bore resemblance to 'animals' though some forms like *Tribrachidium heraldicum* with three-fold symmetry, not seen in modern organisms, do not fit into any category. The biological enigma about these Ediacaran fossils still persists. Perhaps they belong to diverse groups – some resembling corals, some the mobile animals, while a few others, acellular; in fact they can be interpreted to represent a whole spectrum of organisms.

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Paucity of preserved old crust

Though Earth's oldest crust formed more than 4 billion years ago, today researchers are baffled by the paucity of early continental crust. Different models have been put forward by them to explain this. According to one view, oceanic crust gets recycled into the mantle by plate tectonics while the continental crust, being too buoyant to be drawn back into the mantle, had persisted and got weathered soon. Another view assumes that continental crust grew very gradually and their scarcity is due to their smaller size during Earth's early times and perhaps the creation of new crust and destruction of old ones had balanced since then.

An answer to the riddle about the rarity of early crust has come out of recent studies by Bowring and Housh[1] who through Sm–Nd isotopic studies have proved that indeed large segments of continental crusts have been recycled into the mantle during 4 billion years of Earth's evolution. They have used the progressive variation in the Sm–Nd ratios in the mantle reservoir through time as the basis for distinguishing older from later or 'juvenile' crust. The variation in the Sm–Nd ratio is brought about during the mantle differentiation which results in the formation of a buoyant crust. In this process, the newly formed crust gets preferentially enriched in Nd causing depletion of this element in the mantle reservoir through time. Thus the older of the early continental crusts will have ratios closer to the initial Sm–Nd ratios of the mantle and the younger ones, the products of mantle reservoir with depleted Nd, will correspondingly reflect the later Sm–Nd ratios. The analysis of fragments of early Archaen rocks indicate that even though large amounts of continental crusts formed early in Earth's history, they were subsequently destroyed and replaced by 'juvenile' rocks.

Direct unambiguous evidence of such recycling of early crust has come up recently in the find[2] of a diamond from a kimberlite pipe in N. E. Swaziland in Africa having as an inclusion, a crustal mineral – staurolite (an Fe–Al silicate). This mineral is typically developed in metamorphosed clay-rich sediments and never reported from the mantle. This staurolite was apparently carried down into the mantle by subduction and later became encapsulated by diamond when the latter nucleated around it. The diamond was subsequently brought to the surface through the kimberlite magma. In another recent report[3], a large chunk of peridotite in crustal gneiss in Alpe Arami region (Swiss Alps) has been found and this is considered yet another evidence of recycling of continental crust. Here, the large chunk of peridotite is believed to have been picked up by the continental gneiss of this region during its transit deep into the mantle (300 kms or more), when the gneisses were subducted during plate collisions, and subsequently brought back to the surface driven by buoyancy forces accompanying their warm up. In the process the gneisses underwent some metamorphism by the heat and pressure of the mantle. Fresh evidences are steadily coming up, establishing that recycling was an important process during the early history of the Earth and that the 'preserved continental crusts comprise of fragments that escaped recycling'.

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