

## TIME BINDING

### The Sky's the Limit

From the time the first caveman jumped off a cliff and flapped his arms like a bird, until now, mankind has had a fascination with flight. In literature and mythology we find many strange and wonderful tales. Scientists, mathematicians, and inventors struggled with the theory of flight for a thousand years.

Yet, it was not until Joseph Montgolfier, sitting in front of a fire and watching smoke go up a chimney, that someone found a practical solution. First, he made a small cloth balloon, open at the bottom, and lit a fire under it. Much to his delight it floated up to the ceiling. On June 4, 1783, in the town of Annonay, France, Joseph and his brother demonstrated their discovery with a 35 foot diameter unmanned hot air balloon. Then someone realized that there was a strange light gas (hydrogen) that might work as well as hot air. On August 27, 1783 the first unmanned hydrogen balloon was flown in France. In November of that same year, two more Frenchmen built a very large hot air balloon, and got into the gondola and became airborne.

During the next 100 years inventors refined both hydrogen and hot air balloons, added power and steering, used them for military observation, and continued to dream on. Another group of inventors looked at the possibility of heavier-than-air flight. As early as 1809, George Cayley of England worked out the essential theories of modern aircraft. Unfortunately, his work went unnoticed, and potential time-binders were left to discover this information on their own. Initially, nineteenth century inventors developed designs for gliders. Some of these contained fatal flaws. The Wright brothers' gliders flew with reasonable success, and in 1903 they put an engine in one and started an entire new industry.

Barely fifteen years after the Wright's plane stayed aloft for less than a minute, men were flying over the French countryside in biplanes and tri-planes, shooting at each other. When World War I ended in 1918, the best planes were still fabricated from wood and linen. Less than twenty years later, all-metal fighter planes and bombers were off the drawing boards and flying.

As World War II got underway, the Germans were developing the jet airplane. Late in the war, they got their jet fighters into the air. Once airborne, no Allied plane could match their performance, but they had to take off and land. Many of the German jets were destroyed during the take-off and landing periods. The Japanese obtained the design of their jets from the Germans, and between the first and second atomic bomb attack, flew their first prototype.

During World War II the Germans developed long range rockets. These rockets were the forerunners of the rockets we use today to put men into space. The capture of working rockets, data, and German scientists, allowed the time binding scientists in the United States to move forward rapidly.

To put this rapid advance into perspective, consider this. When they were young, your great-grandparents could travel using slow steamships, horses and buggies, and steam drawn wooden railroad cars. Today your parents can travel by auto on super highways, fly to Europe on a jet, and maybe even go into space. All this change occurred in a short time in the history of this world, and it came about because each generation learned so much from the previous one. We call this time-binding in action.

To put yourself back into the experimental days of flight, see if you can take a piece of notebook paper and make a glider out of it that really flies. Check your classmates. Did any of them have any success? Will they show you how to make a flying glider? If so, the two of you are binding time. Have fun with your experiment.

