



E, the Tourist Chameleon.

E is a colour lover. He had already tried all the rainbow colours. From violet to red, going through green and orange, no colour of the spectrum visible in the sunlight was too difficult for him. But, one day, he heard that tourists went to the Algarve to get bronzed. Bronzed?!!! A bronze colour skin.

He picked up his smartphone, googled, searched the Internet and found out that bronze is a mixture of two metals, copper and tin, which reflects light in a way that gives it a stunning look. A warm brown with shades of red. Beautiful.

- But how can humans do this? I am the chameleon, I can I change my own colour, and I have never got bronzed!
- thought E.

Once again he did some research and to his amazement, he saw that the process is very simple. It even looks like what happens with reptiles. They only have to expose themselves to the sun. Lie in the sun, stay there quietly, do nothing, only let the sunlight and your skin do the whole job.

The sunlight carries the energy that reptiles need to warm their blood, a well-known fact for E, because every morning and on cold days, he gets very slow, flaccid, he crawls himself with effort, up to a bright warm location, where he charges his "batteries", and only then can he pursue his adventures.

This is the energy that causes a miracle on the skin of humans. It can produce vitamin D and at the same time a brown pigment called melanin. Thus the skin protects itself from the ultra-violet rays, that are so aggressive and dangerous, and gets that enviable bronze tan. So it is no wonder why it is usual to see humans lying on the beaches,



just like reptiles in the sun, so that their skin gets an attractive and "healthy" bronze colour.

It was right at this point that E decided to become a Tourist Chameleon. He headed to the Algarve to get a bronze colour, the only one that was missing.

He got in a boat called S, who always took part in his adventures and after a very enjoyable journey they arrived at a beautiful beach on the Algarvian coast. The small waves made S glide gently to the sand. E landed. Suddenly, he looked at himself and was amazed.

- Yellow, I am yellow?! So much effort for this?

He looked around and tried to understand what was happening to him. He was on the Gale Beach, also well-known for its yellow rocks. He continued his visit and noticed the "penecos" surrounding the sandy beach, which were some yellow rocks, made of calcarenites with fossils of corals, which were formed in warm shallow waters, which indicates that this region was in a tropical area.



Fossil corals

- Oh, I got it. This habit of imitating the colour of the place where I am, sighed E. I can see that here I will never get a bronze tan.

He went back to where S was and they sailed along the coast looking for another beach where he could get bronzed.

- Watch S! What a beautiful beach!

It was Manuel Lourenço Beach, very unique and very different from the first one. It was full of living beings. His curiosity made him want to know all those varieties of living beings, the biodiversity of this beautiful beach. He wandered



slowly along the beach and noticed a sandy area and a rocky area.

The rocky part, due to its firmness, is used as a shelter and a support to many living beings that stick to it. But as they moved towards the sea, he saw that the living beings he encountered were different. And the colours were very varied. Further inland the rocks were still yellow but darker at the bottom. When he looked towards the sea, the rocks were more and more flecked with green and brown.

When he walked in the rocky area, he found out that there were many puddles. They were tidepools. He came close to one of them and he very attentively noticed that the creatures that were in it, were different from those who lived in the rock around. With a certain indecision, typical from a chameleon, he put one of his paws in the water puddle. It was warmer than the sea water. He took it into his mouth and tasted the water.

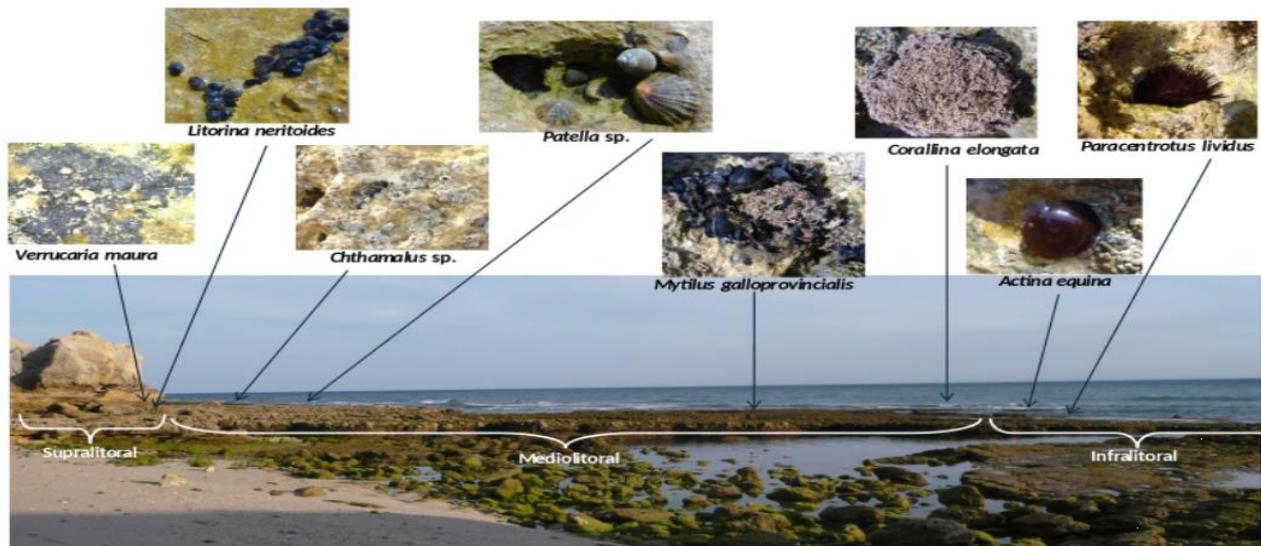
- Oh, so salty, this water is even saltier than seawater, exclaimed E astonished. Then, he wanted to find an explanation for this and remembered that the water in that puddle receives energy from the sun and, being in a smaller quantity compared to sea water, its temperature increases much faster and it evaporates also faster. But as salts, which are dissolved in water, don't evaporate at this temperature, they become extremely and more and more concentrated. The salinity of the water puddle is higher than that of seawater. But the most curious, thought E, is that when the tide rises, the sea water will get back to that area and the conditions will be the same as in seawater. Such great variations! The living beings have characteristics that allow them to tolerate these variations and thrive even so.

And that's when E understood. Different living beings are adapted to different environments and the presence or



absence of certain species and / or species groupings define different zones on this beach.

E, the tourist chameleon, could distinguish three areas:



The Supralittoral Zone

It is located between the land area and the maximum level of high tide - it is rarely covered with water.

It is common to find in this area the *Verrucaria maura* (lichen with tar aspect) and the *Littorina neritoides* (the sea snail).



Tar-lichen (*Verrucaria maura*) on the rocks

The Midlittoral Zone

It is located between the maximum level of equinoctial high tide and the average level of low tide of living waters (it is the real zone between tides). It is subdivided in upper and lower midlittoral zones.



The Upper Midlittoral Zone

It is characterized by a "waist" of barnacles (kind of *Chthamalus*) and limpets (kind of *Patella*).



The Lower Midlittoral Zone

It is characterized by a "waist" of mussels (*Mytilus galloprovincialis*) and great quantity of *Lithophylum incrustans* (red seaweed) in the puddles.



In the subtidal zone it is common to find the seaweed known as the *Corallina elongata*.

Mussels
(*Mytilus galloprovincialis*)

The Subtidal Zone

It is located between the lower limit of the midlittoral zone until the depth compatible with the seaweeds that require much light. It is an area that is submerged most of the time.

E was so delighted with the richness of knowledge and colours found in his visit to Manuel Lourenço's Beach that he forgot his main goal: getting a bronze tan. He went from yellow to green, from green to brown, but no bronze colour. The task was becoming difficult.

Anyway, the adventure in the Algarve was being really exciting.

Happy and much wiser, he decided to continue his discovery on the beaches of Albufeira and so he came to the Arrifes Beach where, to observe everything, he needed an alpinist equipment. On this beach the strata are upright, i.e.,



instead of being horizontally oriented, they are in the vertical direction.

- How strange, what must have happened here? - thought E.

Wise as he was, E knew that the layers were formed in a horizontal position, but he did not know, yet, why they were actually in a vertical position. He took again, his smartphone and decided to search the Net to find an explanation for this mystery. The geological history of this place can be summarized as follows - the layers of limestone initially formed themselves in a horizontal position. The presence of the tracks and fossils indicate that its origin was marine. Then, these layers were deformed till reaching the vertical position due to forces caused by the approach of Africa to the Iberian Peninsula and also because these rocks were pushed upwards due to the

rising of salt and plaster, which existed in the lower layers. This plaster ascended because, in spite of the weight of the upper layers, it is less dense and the approach of the African plate and the Iberian plate, made a greater pressure on the vertical



upward direction. This is why the plaster can be seen on the surface on the tips of Baleeira.

Tired of so much climbing, he got on S and continued his journey by sea. Perhaps the Algarvian coast could still surprise him, as they had heard about an eastern beach, with a very strange name, the Olhos de Água Beach, meaning Water Eyes.

Suddenly they went through a very lively and bustling beach, full of people. It was the Water Eye ere the fishermen used to berth their boats.



E continued his journey during low tide and arrived at the Ólhos de Água Beach. When he approached an area with small rocks, he saw some people who looked very excited staring at the wet sand. He approached them and saw water bubbling in the sand. It really looked like eyes, water eyes. At that time someone told E to taste the water.

- That's funny, this water, which comes from the sea, is not salty, it is fresh water. As E looked very amazed, the person who had told him to taste the water explained that that water comes up on the beach because the aquifer of Albufeira flows into that place.

E had thought that the name of the beach was related to the Fado nostalgia, a typical Portuguese national song, but it only describes an unusual natural phenomenon.

Impressed with all the facts that he got to know in his adventure, E was wandering thoughtfully in the sand when...

- I don't believe this. I'm bronzed! Finally, I did it!

Suddenly he felt the ground quaking and heard a voice in panic:

- Oh! A chameleon! I have a chameleon on my belly!

So he fell down the tanned belly of a girl, who was lying to sunbathe, he got yellow again as the sand of the beach. What a disillusion!

Keeping bronzed is not easy for a chameleon, but for you, getting a bronzed skin is easy and fun, you just have to come and visit the beaches of the Algarve with your family.

See you soon!!!

Maria José Morais and Pedro Cruz