Science and Leonardo

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Presently, we have seen advanced and sophisticated aircraft, which has come lingering throughout our history. And the entire fulfillment of our wish has only dawn on the 20th century. Still now, imaginary company with flying are also still strong, as a means of transportation, aircraft have always had an existing supplication. Undoubtedly, early man could scheme, what shown to him by the nature and besides this, due to the lack of advancement, there is no other way as there were birds to make flying easier and to lift his body into the air. Of course, it is to be assumed that in our initial desire at flight we had been inspired by the birds to try.

Reference has also been made from great epic, the Mahabharata, the Gita and a lots of Sanskrit literature where we could see the notes on flying machines used in aerial war lifted by wings. Ancient Chinese civilization was also involved with wing creatures. Likewise, Indians are attributed with two different forms of aerial transportation; one of these was constructed considering the birds flight and the other was depended on the principal of a system of flight imagined by the Greeks which was kept a closely looked out unraveled. In the Buddhists and Hindu civilizations the `Apsaras', described in paintings and represented as possessing by feathered wings, were perfected immortals in the view aeronautics science.

At the earliest documented effort, for the investigation to the possibilities of flight, originated in China. Emperor Shun, (2258 B. C. - 2208 B. C.) was to have been instructed fundamental aerodynamics and aeronautics science by the daughter of Emperor Yao. When he was constructing a granary suddenly he got himself trapped on the roof because the building had caught fire, instantly he put on the work clothes of a bird, and flying made his escape. And he made himself the

first man who put theory into practice. Some other Chinese references say that the application of one or many hats with long straw and the umbrella as parachutes, could be used for flying and saving life. Nevertheless, Chinese civilization is also probable to have been the first to develop `man-carrying' kites.

Keeping the time of the four hundred years from the early fifteen century on mind, the aeronautics science, besides one or two notable exceptions, seemed to be comparatively unproductive than the advancement of `man powered' flight. But we cannot say that attempts for aeronautics science detrimental.

At the beginning a new form of development, saving the lives of many men, started to go on. This was also the process of designers to get result of their inventions by calculation and the use of test rigs that used mechanical power to make the motion of wings. So that, considering the information provided previously, only jumping from the top of the tower could use these rigs. Needless to say, only a very few cautious person followed and could to get achievement.

Similarly, the most significant exception to the amateur bungling of the tower jumpers was Leonardo da Vinci who gave many contribution in the field of the science as well as in the arts. His considerable struggle was dedicated to the field of aeronautics. Regarding the manuscript of da Vinci in detail a modern aviation historian Gibbs-Smith writes that most of da Vinci's work on this field was influenced by former `man-powered flight' using scientific and deep study of bird. This activity helps him to study more detail in practical aspects. He designed various types of flight, as his peculiar output on scientific literature included about 250000 words and 500 drawings on the subject of flight.

His first `man-powered' ornithopter designed perfectly simulated the wing-motion of birds. This was single seated and the pilot could secure himself in the light steel frame in inclined position. To activate the flight pilot had to use his

hand and legs. The wings could be returned to their highest positions by using the hands with two livers. The other system was `cord-system'. A cord closing to the feet, passed over the pulley to the main parts of the wing, and it's tip regions were related to the main pole by a perfect joining to enable a movement to be caused of risk to this sections.

Preparing many scheme Leonardo da Vinci became the first person to recommend sophisticated control devise for the aircraft, which is to be considered as a `man-powered' aircraft because it requires man's arm and leg to generate the power and to lift the flight up in the air. This devise was very interesting and complex at such time, and he used it in his previous `inclined man-powered helicopters'. In this system, as the pilot could use his head to control, and this activating of control using the head was apparently unique.

One of da Vinci's model was two sets of wings. These two sets of wings was adjoining with a rotating disc. The cables that were caused to flap managed the transmission control system. Da Vinci said that this mechanism could also be made with a single set of wings where the arms and feet were able to raise the wings and controlled the motion respectively.

Up to three years from 1487, he again changed his old shape in his `man-powered flight' and he designed new ornithopter. This model was basically different with position of pilot and wings. The pilot may handle the flight either by sitting or standing. And crank handles rotated on the side of the flight adjusted the wings. In this model, a adjustable thin tail-plane in appropriate size was also involved but a wing motion to thrust forward was lacking which could generate more lift power, as he mentioned.

Deep study of da Vinci's could make a conclusion that his extravagant power on his aeronautical field was in climax during the period of 1480-90. Within this period, his most popular model was `a bowl-shaped craft' where the pilot used

to operate in bowl-shaped frame with a complicated adjusting system using his arms legs, the head and the help of chest muscles. This was proved to be extraordinary heavy to provide energy to lift the flight up. In the period of 1497 to 1500, he was engaged on the same types of machine, which had `wing tips flapped'. The pilot could stay between the wings. The most important things in this model was not using the principle of center of gravity properly and contrast with 1490s. He later studied on trying to make perfect wing and control surface design, after this, in 1505 he wrote about his model and designing he created. This model was one of his most advance and seems to be final exercise on designing involving `man-powered aircraft'.

Yet, we can see the principle given by Leonardo da Vinci in the various model of airplane. Describing the model of the `man-powered flight, da Vinci suggests:

"A ladder for descending and ascending; let it be twelve breccias high, and let the span of the wings be forty breccias, and their elevation eight, and the body from stem to prow twenty breccias, and its height five breccias, and let the outside cover be all of cane and clothes... Make the ladder curved to correspond with body....".

Later on, he had been completely known as scientist as well as philosopher. His contribution for the science, especially in aeronautics and flight, has become a important guideline for the modern achievement for the aeronautics and flight. If our early scientist had not contributed in this way, we would not be able to hope of such advanced development in the field of flight, as we have presently. (Written : January 95).