

SEARCH And RESCUE DOGS TECHNICAL NOTE

SOME OBSERVATIONS ON WEATHER CONDITIONS AND AIRSCENTING PROBLEMS

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On June 10-13 the Virginia Search and Rescue Dog Association was involved in a search for a 61-year-old patient who wandered away from a State geriatric hospital near Roanoke, VA.

The weather conditions, terrain, and vegetation created difficult circumstances and situations that caused unusual airscenting problems and are worthy of some speculation and analysis.

No accurate weather records exist for the immediate area during the time of the search except for general observations of the eight dog handlers and support personnel involved. The author has been trained in micro-meteorology as it applies to forest fire behavior in mountainous terrain and has studied airscenting behavior of dogs for about four and a half years.* The hypotheses and conclusions are my own: they may or may not be correct, but the assumptions seem to be borne out by the facts recorded on the search and, it is hoped, will be of help to others in similar situations.

The successful outcome gives us the advantage of knowing the victim's location was on a steep south-facing hillside. Though it was wooded, victim and surroundings were exposed to sunlight for most of the day. The slope, calculated at $22\frac{1}{2}^{\circ}$ (50%) at latitude $37\frac{1}{2}^{\circ}$ N, approximates 75% of the insolation received on flat ground at the Equator (see Figure 1), or the same as on the level in Guatemala at 15° N latitude.

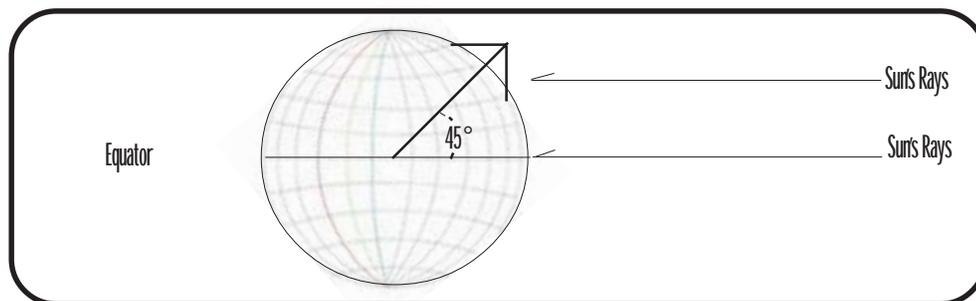


Fig. 1. At noon on the summer solstice, the sun's rays are at right angles to level ground at the Equator and to a 45° south-facing slope at 45° North latitude.

The temperature—estimated from weather reports at about 80° (in the shade) on 6/11 and 6/12—would be much higher in the sun on the south-facing slope.

Victim was wearing white. This helped her survive but also reflected back the heat, causing thermal air currents to rise up from her body.

It is assumed the victim fell sometime after dark on Friday 6/9 (est. 2200 hrs, or 10:00 pm) and remained in the same position.

On a major mountain mass, the typical nocturnal wind pattern is down-slope and down-canyon. Airscent, emanating on Friday night/Saturday morning would be to the south, into the hospital area.

* See Syrotuck. *Scent and the Scenting Dog*. -1-

During the day, airscent would be immediately borne aloft, influenced by white surface, south slope, and the diurnal upslope drafts. Any scent cone developed during the night would soon be burnt off by the south-slope exposure. Thus there was little or no pooling of scent around the victim during the day. Most airscent would tend to be found upslope.



Map 1. Upslope convection currents during day (6/10) and downslope drainage the following night result in pooling of scent in hollow. Several weak alerts in the vicinity of cabin on 6/11.



Map 2. On 6/12, one dog apparently alerted on the scent pool and traveled at least 500 ft.

A very slight westerly was noted sporadically on 6/11 and 6/12 and it is assumed to have been present on 6/10; much of the time, cigarette smoke was rising vertically but occasionally would drift W, N or S, with a little more orientation toward the E.

Any airscent moving to the east (or west) during the day would, at nightfall be carried down the slopes and especially down the deeper ravines which dissected North Mountain. To the east, low hollows between the mountain and the foothills to the south acted as a natural trap to the down-flowing air. These hollows also, being shaded by the hills to south, maintained cooler temperatures and retained the scent longer. The hollows would also, in the morning, tend to receive any airscent in the ravines pushed east by the prevailing westerly.

In summary, on 6/11 and 6/12, there was very little airscent on the ground near the victim. Much of it was rising up, being dissipated by erratic winds, coming to ground in different locations—mostly well up the mountain above the statistically probable search areas which were receiving attention. The low hollows to the east and the shaded ravines, on the other hand, retained airscent brought in the night before. Maps 1 and 2 show alerts by the dogs on 6/11 and the morning of 6/12.

On the afternoon of 6/12, a major weather change occurred. A heavy thunderstorm passed over the area with strong down-drafts radiating out from the storm cell and a cool air mass moved in from NW with strong breezes and more rain during the night.

During and after the storm three dogs—two working adjacent sectors—gave strong alerts as shown in Map 3, but were unable to follow them out.



Map 3. On 6/12, a storm cell passed over the victim's location, pushing strong winds outward. Three dogs alerted during the storm from two widely separated locations.

On the morning of 6/13, three dogs followed up on the two adjacent alerts of the night before. There was a steady west wind at 0600 am. The first dog gave a strong alert and started into the wind and uphill but was intercepted by a skunk. After some delay a second dog was started in upwind of the skunk incident. He gave a positive alert and moved NW uphill at a sustained rapid rate. After about one-eighth mile, he descended into a very deep ravine and obviously lost the scent. With the strong (5-7 mph) breeze it was obvious the airscent was flowing aloft from across the canyon without dropping into the ravine (Map 4).



Map 4. Early on 6/13, two dogs alerted with one making a sustained drive until losing scent in a deep ravine. Dogs were then deployed west of the ravine, resulting in the find.

The three dogs regrouped on the west side of the ravine about 1000. By this time, the strong westerly was slackening and the south slope was heating up. Spread out 500 feet apart, the trio moved toward the west. At 1039, the lower dog on the hill gave a weak alert and, following it, the handler spotted the victim. The second dog up the hill was also alerting but did not seem able to sustain a run to the victim as we have come to expect.

Again, it appeared that the location of the victim and weather were not permitting development of a scent cone on the ground. The air scent, being initially borne aloft, was picked up as it later descended at a considerable distance from the victim by all of the dogs at one time or another. [This phenomenon is called a "looping scent plume" and is described in a later paper, Technical Note 2. hg]

Fortunately, all handlers informed base camp by radio of the locations of all their alerts and noted them on their maps. The developing pattern over the two and a half days eventually led to the victim.

Our experience had generally been one of a single dog alerting and following through to the victim. All five dogs failed to do this on more than five occasions. We believe a careful study of weather conditions, terrain, and the careful noting of each alert are valuable SAR dog techniques. In this case, following up on previous alerts certainly paid off. After 84 hours the victim was found alive and survived the ordeal.
