



Threatening Peaks Hidden by Clouds From Planes Above

Keeping up with the Weather — for Aviation

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IT was only a few years ago when the first bold attempts were made at flying. Bold because no one then knew how to fly; because also the engines were bad and balky; and because the wings and all other parts of the machine were flimsy and wrongly shaped.

And when flights were made they generally were only short hops close to the ground and in the deadest calm. But improvements were rapid.

Today there are engines that will deliver hundreds of horse power for weeks at a time with never a moment's failure, and machines so constructed in every detail as to secure the greatest possible lift and speed with the least hindrance to their movement through the air. There also are many devices at the aviator's disposal to help him on his way, and there are trained pilots, too, some of whom are so skillful that they could fly a barn door with a donkey engine, or mighty near do it.

Every thing that pertains to aviation, with but one exception, has greatly and marvelously improved. Indeed, we can say with assurance that some things have come close to perfection.

We know from theory and from experiment that the drag of a wind on an object is smallest when it is so shaped that the air slips over it without the formation of eddies and turmoil. The plane and its parts are now constructed mainly on this ideal plan. They are given stream-line shapes—roundingly blunt in front and tapering to an edge in the rear. In this case perfection has been attained or very nearly attained, for the stream-line shape and it alone enables an object to get through the air with the least possible resistance. The wing also has a highly efficient form for lift and speed.

Biggest Factor Unimproved

But there is one factor in aviation, and today it is the biggest factor, that has not been improved one particle from the beginning, and is not going to be. That factor is the weather.

Joshua may have commanded the sun to stand still, but the wind bloweth where it listeth, and so it is with the rest of the weather elements. Elijah didn't make the rain that caused Ahab to hurry and eat and get down from Mount Carmel, he just predicted it.

It is true that we do a lot in the way of controlling weather on a small scale. We use heaters of one kind or another to temper the air in our offices, work shops and living rooms in the winter; and when it is disagreeably hot on the street we find comfort in the conditioned air of a theater. We fix the factory weather just right for a thousand and one industries, from cotton spinning to candy making.

We also do something at times with the weather for a very limited region outdoors. For instance, when frost threatens to kill fruit in blossom, or spoil it before picking, we light the orchard heaters and save the crop.

But none of these things affects the weather that concerns the aviator. In respect to his weather, the real outdoors weather, the wind still bloweth where it listeth, as it did in biblical days, does now, and will continue to do as long as there is air to move. We cannot control the weather at large, try as we may, but we can do the next best thing, we can learn a lot about it. Those, for example, who have to do with aviation, and I am talking about that art in particular, can learn how every element of the weather, and every stage of that element, affects the take off, the flight and the landing.

Half Hour Ahead

They can also learn how to judge almost certainly of the weather of the next half hour—long enough for many of the aviator's most urgent needs—how to know what it very likely will be during the coming two or three hours, what it probably will be even a day ahead, and how to do better, as a rule, than guess its major features a week off. But it is the weather of the now and the almost now that chiefly concerns the average pilot. If he always knew what the weather would be during the next half hour he seldom would need to bother about the weather of tomorrow.

What, then, is it about the weather that concerns the aviator? Everything, in fact, but some things far more than others. It isn't nice to have to take off, or to land either, in a strong gusty wind, partly because in such winds the velocity of the machine with reference to the air, and hence the lift, varies greatly from moment to moment. The resulting bumps are bad enough in the free air but when they lead to hitting the ground the term bump hardly expresses the result.

Fog is another weather element that gives the aviator much concern, because it is impossible in a dense fog to see what is ahead of one and to pick a safe landing place. For this reason the aviator must be fully advised at all times of the occurrence of fog anywhere along his course.

Another weather element the aviator's needs have brought into especial prominence is visibility, or distance to which one can recognize objects of appropriate size by the unaided eye. If visibility is poor, no matter what the cause, whether fog, low cloud, smoke, dust or what not, the aviator probably will not know definitely

where he is, nor be able to see either the objects ahead of him or the ground beneath. Such a condition obviously renders a forced landing, or in fact any landing, distinctly hazardous.

Then he must beware of the thunderstorm. True, we sometimes read of bold aviators who, like Tam O'Shanter, never mind the storm a whistle; but on the night of his famous ride Tam was gloriously drunk, and similarly only the aviator who has lost his wits will ignore the dangers of a violent thunderstorm, for they are several and very real. At times and places the uprush of the air in this storm is so violent as to toss any machine wildly and at random despite every effort to keep it under control. At other places the rain is so heavy and the downflow so great as to drive a plane to dangerously low levels and into winds of extreme irregularity.

Avoids Thunderstorms

Hailstones the size of hen eggs, and much larger stones sometimes occur, and are pretty certain to at least play rough-house with a propeller. There is the lightning to which few planes, if any, are yet immune. In short, the cautious aviator avoids the thunderstorm, much as a canoeist keeps out of strong rapids and away from cataracts.

There is yet another weather condition, a treacherous one, that the aviator must be wary of. That danger is the free-air ice storm, or conditions at a flying level similar to

those near the surface when trees and other exposed objects are coated with clearish ice or glaze. Ice of this kind not only loads the machine, as would any thing else, but what is much worse, accumulates in such manner as to greatly increase the drag of the machine through the air and often to so decrease its lift as to force a hurried landing.

Where Not to Be

The place and circumstances most likely to lead to the accumulation of such a load of ice are: in a rain, whether also within a cloud or not doesn't matter, with the temperature a degree or two below the freezing point. This condition implies a warmer stratum above in which the liquid rain-drops are formed, and a colder layer beneath in which the drops are likely to freeze to sleet, of the kind that rattles when it hits a window-pane. The obvious way to avoid this danger, or to get out of it if realized in time, would be to fly either low enough to be in the fully frozen sleet, where the pellets would bounce off harmlessly, or enough higher to be in the relatively warm stratum where ice can not form.

Another place where a considerable load may be picked up is the level of wet or partially melted snow. In this case the higher temperature at which snow could not accumulate on the plane is at lower levels. Neither would the snow accumulate on the plane if the latter were taken to a considerably greater height where the snow is so cold as to be dry. (Turn to page 111)



Finding out about the weather at a flying field

NATURE RAMBLINGS

By Frank Thone

*Kansas B'Gosh*

WHEN the long trains of covered wagons toiled across the hot western plains, back in the days of our grandsires, the most cheerful sight on the monotonous horizons, next to the lines of cottonwoods and willows that bespoke water, were the great masses of yellow sunflowers. Across the wide bottoms of the Platte and all those other rivers that were "a mile wide and an inch deep" these golden armies marched, plucky and optimistic as the settlers themselves.

When the comers into the new land literally dug themselves in, holding out against drought, winter, Indians and grasshoppers in their meager sod shanties, they often had to fall back on the stalks of these sunflowers for something to burn in cold weather, for often there was little firewood in the land.

In the days of our prosperity we often pluck up some familiar thing we had with us when times were harder, and wave that as a proud banner. So it comes to pass that wherever there is a national convention of any kind, be it Rotarians, or Elks, or Shriners, or Professors of Classical Languages, the delegation from Kansas invariably blossoms a flaring sunflower from each button-hole.

But the common sunflower is far from being confined to the state whose badge it has become. It shines around the whole world like a golden crown. In Russia, where there are areas much like Kansas, it has been developed into a highly respectable crop plant that figures in national economics as a source of oil and cattle feed. And you can no more stop the Russian peasant girl from nibbling sunflower seeds as we eat peanuts than you could keep her from looking in a mirror. For doesn't she know that sunflower seeds are good for the complexion?

*Science News-Letter, August 16, 1930**Vitamins and Variety*

THE most important factor affecting the vitamin C content of apples is the variety of the apple. The character of the soil, age of the tree and season of picking have practically no effect. These are preliminary results of an investigation on the vitamin contents of different kinds of fruits and different varieties of one fruit which is being conducted by Mary F. Bracewell, Edward Hoyle and Dr. S. S. Zilva at the Lister Institute, London.

The English cooking apple, Bramley's Seedling, was much more active in antiscorbutic properties than any other cooking or dessert apple which was tested. This indicates that this variety contained the most vitamin C.

There was very little loss of vitamin C when the apples were stored at one degree centigrade in the air for three months. When stored for the same period at 10 degrees centigrade in a gas mixture of carbon dioxide, nitrogen and oxygen, there was slightly more deterioration. One of the most interesting results was that after Bramley's Seedlings had been heated in their skins they showed practically the same antiscorbutic power as before.

*Dietetics**Science News-Letter August 16, 1930**Deafness Pre-Natal*

DEAFNESS is a part of disordered growth, beginning far back in pre-natal life and becoming more severe with increase in age.

This is the most striking conclusion reached from a series of investigations into causes and conditions of deafness, conducted by the Department of Psychology of Temple University at Philadelphia under the direction of Dr. Thaddeus L. Bolton.

Results of the investigations, just made public, show that in some children the auditory organs were missing altogether. In other cases, the ears were so deformed that they could not function. The investigation would indicate that all forms of impaired hearing, with the exception of deafness caused by accident, are due to abnormal development of the hearing organs, beginning with pre-natal life. The psychologists believe that "the comparative timing of the cycles of growth of the various structures may play a part" in the disordering of the ear structures.

*Physiology**Science News-Letter, August 16, 1930**Weather—Continued*

Finally, the temperature within a cloud may be considerably below freezing and the droplets still liquid, in which case the front portions of a passing plane become more or less coated with a sort of tufted frost, but seldom if ever to a dangerous extent as it is shaken off by even moderate jolts and jars.

What then must the aviator know about the air and its ways? That depends on the kind of an aviator he wants to be. The fair weather aviator, one who flies only when the weather is ideal, can get along pretty well if brought up on one or more of the various recent books of meteorological misinformation, for there is nothing to bother him. The devil-may-care aviator has no business in the air anyway.

The safe and sane aviator, however, can and does use to great advantage all the correct information and clear understanding he can get of every mood and manner, from the mild and peaceful to the madly tumultuous of the medium in which he flies. The pilot that knows the air and knows that he knows it is the safest of all. Fly with him.

Science News-Letter, August 16, 1930

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