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Mass
Hang
Gliding
Association

UPDRAFT

Meeting Notice

The November meeting of the M.H.G.A. will be held at 7:30 PM on November 17 at the ME Bar and Lounge on Route 47 in Hadley. The meeting will be primarily a social gathering for some good cheer and tall tales in the cold nights of winter. We will have another FAA film as well. (Last months FAA film "Wake Turbulance" was excellant).

Weatherwise

This months column features some natural physics leading to an understanding of the conditions favorable to thermal activity itself.Let's start by examining the transfer of energy by various means. There are three processes by which heat energy is conveyed: radiation; conduction; and convection.

Radiation is the transfer of energy in waves. Sunlight and microwaves are forms of radiation, as are X-rays, ultrasonic waves, and particle wave emissions from radioactive elements. Sometimes radiation is converted to other forms of energy. Our whole realm of atmospheric weather is caused precisely by such conversion when the sun's energy (as light waves) is absorbed and converted to heat energy by the earths surface. The warmed planetary surface then transfers its heat to the surface layer of air it is in contact with through conduction.

Conduction is the transfer of heat energy from one mass to another it contacts due to the temperature difference between the masses. Since conduction depends on the heat capacity and density of the masses involved, materials abounding on the planets surface are much better conductors of heat than low density masses such as air. Air is, at best, a very poor conductor of heat. This is fortunate for earthly life forms; else the heat of the planet would be conducted to space, instead of being concentrated and preserved by the insulating atmosphere we fly in. The surface of air, warmed by the earth, can change sufficiently to cause it to travel upwards in the atmosphere. We call this process of change and lifting motion "convection".

Convection. We've all heard, and probably used, the term numerous times. A great many atmospheric events, as various as they are, involve this phenomena, and this variety obscures to some degree exactly what convection is. It is simply the transfer of heat by vertical motion of fluid or gas, when that motion is caused by the heat itself. Heated air becomes less dense due to expansion, and therefore more bouyant, so it rises, carrying its heat with it. This rising of air due to its own heat is the basis of thermal lore, but a lot more happens to air that is rising

than this simple definition can tell. We'll examine the various concurring phenomena shortly, after we fit convection into its niche in the system we call the atmosphere.

So far we know that air is a poor heat conductor; in fact we ultilize this knowledge by insulating ourselves and our homes with air (trapped between feathers and other fibers, etc.). We have learned that the air is transparent to radiation, and therefore derives virtually no energy directly from it. And we realize, as the result of more than a century of scientific atmospheric study, that our atmosphere is in constant motion undergoing the changes we call "weather" because of the processes we have named "radiation", "conduction", and "convection".

Scientists have estimated from the known data that the earth receives 15,000,000,000,000,000 (fifteen quadrillion) horsepower of energy each day as radiation. The earths surface is composed of a great variety of substances (mostly water) each possessing its own combination of heat capacity and density characteristics. So they heat at different rates, producing areas that are much warmer than others. This heat is conducted to a very shallow layer of air which is in direct contact with the planetary surface. This differential heating of surface air produces regions of low level atmosphere with often striking disparities in physical property.

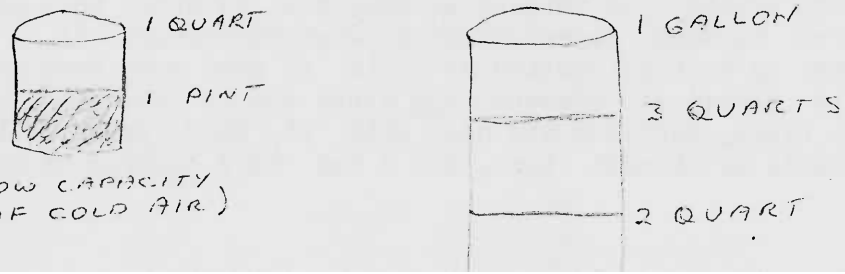
A warmer region of air also has a higher moisture content because evaporation of ground moisture is higher. Its heat also causes it to expand thereby reducing both its density and pressure. We call this type of air mass a "low pressure cell", or simply a "low".

Cooler regions of air, conversely, have lower moisture content, and higher density and pressure . these are known as "high pressurecells", or "highs".

The warm "lows" not only carry more moisture from evaporation than the colder "highs", they have a greater total moisture capacity as well. Humidity is our measurement of moisture in air, and since this measurement varies with the air temperature, it is called "relative humidity". Two air regions of equal mass have different temperatures. Equal amounts of water vapor in both will show as a higher relative humidity in the cooler one because it represents a larger percentage of the lower capacity of the colder air.

A simple illustration may explain this more easily.

A pint of water in a quart container represents filling 1/2, or 50%, of its capacity. The same pint of water in a one gallon container represents filling only 1/8, or 12.5%, of its capacity. Both vessels contain a pint of water, but it is a larger percentage of the capacity of the smaller one (the cold air mass).



1 Gallon Jar (higher capacity of warm air)

Warmer air, represented by the larger jar, has a greater water vapor capacity than colder air, the small jar (ED. Why?). Less moisture in cold air has a higher relative humidity than the same moisture held in warmer air. Less seems like more, in this circumstance.

Another apparent paradox is the fact that water vapor is lighter than air. Some of you may wonder how this is so, as we all know that water molecules are heavier and larger than simple air molecules. However, the molecules of water are spread out much further than air molecules when in a gaseous state. Moist air, then, is composed of molecules with more space between them. For this reason air containing water vapor is less dense, and hence more bouyant, than drier air, at the same temperature.

These factors, and their interrelationships, account primarily for the causes of weather in our atmosphere. The events we've examined and the conclusions we've drawn have set a proper stage for next months literary drama, "A Portrait of the Thermal as a Young Wisp", or "The Worlds 100 Favorite Recipes for Lift and Sink(with High Altitude Adjustments)". Tune in then, dear readers.

Mark La Versa

News

Two of our members made their first flight from Skinner in September. Both Glenn Pugh and his son, Dave, got great flights in great air. Both soared too and Dave got twenty minutes. If Dave had flown closer in he would have got some great altitude.

Your president finally got back in the air Novemeber 2 with a 40 minute flight in glass wonder winds. Some people claimed everyone made 2000 feet over launch but there were no altimeters in evidence to back it up. There is nothing like flying to get you in the mood to fly especially in PRIMO conditions.

As you are all aware Skinner closed for the winter at the end of October and is now a walkup. It is still regulated and the park supervisors expect all regulations to be adhered to! We may fly anytime as long as there are no problems. So if you are forced to leave your kite in the trees over night, be sure to notify the person living in the half way house for the winter. Better yet don't leave yourkite in the trees. If you should find the gate open, you may drive up to the half way house and drop off your gliders. BUT, be sure to drive your car out immediately!!! Also, do not park your car near the gate at the bottom as it does not leave room for emergency vehicles to pass.

Mark "Mongo" Droy and Jim "Grim" Finkowski dropped in for a visit at the end of October. Jim was here for a weekend while Mark stayed for almost three weeks. The highlight of

both of their visits (besides the drunken parties and bar hopping) was a trip to Greylock on October 24. Since both spend their time on flat surfaces now they really got off soaring Greylock. In fact, it was Mongos first soaring flight at Greylock and he had to leave the area to get it. While conditions were marginal and Mongos wing loading was as big as he is, they both stayed up over 1/2 hour. In fact Grim was first off(as always) and last to land. Not bad for a flat lander!

An old M.H.G.A. member is back in the area from a three year soljourn to Laid Back Land. Bob Perwak took off just after buying a yellow Spyder. While he has sold the Spyder, we will undoubtably see him in the air soon. Maybe he will even re-up with the club.

Another old member is back too. Jim Cobb has been spending some time down south. He did well in some Central and South America meets and you will see a lot of him in his Sensor high above the local sites.

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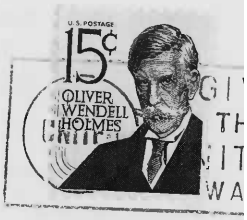

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