



CAMOUFLAGE

THE EVOLUTION OF BECOMING INVISIBLE

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Camouflage is derived from the French word “camoufler” meaning “to blind or veil.” It is a method of crypsis—avoidance of observation. It permits an object to remain indiscernible from the surrounding environment through deception. Its objective is to disguise an object in order to conceal it. In the 1800s an American artist, Abbott Thayer, noted that in animals, coloring generally progresses from dark on the upper torso to lighter colors on the underside or belly. This graduation of dark to light made it harder to see the animal as one thing. Its outline or form was harder to detect in its surrounding environment. This could serve to help the animal survive either as predator (the tiger’s stripes or a bobcat’s dots) or as prey. Animals (humans included) recognize shapes, outlines, and contrasts in the environment. A deer or elk readily recognizes the human shape (outline) against an unlike background. We are trained as hunters to see irregular patterns in nature. As prey, deer are trained to recognize these same patterns. Attention is drawn to objects with definitive lines and angles. This is out of place with what is naturally found in the wild.

The first use of camouflage in modern times occurred in 1915 during World War I. The French created a new unit called the camouflage division. Before this, in 1857, the British had dyed their white, highly visible uniforms tan, called khaki (Urdu word for dust), due to overwhelming casualties in India. After World War I, uniforms in addition to military hardware progressed from drab, bland colors to what we now will recognize as modern camouflage. The primary principal, one which is maintained today, was to blend in with the environment.

Hunters recognized early that game animals were fearful of the human silhouette. Early settlers adopted Indian tactics, at times covering themselves in deer skins or using long tassels to break up the human outline. In the early- to mid-1900s, patterns of black lines were used with red or green to form a plaid that served to breakup the human silhouette and blend in the background.

Modern day hunting camouflage started with Jim Crumley, an avid bowhunter of deer and turkey. He was the first to design “hunter-specific camo,” starting with splotches of brown dye on gray work clothes. Later he used a magic marker to draw a tree-bark pattern on his clothes. His Treebark® pattern is still used today. In the early- to mid-1980s, Toxey Haas used elements of dirt, leaves and limbs along with their natural colors to enable the hunter to “blend in” to the surroundings. Mossy Oak® was born, whose pattern’s 3-D effect made it difficult for animals to see or recognize the human silhouette up close. Later Haas’ team realized that strategically placed shadows would serve to “break up” the surface of the pattern making it more difficult for the eye to focus on. Similarly in 1986, Realtree® camo was born when Bill Jordan, using colored pencils, sketched the bark of a giant oak tree. He used a layering of the images of the twigs and leaves over a vertical bark background to create a three-dimensional image that would match a variety of terrain.

The new kid on the block is “digital camo.” This is adapted from the military camouflage named MARPAT (short for marine pattern). The pattern is formed by multiple small rectangular pixels.

FALL



CAMMO

Darrell Brist
Typical Whitetail – 173-1/8
Lake Co., Montana – 1971



Mark J. Bowersox
Alaska-Yukon Moose – 212-1/8
Alaska Range – 1989



J. Michael Goodart
Bighorn Sheep – 176-5/8
Costilla Co., Colorado – 2009



Theoretically by mimicking dappled textures and rough boundaries found in the natural setting, the human outline blends into the surroundings. These miniature splotches of color used by the Germans in World War II are similar to the current German military's flectarn camouflage. The purpose of the digitalized pattern is to match the visual texture of typical backgrounds. The textured appearance and lack of hard edges theoretically makes it more effective than traditional patterns. Optifade® camo by Sitka gear utilizes this concept.

In truth, any camo pattern that creates a combination of blurred background and detailed foreground that is hard to focus on and discern an outline tricks the eye, be it human or ungulate. It is this three-dimensional factor that is the cornerstone to effective camo patterns. But with ungulates such as deer, is this all that's needed in camo? As it turns out it's not. To understand the next step in the camouflage saga, we have to understand how a deer views the world. A deer's eye is different than a human's. The evolutionary development has made the deer a formidable challenge to the hunter.

Ungulates evolved to see better in dim light than humans. The retina (light-sensitive layer in the back of the eye) is made up of rods and cones. Cones are sensitive to the daytime color vision. Humans have more cones for detailed vision. The other structures, rods, are responsible for vision in dim light. Rods are approximately a thousand times more sensitive than cones to light. In ungulates, rods make up 90 percent of the photoreceptors in the retina. Also, the evolution of the ungulate eye has resulted in its ability to see at a wide angle but not as sharp in detail as humans. Where humans see about 180 degrees, deer

can see 280 to 320 degrees. It's like looking forward and also having the ability to see something over your back shoulder. Deer vision is about 20/40, meaning a deer can see at 20 feet away what a normal human can see when standing 40 feet away, but their pupils can open wider to admit more light, and they can gather about nine times more light than humans. Ungulates are also colorblind. Where humans have trichromatic (three-color), vision, deer have dichromatic (two-color) vision. It's the cones in the retina that allow animals to perceive color. While deer vision is based predominately on rods (light sensitive), the retina containing 10 percent cones still permits them to see colors. Deer have only two different cone types—short wavelength and long wavelength sensitive cones. They have difficulty seeing green, yellow, brown, orange, and red. These colors would be perceived as tan/yellow and blend in with a background of earth-tone colors.

Another unique eyesight trait of ungulates is the ability to see the blue-violet and near-ultraviolet spectrum. The human lens filters out ultraviolet light. Deer perceive ultraviolet light-emitting clothing as a "glow." This is important because some of the dyes used in clothing and our laundry detergent enhance ultraviolet light. UV brighteners used on any camo garment will cause it to appear as a blue glow to ungulates especially at low light conditions. As Jay Neitz Ph.D. (vision scientist) says, "a sportsman wearing garments that strongly reflect short-wavelength light would stand out against these backgrounds like a ripe red tomato on a green vine". The take-home message is that you can buy the best camo, but you need to wash it in UV-inhibitor detergent and/or use UV inhibitor spray or you may have a "UV glow" in the woods.

Camouflage is and will remain a useful adjunct to our hunting armamentarium. It's only one part of our attempt to be invisible. In reality, it's a small part. An ungulate's greatest defense is its sense of smell. Deer are 10,000 times more sensitive to odor than humans. They are able to recognize six different odors at the same time. It's much easier to fool a deer's eyes than its nose. This discussion will be continued in the next issue. ■