

# Design - Conceived in the Mind

Industrial design first involves planning of both the structure and operation of the item to be created, so that it will function in the desired way. But the design is not completed until the artist has given his input to produce an aesthetic result. Designers are currently pushing the envelope in design towards producing an autonomous motor vehicle, but this is a far simpler mechanical device than one that might be created to emulate a great white shark.

Consider the major specifications of this autonomous sea-going vehicle. At 6 m long and weighing 3 T, with the ability to accelerate to 55 km/h, it will be able to range through the world's oceans to find and catch prey, including sea mammals, fish and seabirds, for its energy source. To assist this activity it will need excellent visual detection in low light while it dives occasionally as far as 0.9 km below the surface. It will be able to detect the heartbeat of a resting animal by sensing electromagnetic field variations down to half a billionth of a volt. It will be able to store sufficient energy reserves for a 10,000 km cruise, and maintain good buoyancy under all conditions. It will need the ability to suddenly accelerate in order to capture prey.

Then consider that even if all the physical features of this vehicle were successfully assembled, it would remain inoperable. Existing sea-going predatory craft require specially trained crews to keep them operating. But this one is not designed to be a remotely controlled sea-drone - it would lie like a dead body because it lacks the programming to integrate the various elements into a working unit. Software engineers must develop the system specifications, design the programs, oversee the writing of the code, then the testing and debugging to make this a truly autonomous unit.

It needs little imagination to conclude that such a project would need a great amount of highly skilled manpower - with the input of a lot of thought and effort. On the other hand, some might suggest that given a few million years, this autonomous craft will be spontaneously generated - automatically assembled in good working order.

More than one hundred and fifty years ago, in 1860, the French Academy of Sciences offered a prize to those who would "attempt, by means of well-devised experiments, to throw new light on the question of spontaneous generation." Louis Pasteur, who at that time was a chemist, took up the challenge. Pursuing scientific method, he devised ways of detecting whether it was possible for microbes to come into existence from non-living matter. Pasteur subjected flasks containing a sugared yeast solution to a variety of conditions. From these tests he demonstrated conclusively that any microorganisms that developed in suitable media came from microorganisms in the air, not from the air itself, as Needham had suggested. That 18th century naturalist had been a staunch advocate of the theories of spontaneous generation (life from inorganic matter) and vitalism (doctrine holding that life processes cannot be explained by the laws of chemistry and physics). Corroboration for Pasteur's findings came in 1876 from an English physicist, John Tyndall, who demonstrated that air had the ability to carry particles of matter. His apparatus could be used to indicate when air was pure. Tyndall found that no organisms were produced when pure air was introduced into media capable of supporting the growth of microorganisms. It was these results, together with Pasteur's findings, that put an end to the doctrine of spontaneous generation.

Why, then, does there persist the general belief that all life, including the Great White Shark, come into existence without the mental effort of a Designer?