

Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (Third Year)

Subject: Geology

Course Code: GEC 108

Course Title: Sedimentary Petrology

Unit: II

Module Name: Rudaceous Rocks

Module No: 10

Name of the Presenter: Ms. Yogita Karkhanis

Notes:

- Rudaceous deposits are the coarsest members of a continuous spectrum of clastic or fragmental deposits composed of detrital material, which has been transported mechanically (which include gravels, conglomerates, breccias), the overall grain size being greater than 2 mm.
- A 'gravel' is an unconsolidated accumulation of rounded fragments larger than sand, while the term 'rubble' has been applied to an accumulation of angular fragments coarser than sand.
- The term conglomerate is applied to indurated gravels. The terms pebble, cobble or boulder may be prefixed to it according to the dominant fragment size.
- Breccia is the consolidated equivalent of rubble with angular fragments. Breccia applies to non-sedimentary rocks also (such as volcanic breccia, fault breccia, etc.).

Fabric and composition of gravels:

- Most gravel consists of a framework and voids.
- The framework is composed of gravel-size materials (phenoclasts: *pebbles, cobbles, boulders*); the voids are the openings between these framework elements.
- Normally framework elements touch each other, and the voids are filled with detritus, sand, or smaller sizes, with precipitated cements, the matrix material forming about one-third of the whole rock volume.
- Shape, roundness and surface textures of the gravel clasts may aid in the determination of the agent responsible for transport and deposition of the gravel, for e.g., striations and scars produced by ice action, percussion marks of the pebbles of high-velocity streams, etc.
- The shape of a pebble is more dependent on the shape of the original fragment than on the agent or transport. The shape of the original fragment is a function of the bedding, jointing, and cleavage of the source rock.
- Roundness of the pebbles, to some extent, is a function of the character of the material of which they are composed.
- Conglomerates have various internal fabrics. Larger clastic elements of gravel tend to have a preferred orientation.

CONGLOMERATES:

- The composition of the phenoclasts in conglomerates is varied – igneous (intrusive & extrusive), sedimentary and metamorphic.
- The composition of a gravel or conglomerate does not exactly conform to the kind and abundance of rock types in the source area.

- Because of varying block-forming capacities of varying rock types and of varying resistance to abrasion of these rocks, proportions present in the conglomerate are not a direct reflection of the relative abundance in the source area. Vein quartz and chert, for e.g., are common as pebbles.
- Granite, on the other hand, tends to disintegrate and become arkosic sand; Limestone tends to dissolve and yield no gravelly detritus other than the insoluble chert nodules present in it.
- The composition of gravel produced is significantly modified during transport – unstable elements are readily eliminated, with a simultaneous enrichment in stable species taking place.
- The dominant group of conglomerates can be subdivided into two sub-groups:
- ORTHOCONGLOMERATES: which are gravels collected by ordinary water currents and have an intact or clast-supported framework. These are the ordinary or normal conglomerates.
- PARACONGLOMERATES: deposited by turbidity flows and slides and by glacial ice or other modes of mass transport do not have an intact framework of gravel clasts, but display instead, a dominant matrix of fine-grained materials in which the larger clasts are embedded. They are poorly sorted.

BRECCIA:

- The term breccia applies to a rock of any kind which is composed of an aggregate of angular fragments.
- They are a diverse group in both their manner of origin and their physical attributes.

- They arise in three principal ways and can be classed, accordingly, as *cataclastic breccias*, *pyroclastic breccias*, and *impact breccias*.
- Cataclastic breccias are those whose fragmentation is caused by movement of large masses of rock past one another. The stresses involved may be gravitational or tectonic. Included here are Fault breccias, Fold breccias, and Crush conglomerates.
- Pyroclastic Breccias: coarse pyroclastic deposits include volcanic breccia, a deposit consisting of blocks of previously deposited materials.
- Impact or Fallback Breccias: formed in terrestrial craters formed due to meteoric impact have been described as Impact or Fallback breccias. Meteoric impact craters and associated materials are very prone to destruction by surface processes and hence are unlikely to be preserved.