduced in size, becoming typical beach shingle.

This process is called **ATTRITION** and occurs whenever there are strong waves disturbing the shingle on the beach. It causes beach volumes to diminish unless fresh flint supplies reach the beach to make good the losses.

The chalk blocks that fall onto the beaches are worn away much more quickly by attrition than the flints, which are very much harder.

Look at the photos below of three flint pebbles of very different character, taken from the same shingle beach. Describe and explain the history of the three pebbles, and the processes that have shaped them. Start with the idea that all have been released from a nearby chalk cliff by the force of the waves at some time in the past, but not necessarily at the same time. The information given with the photographs should provide you with further clues.



Pebble A: A chattered flint pebble

a) What is its shape? What does this imply about how long it has been in the sea?

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b) What do you think caused the small semi-circular 'chatter marks' on it?

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Pebble B: A battered flint pebble.

c) This has some 'chatter marks' on it, but its shape differs from that of A. Can you think of reasons why?

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Pebble C: A shattered flint pebble

d) How would you describe its shape?

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This pebble has no 'chatter marks' on it. The white area is a chalky coating on the outside. You can see fresh black shiny flint on the inside where the large splinter has broken off.

e) On the beach where the three pebbles were collected there are very few chalk pebbles but huge numbers of flints? Can you explain this?

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f) What will be the future for **Pebbles A, B** and **C**? How might this affect the beach as whole?

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2. BAR RESEARCH ON ATTRITION

BAR researchers at the University of Sussex have shown that rounded flint pebbles on the Sussex coast do not last as long as was generally supposed. They suggest that a flint pebble on a Sussex beach could have a life expectancy of less than 50 years! The exact length of time would depend on whether it remained on the surface or became buried and out-of-reach of the waves.

Planners try to devise schemes to protect beaches. Many schemes aim to give 50 years of protection, but the BAR data suggests that during this time the beach shingle volume could be reduced by 25% or more because of wear due to attrition. This suggests that many beaches will be depleted and have to be recharged, i.e. have more shingle added to them, well before the fifty year period is up.

Beach recharge at Pevensey, East Sussex. Shingle is being pumped out from the boat onto the beach to build up its volume. The shingle was dredged from the bed of the Channel off Hastings.

a) What precautions should be taken in deciding where to obtain the shingle?

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b) What might happen to the recharged shingle during winter storms?

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