We the Termites of IISc

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We would like to draw your attention to some crazy researchers who are trying to find out how do we construct mounds… ecologists and civil engineers together. Now, who doesn't need a home? Step out of your buildings and you will see animal homes in all their grandeur … bird's nest, spider's web, beaver's dam, mice burrows, orangutan nests and so on. Our brethren make homes by collecting materials from their surroundings (birds's nests) or by secreting materials from our bodies (bee hives) or by cementing collected materials with secreted materials (our mounds). In recent times our homes are drawing human attention for their remarkable engineering and architecture.

Our mounds are conspicuous in several landscapes in Africa, Asia and Australia. After all who can miss a ten meters tall structure? Mind, we ourselves are a few millimetres in size. Dare competing with us? You will have to make a building ten kilometres tall !! Taller than Mt. Everest !! Our mounds can withstand weathering from rain and wind for decades. In fact the remains of some mounds are known to stand for centuries. It is no mean feat. But guess what, we don't bake our bricks in kiln. We mix soil with our secretions and it becomes ten times stronger. A million of us can be inside a mound and we live together as a big happy family.

In our family we have king and queen, workers and soldiers, young ones and winged reproductive 'alates'. The king and queen parent the rest of us in the colony. We workers build mounds, take care of the eggs and young ones, go for foraging and tend to the fungus garden. The soldiers defend our colony and the winged alates fly out after rains to start new colonies. Some

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of our fellows are of two types major workers with a large body and a large, dark brown head and minor workers with a small body and a small, light brown head. And we all work in synergy. We work without an architect, without a masterplan, in fact without even seeing the house we are building. Yes, we are blind!! Then how do we do all this?? Let humans scratch their heads for some time…

One fine day some researchers came to our mound and made an intentional breach. Now who likes a breach of privacy? So we started repairing the breach. We repaired the circular breach all along its circumference. We started from the periphery and reached the centre during repair. Can you construct hanging upside down? We can. For repairing breach we mixed our secretions with moist soil and made tiny balls with it. Humans have termed them 'boluses' (singular bolus). These are analogous to the bricks you use for your buildings. While we brought boluses for our work, humans snatched our boluses and measured them. To their surprise they found that we make two different sizes of boluses. But how can anybody make a building with two different types of bricks? We make a scaffold with the large boluses and fill the gaps with the smaller ones. This makes a dense and strong structure. But we are blind and we don't have a masterplan. So how do we co-ordinate?? Simple, once we reach the site of construction we take cues from the local environment and decide on the spot what to do. This is called 'stigmergy'. Humans have even designed robots for understanding this stigmergy; what we do effortlessly.

Now humans started treating us as their pets. You guys are indeed playful. They offered us a playground of different materials in their lab, right from tissue paper to agar gel to metal powders, sand, paraffin wax and what not… twenty four materials in total. God only knows what they were thinking. But little did they know that bolus making is hard wired in us. We ended up using almost all the materials for bolus making. Obviously, we could not use all the materials equally easily. They figured out our favourites.

But you will be surprised to know that we don't live in the mounds we build with such great efforts. We live deep underground. Now anybody living underground would suffocate unless sufficient provision is made for ventilation. Our mounds do exactly this. They harness the variation in temperature during day and night and use it for ventilation. See how smart we are!! Our homes are indeed cosy … air conditioned all round the year with moderate temperatures and high humidity (we are soft bodied and will die under dry conditions). Moreover, we have an entire fungus garden inside the mound where we grow our food. We are amused that you humans make your dwelling with expensive stuff and they turn out to be either too hot or suffocating. And then you spend additional energy for cooling and ventilation.

Infamous for eating up your furnitures and books (yum!!) you have often treated us as villains. Only in recent times you are beginning to recognise our significance… We don't just engineer magnificent mounds; we engineer entire ecosystems too we increase the fertility of soil and make ecosystems drought resistance. However, it is quite some time before you develop full understanding of the ecosystem services we provide. Our mounds are already inspiring construction of energy efficient buildings. We will also help you make cementing agents for construction, algorithms and robots for self-organisation, traffic regulation and construction in unreachable places like disaster hit regions or the surface of Mars (please tell Elon Musk)!! Since we grow our own food in fungus gardens, you might have guessed that we employ ingenious ways of weed control which can benefit your agriculture greatly. There is no dearth of secretes we are holding for you so come and explore our world. Who knows it might make a better world for your kind…

Reference:

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