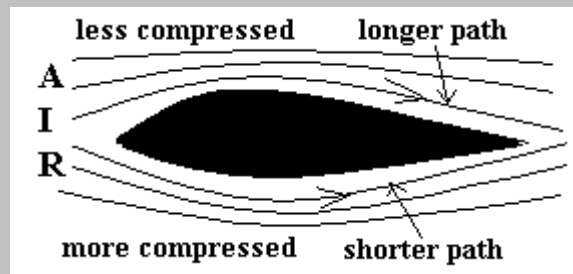# The first flying machine was down under

The first man-made flying machine was not the Wright Brothers' Airplane but the Australian boomerang, says **S.Ananthanarayanan**

The Australian outbacks abounded with bent pieces of wood and had plenty of open spaces. Use of the bent wooden pieces to throw at and strike emus and kangaroos revealed startling aerodynamic properties, which were refined to develop the real, 'guided' boomerang.

The airplane wing

The cross section of an airplane wing is shaped somewhat like a fish, but a little different, so that the upper surface is longer around than the lower surface. When such a wing moves swiftly through air, or if air blows across it, the air makes way, just for an instant, for the wing to go past.

That is, the air above the wing just moves up a little, getting compressed, and the air below moves down (also getting compressed), so that the wing can slide though. As soon as the wing is past, the air expands back and returns to where it was before.

But because of the different shape of the upper and lower surfaces of the wing, the air above the wing also needs to slip past the surface a little faster than the air below. This has the effect of 'stretching' the air out, which is something like 'expanding' it a bit, and so the pressure of the air above the wing is a wee bit below the pressure below.

Voilà, the difference in pressure results in an upward ´thrust´, which keeps the airplane wing and the airplane in the air!

The boomerang is similar

The boomerang is usually a flat stick, with a slight bend and between two and six feet long. As the cross-section of the flat portion is like that of an airplane wing, a little more curved above, the boomerang also experiences the 'lift', which keeps it aloft longer than usual. With the bent shape and with the ends of the boomerang being sometimes heavier, to make it spin like a flywheel, the powerful Australian aborigine was able to throw it so that the spinning edges cut the air at a speed of hundreds of kilometers an hour!

If the boomerang were 5 ft long, for instance, the circle of spin is about 16 ft. If the spin were even 10 times a second, this makes 160 ft a second, which is about 180 km/hr, at the tips. Add to it the speed of the boomerang itself and you could get a speed of some 300 km/hr.

Both arms are not the same

We can also see that the outer edge of one arm of the boomerang cuts the air but of the other arm it is the inner side. This difference permits refinements to balance the flight, give the boomerang a tilting plane, make it describe a curve as it flies, and so forth.

The Australian aborigine, who had discovered and developed the boomerang by trial and error in the wild, was able to achieve great precision and artistry, in striking moving targets at great distances and making the boomerang come right back for another throw, in case it missed!