Smile, You Are On Candid Camera!

By Dr. James C. Kroll, Phd

I have been blessed to be part of a growing national movement, private deer management, for almost 40 years. It is difficult to contemplate a world in which most of the commonly known information about whitetails and the extensive lexicon of terms and concepts were unknown. But, that is how is was when I began my career. Thanks to my long-term involvement with North American WHITETAIL Magazine, a young deer scientist was given the unprecedented opportunity to share with thousands of folks, hungry for knowledge the benefits of our research. This series of columns has been a remarkable "walk down memory lane" for me, bringing to mind events and discoveries long since faded into that hazy world we call memory. In this installment, I will discuss how we came about discovering some new technologies and their applications to finding answers to some of our most difficult questions.

It was around 1974 or 1975, and I was working with a colleague on recreational use of forested lands in eastern Texas. Dr. Mike Legg has remained a trusted friend and colleague since that time, and I view him as a real pioneer in outdoor recreational research. The problem involved measuring how much use folks were giving to various parts of the forest. The purpose was to find ways to manage our forests to attract more users. The US Forest Service found a device that would do just that. It was a simple plastic box, in which there were electronics that produced an infrared beam. That beam was focused, using a Fresnel lens on a simple automobile tail light reflector, positioned on the other side of the hiking trail. The beam bounced off the reflector back to a receiver lens. When the beam was broken, a counter would be triggered. The counts would serve as an indicator of use.

About two years later, I found a place on North Boggy Slough Hunting and Fishing Club, where something was eating the dirt exposed along a cut back of a creek. The tracks were tale-tell, suggesting most of the use was deer! North Boggy is part of a 25,000 acre forestry-wildlife research area, operated by what was then the Temple-Eastex Lumber Company. Mr. Arthur Temple, president of the company, was not only the largest landowner in Texas, but an avid sportsman. Through his wildlife department director, Gene Samford, he had given me free-reign to design a deer management program for North Boggy, the purpose of which was to produce trophy bucks. Considering the fact deer management was a very new concept at that time, plus my being a young deer biologist, this was a significant step.

This seemed like a great application for this new technology; however, although we did record the number of visits over time to the natural mineral station, we had no idea if it was deer or some other animal. That is when we came up with the idea of developing a trigger to obtain a photograph. As luck would have it, I was teaching nature photography at the time and ran across an advertisement for a remote trigger for Nikon cameras.

The device was simple: two cigarette-sized plastic boxes, one sending out an infrared beam and the other serving as a receiving unit. When the beam was broken, the receiver closed a circuit that attached to a Nikon camera with a motor drive and flash. The camera I was using at the time cost over $600, which in the early 70s was a serious investment! The flash unit would carry a charge for a short time, limiting the amount of time between a flash activation and the time to re-arm the flash. Battery life was very short. To make things worse, we were putting a very expensive, non-water proof camera out in the woods. We designed a cover for the camera, but in most cases I had to retrieve the camera if a rain was imminent.

Using this device, we did indeed obtain photographs of deer using the natural mineral lick. We discovered there were significant sex-related differences in time of use. Bucks tended to use the minerals more in late summer, while does used them more during the time when they were nursing fawns. Both observations were totally logical, since bucks are mineralizing their antlers at this time, and does use a tremendous amount of sodium, calcium and phosphorus in producing as much as 72 ounces of milk per day. [As an aside, this research led to the development of the first mineral ever designed for deer.]

I am not sure what happened to the California manufacturer of the camera trigger, but it is a shame they never benefited from the current boom in infrared-triggered cameras. That work completed, we went on to other studies. Later, a student in Kansas, Grant Woods, presented a paper at the Southeast Deer Study Group on buck behavior at rubs and scrapes, using a newly developed active infrared system. He was working with a company named Goodson & Associates in Kansas. To my knowledge, they were the first to really develop a scientifically functional system for wildlife studies. We competed heavily to get Grant to do doctoral work here at Stephen F. Austin State University, given my long-term interest in the cameras, but lost out to another university. Since, then Grant (now Dr. Woods) has contributed a great deal to our knowledge about deer.

By the mid-1980s we once again were working with the cameras. We developed a relationship with one of the first companies to develop a passive system. The difference between an active and a passive infrared-triggered camera system is, the active systems must use a sending and receiving unit, while a passive system uses an infrared sensor which requires only one unit. Unlike the active systems, a passive system "senses" the change in heat caused by a moving animal's body, which triggers the camera. Both have their pluses and minuses, but the passive systems are more simple to operate. Our initial work was to use the passive systems to monitor habitat use. You could place these cameras within habitats, with the strategy of catching a deer as it passed by the camera. My idea was we could use these data to replace telemetry locations, which only recently have become reasonably accurate. We ran into problems with this experimental design, since it required many cameras, making it cost-prohibitive. Then along came Mr. Temple again.

In 1987, the deer herd of eastern Texas collapsed. There is not enough space to fully explain why, but suffice it to say the main cause was poor management. The Pineywoods of east Texas was one of the last bastions of resistance to shooting does. Following an

explosion of leasing in the mid- to late-1970s, deer herds multiplied ten fold. An April freeze that killed all new vegetation and appearance of disease caused the crash. But, of course the hunting public would not accept lack of herd control as the cause. The logical blame was placed on timber companies, since clear-cutting also began about that time. It had to be the way forests were managed. Mr. Temple and the other managers of the company wanted to know if that was true. So, in 1991 they awarded a significant grant to the Institute to conduct an objective study on the cause(s) of this disaster.

One aspect of this work would be an accurate assessment of deer populations. Anyone who ever has anything to do with deer census knows full well none of the methods commonly used are accurate. Estimating deer numbers and densities probably has been the cause of more lack of credibility for state agencies than almost any other activity. Working with my colleague, Dr. Harry Jacobson, Ben Koerth and I launched a major study in Mississippi to determine if infrared-triggered cameras could be used for this purpose. Ben had joined me as my research partner in 1991, as part of the Temple project. Graduate student, Randy Browning and Ben did the majority of the field work on this project. We later published three scientific articles directly stemming from this work. What we had discovered was, properly used, these cameras could give us an accurate assessment of deer numbers. In our study, we were able to photograph 95% of all deer on the study area in only 14 days! Just as important, we learned you could obtain a portfolio of the vast majority of your bucks, which could be used for many purposes. Among these were: 1) assessing age structure; 2) measuring success of your management program; 3) developing a "hit" list for bucks you want to remove from the herd; and, 4) identifying bucks you want to protect for breeding.

This work opened up a host of new projects, all of which benefited private landowners and deer managers through our ***Building Your Own Deer Factory*** series. We even used the cameras in a study testing attractiveness of various scents and chemicals to deer. In my early writings for NAWT I discussed my strange practice of urinating in buck scrapes to influence deer movements for harvest. A great deal of our readers simply wrote my recommendations off to those of some "kooky" outdoor writer, since "everyone" knew human urine spooked deer. Yet, when we placed the cameras overlooking mock scrapes treated with human urine, we got just as many visits by mature bucks as with commercial scent preparations. We even tested "new car" smell, achieving the same results. It seems bucks come and investigate a variety of odors in the forest. The argument was settled by the cameras.

In 1998, I began work on a device that would give you video images of our deer. Again, we returned to a simple triggering device connected to a video camera. We could set the camera for day or night, but not both. This device evolved into a system housed in one case that could sense the amount of light available and switch a filter to allow day or night videography. Using this instrument, Ben and I obtained some exciting results. For example, we had re-located a young south Texas buck to our east Texas research area. Still images from traditional cameras always showed the buck to be alone at a bait pile (used to attract deer to the cameras). We concluded the buck was not being accepted by the native buck social groups. To our surprise, however, video obtained by our new

camera system clearly showed this buck was fighting off the resident bucks. It turned out from subsequent video, he was not being "picked on," he was the dominant buck!

Since our first work with infrared triggers and cameras, a host of commercial and scientific concerns have contributed as well to this technology. It is pleasing to know we had an impact in our own way. Today, there are more than 100 models on the market, and infrared-triggered cameras are commonly used, both by scientists and private managers. In my career, I have gone from spending hours in the field, notebook in hand to being able to monitor movements using radio-collars, and then the marvelous addition of actual images of deer behavior. In our next installment, I will discuss how we are taking technology to a whole new level; one that is answering some of the last, and most difficult questions of my career.