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Since the flow about any object is speeded up as the streamlines crowd together in going around the forward part and is slowed down as they are returned toward their original state over the rearward part, separation usually occurs over the aft portion of bodies. To make matters worse, the boundary layer has had time to become rather thick by the time the aft end is approached, so separation is allowed to occur in this retarded zone more easly than if the boundary layer were not there at all. Remember that the boundary layer (be it laminar or turbulent) is thicker when the Reynolds Number (based on the average velocity and length traveled from the nose) is *low* than when it is high, so on model aircraft the thickness of the boundary layer is a serious instigator of separated flow, especially if it is a laminar layer.

Consequently, at low speeds the flow about bodies is very likely to separate behind the thickest portion, and the flow over airfoils often separates just behind the point of maximum thickness (labeled "S" in Figure 2-A). At higher speeds the Reynolds Number is greater, so that natural transition from a laminar to a turbulent boundary layer (labeled "T" in Figure 2-B) eventually occurs before the point of laminar separation is reached. Because the turbulent boundary layer has more velocity next to the surface, it can endure more slowing down without separating from the surface, hence the lift is increased and the pressure drag is decreased. *Airfoils with laminar separation are said to have a "sub-critical Reynolds Number" (based on stream velocity and airfoil chord), while those operating with a turbulent boundary layer before separation are said to have a "super-critical Reynolds Number."*

An exactly analogous situation exists at very high subsonic Mach Numbers (M = .7 to 1.0). At those high speeds the streamlines are speeded up to supersonic velocity as they crowd around an airfoil. As they start to slow down a *shock wave* forms in which the velocity jumps down and the pressure jumps up. The same laws of separation hold true at any speed, so if the boundary layer is too thick (and especially if it is laminar) the flow over a transonic airfoil may separate just behind the point of maximum thickness, thus greatly increasing the drag and reducing the

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Spiraling

with E. J.

From all I can see and hear — by looking around and listening; that being one way to see and hear things; I think nearly everyone is an adventurer, explorer, discoverer, etc., at heart, and given any opportunity he would engage in these activities which must surely be one of life's most satisfying experiences.

Along with a theatre full of blokes I sat of an evening — spellbound at a movie 'titled "The Conquest of Everest." We were with Sir Edmund Hillary and company attaining something of an absolute altitude record by topping 29,000 foot Everest. This is said to be the highest hill of all and I guess it is if you are talking of mountains of dirt and stone. But you and I know of mountains that go to twice Everest's heights.

But anyway — I dare say that each and every one of us in that theatre felt in his own mind's eye that he was a member of Sir Edmund's party in this magnificent adventure, and after we left the movie house felt a genuine longing for an opportunity for real life adventure. An adventure so thrilling as Sir Edmund's via the cinema or a book is one thing and pleasant enough as for that — but the genuine thing is something else again, and one is reminded of the difficulties this day and age. There are darn few places left to discover and 29,000 foot peaks seem not to abound in great numbers, and those that do are in such unhandy places as Tibet — a beastly long way from the bus line. Therefore it would seem that one would be hard put to bring off a first class adventure these days, save and except via the cinema or book.

But 'tis not so — thanks to the high performance sailplane. Just today I observed from a vantage point in my own back terrace — a mountain chain with not one but dozens of peaks extending far above Everest's puny 29,000 feet. There they stood in all the majesty of the Hymalayias. From horizon to horizon they stretched — a series of peaks and craggy heights glistening white against an azure sky. Perhaps 40,000 feet to the tops of the taller ones.

Everest and Anapurna never offered a challenge more thrilling. And the uppermost ramparts of this mountain chain are attainable. A skillful climber in a high performance sailplane should be able to do it within the better part of an hour.

And so it is that real, live, red blooded adventure is still available to the daring.

I thought I should run across to the yard next door and call my neighbor's attention to the unusual spectacle of this well developed squall line stretching across the sky, this mountain chain of boiling and billowing air just waiting to be climbed. But then — he was busy mowing his grass and already he suspicions that maybe I am 'that way.' This would prove it.

—E. J.