A BREED APART:
Special Considerations for Performance Horses
Before, During and After Transit

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As an historian with an interest in horse transport, I interpret my role as that of a reviewer of current practices in horse transport. I don't claim to know the answers, but I can confidently point to those who do. Many of them are in the AATA.

I'd like to start with three comments arising from the 1999 Middleburg, Virginia and 2003 Hartpury, UK international conferences on horse transport. Then I'll touch on the issues of fitness to travel, noise, nutrition, scheduling, clothing, loading, respiratory distress, care on arrival, ventilation, heat, stall size, and driver training.

At the Middleburg and Hartpury conferences, researchers seemed to assume that horses balance on their hindquarters "better" when traveled facing away from the direction of travel. But, accommodation to face away from the direction of travel was designed to allow the horse to balance as it normally does, off its forequarters. If there is braking, the horse lowers its head and leans away automatically from the direction of travel. Under ordinary deceleration, it can do this with minimal engagement of or no weight displacement toward its hindquarters (Roberts 1990). Of course, if a collision or an emergency stop lifted cargo from the deck, it would continue in the direction of travel to strike the front of the cargo area. In this instance, the horse's well-fleshed rump would absorb the impact better than the fragile skull.

About face posture relieves the hindquarters of the unnatural weight bearing it must maintain when the horse faces the direction of travel. In that instance, the horse typically travels head up, leaning to one side, and shifting its weight -- perhaps up to 200 pounds -- toward its hindquarters. Prof. Don Horney of Guelph suggested that having to maintain this posture in standard transport contributes to sacroiliac trauma in the horse (Pers. comm. 1980). As Dr Gianluigi Giovagnoli of the Italian Equestrian Sport Federation documented, thirty minutes of road transport causes "acute emotional stress" when horses have to constantly guard their balance (Giovagnoli 2002).

Measurement of heart rate variability (HRV) is more revealing. HRV records the variable milliseconds between successive beats. This variability is affected by the interplay between the sympathetic and parasympathetic nervous system (Siegel 1999), a more accurate approach than recording heart rate alone when studying behavioral reactions. Using electrocardiograms to record HRV in five 2 y.o. horses, Ohmura's study involved a 24 hour road journey with four hour ferry transport. The record indicated that the horses were stressed throughout the event, even when heart rates alone approached those of stable rest. The horses' immune system was suppressed for the journey's duration (Ohmura 2003). The method used by Ohmura and his colleagues may be used to monitor stress without the need for collecting blood and waiting for the laboratory report (Anon. 2003).

Two air transit studies indicated that horses rested a hindquarter, dozed, and had, during flight, heart rates approaching stable rest throughout the flight. Disturbance of balance in flight was minimal (Stewart 2003).

There was a call at Hartpury to look for transport designs which encourage a horse to lower its head. The late David J. Holmes of New Zealand, horseman, automotive engineer, fighter pilot, heavy goods vehicle driver instructor, pioneered rear face transport in the 1960s. He did so not only for automotive, horse, and human safety reasons, but also for the health of the horse. Long before the Australian studies, he knew that if a horse had freedom to clear its airways during transport, shipping fever could be reduced. His design and hitch rope practice does this (Holmes, 1972; Cregier, 1981). Some otherwise helpful experiments have negated some of the good effects of about face transport. These experiments have overlooked the best practices in loading, interior environment, restraint, and head lowering.

Not all of the necessary detail is offered in studies showing contradictory results about heart rate, orientation, and type of transport vehicle. The range allowed a horse's head and neck as its natural balancers, lighting sources, and whether or not the horse is protected from action behind itself are seldom detailed. Although a horse grazes for hours, swinging from one side of its forequarters to the other in its tireless thoracic sling, one researcher, seeing the same posture in rear face transport, assumed that it would be tiring.

Observations in one study and by clients of ATA member O'Brien Animal Transportation Services, indicated that when traveled rear face, horses arrived fresher (Slade 1987; von Wagener 1996; O'Brien 2002). Their race times were better by seconds. Wentworth Tellington's five-horse rig covered 8000 miles

in one summer month including Labor Day traffic from California to New England and return. The same horses traveled 24 hours non-stop, except for competitions and exhibitions. Following one 1000-mile non-stop trip within twenty-four hours, each horse passed veterinary inspection within 30 minutes of arrival and went on to compete successfully -- including a "best condition" award -- in a three-day 100-mile ride. "We could not have done this...with a lesser outfit," Tellington writes. "And", he emphasizes, " the primary thing was the horses facing backward" (Tellington 1978).

Also, rear face transport allows male horses to stretch and urinate at will during transit.

Second, the question was also raised as to the degree of correspondence between surface and air travel. The similarity between air and ground travel begins and ends on the ground. Once the plane leaves the ground, the turning, acceleration, and deceleration forces of the ground are absent.

Third. Some transporters advertise an interior which is finished in highly reflective, white or light cream colors. The color is well advised, but it should be a dull finish to mute reflections.

Noise is still a largely ignored factor in transport. We know unwanted sound suppresses the immune system. It adds to arriving tired and unrested. Performance horse veterinarian Daniel Marks notes that to be truly effective, rest stops must be in quiet areas with all doors and windows open (Marks 1993; Richardson 2004). All rattling chains, fasteners, ramps, doors, hooks, pins, and ties should be muffled. Horses' skin, especially the shoulder area, is also affected by sound unheard by humans (Fraser 1992 and Roberts n.d.). The prepared groom packs cotton wool in panty hose or soft 2" gauze ready to place into horses' ears.

Historically, grooms have used special sounds to quiet horses. One such sounds like a "bubbling teakettle". Music's effect on animals has been recorded by Shakespeare, Oliver Goldsmith and John Wesley -- the latter two in their visits to the Tower of London menagerie. One shipper uses classical opera to keep his animal consignment content. Non-synthesized, traditional music has a 3000 year record of healing and calming animals and humans, from newborns to surgical patients, to survivors of terrorist attacks (Siegel-Itzkovich 2003; Bubna-Littitz 2004). (In the film, The Weeping Camel, music entices a camel to accept its calf).

Cooling equipment failure during road transport is a concern. Perhaps shade cloth rated to block out 80% of the sun's heat during long, powerless, halts can be a backup. It was successfully employed at an Australian quarantine station to cool an overheated horse on its arrival from the UK. Keeping in mind my

experiences in the Jordanian desert, strategic raising and lowering of the tent sides created a continuous breeze through the tent even at 120 humid degrees.

Fitness for transport Weeks before the horse is traveled, he will have been wormed. Blood work will check for any viral infection. A twice daily record of rectal temperatures will be kept. Thanks to the pivotal work of Dr Al Schaefer of the Lacombe, Alberta, agricultural research station, there is available a relatively inexpensive, hand held instrument to judge the fitness of an animal to travel. Using a non-invasive infrared thermography scanner, Dr Schaefer identified animals developing systemic infection two weeks in advance of travel and days before the rectal temperatures registered infection. This is not to replace clinical testing, but gives an advance notice of trouble (Schaefer 2001).

Fitness for travel includes training the horse to load into unnaturally confining vehicles, travel, and unload. The standard approaches require time, sometimes over weeks. If something goes wrong, more time is required. At some point in the horse's career it may feel threatened and overcome its training. J. Michael Plumb's horse, Markham, had to be destroyed in flight to the 1964 Tokyo Olympic Games after sedation, twitching and blindfolding failed to quiet him (O'Dea 1996).

Sedatives are a last resort and cannot be routinely administered. Their effect varies from horse to horse, and from time to time within the individual. The horse loses its capacity to regulate its heat loss and its capacity to balance. Drugs are restricted because of performance and, in some localities, legal requirements ([Santarelli] 2003). Future behavioral management for travel might include training the horse to freeze on cue and lower its head on cue. The Beery Method, originally used to teach a horse to freeze no matter the provocation, effective though it was, would be considered harsh today. Professional trainers have softer, though more time-consuming approaches and not necessarily as transferable as the Beery method among handlers.

Behavioral management might also consider the effectiveness of the stallion hold, just ahead of the withers, to make a horse freeze, a practice used in Australian wild horse chutes. Teaching a horse to lower its head on cue defuses its flight reaction, helping the horse to assess a situation. Trainer and abused-horse rehabilitator, Linda Tellington-Jones argues the lowered head allows a freer flow of oxygen to the horse's brain, necessary for it to "think out" a situation. While Parry (1980) found that lowering the head reduced mean arterial pressure, reduced flight reaction is still debatable (Warren-Smith 2005).

Visual separation from its stablemates is said to cause anxiety in some horses. A study by Katherine Houpt, Cornell, indicates that this is not necessarily true for pastured horses who can continue to hear horses on the other side of a blind (Houpt 2004). Mirrors have been used to reduce stereotypical behaviors, such as weaving, in stabled horses. It is possible that safety mirrors in view of a horse in transit might halt fretting by horses such as Niatross, which could not be traveled without a companion (Jacobs 1981).

Nutrition to build immunity and in preparation for transport followed by performance is still largely unexplored (Bayly 1999). Some may recall the English dressage competitor Jennie Loriston-Clarke. She had problems with her horse, Dutch Bid. His temperature rose as soon as he crossed the Channel. He would shiver and shake. But when Loriston-Clark gave him a vitamin boost and amino acids before a journey, there were no more problems (Bredin 1995).

Loriston-Clark's experience parallels that of Dr. Schaefer's team (Schaefer 2001). They reported that key nutrients -- electrolytes, amino acids and magnesium, given either just before or after transport, reduce tissue dehydration in cattle and pork. Electrolytes -- calcium, magnesium, sodium, potassium, chloride, etc. -- together with green feed prevent abnormalities such as fluid imbalance or muscle disorders. They are not thought necessary for a one day trip if the horse eats and drinks throughout. If a dehydrated horse is oversupplied with electrolytes, it can worsen problems.

Interfering with the uptake of nutrients and electrolytes is the practice of tubing with mineral oil before a trip. It is used to protect against the absorption of endotoxins, poisons harbored by certain bacteria. The protection lasts only for part of a day. So the bran mashes and oil laxatives will depend upon trip length and possibly traveling temperature.

Magnesium added to an animal's feed seems to reduce aggression in transport and make the animal less susceptible to transport stress. Certain types of "tying up" or rhabdomyolis have responded to increased fat and reduced carbohydrates fed three to six months in advance of a performance (Divers 2000; Rush 1999).

Dr Carolyn Stull tested the use of popular herbal extracts (ginseng, magnolia vine, arctic root, Asian devil's club) to boost immunity and reduce transport stress. Although the herbs had proven to be effective in man, the particular dosages used in Dr Stull's study did not appear to have any effect (Stull 2004).

Water loss through sweat and lowered intake during a trip is high. Even a cool weather trip of 2.5 hours has recorded weight loss of 40 pounds. After sixty hours, the weight loss is 5% of body weight or 55 pounds despite eating and drinking well throughout the trip (Geor 2001). One study discovered that horses more readily drink unfamiliar water if it is offered in familiar surroundings. They also prefer apple flavored over clover flavored water (Mars 1992).

Graining in transport is controversial. Some argue that there is no proof that it causes colic. Others withhold all grain six hours before a journey. The no-grainers argue that grain decreases gut motility and if things don't move, they ferment. But during transport, the energy that would have "kept things moving" is diverted to dealing with staying upright. (One theory is that recently foaled mares colic during transport due to large amounts of grain producing gas while they are also producing milk. The combination, especially if hay is reduced, results in hypocalcemia, reduced intestinal movement, and a twisted colon (Bayly 1999)).

Feed on a journey must be clean and dust free. Lucinda Green, flying to the 1984 Olympics, insisted that her horse be sequestered on the flight and fed dampened hay. She was laughed at. But Regal Realm was the only one that arrived without a runny nose. The problem of choke must be considered with any feed, especially dry hay. Hay held to the minimum before a trip and then fed during the journey is probably the best tranquilizer.

Feed used on the journey and at the performance venue must be introduced to the horse at least two weeks before the travel or performance event. If the type of feed that can be brought to the performance venue is restricted, feed may have to be imported from the destination country to the home stable.

Loading and unloading are, in the experience of many horsemen, where most delays and accidents occur. They are the most common cause of brain trauma which can result in seizures months or years later. Importer and competitive rider Kevin Crosby lost flight time when stallions he was loading decided to battle. In Halifax, he was kicked while unloading (Anon. 1988). A difficult loader, like racehorse Funny Cide, may have to be humored with an hour's grazing before he decides to load. Or, like the champion hurdler, Red Rum, a horse will load into anything provided his pet terrier leads. Superhorse Niatross walked up the ramp sideways rather than face the entry.

Loading is made simple for the horse and much safer for the groom with provisions like those on O'Brien's Animal Transportation Services. His six-horse trailer has an extra wide entry and the option of

platform reverse loading. Robin Mathews of Tasmania, noting that horses move easily from a narrow to a wider space, designed an impression of a widening entry for his clients.

Scheduling includes time to recover from the trip and treatment for respiratory distress well in advance of an event. Time is needed to recover from possible shipping fever, requiring at least seven days before a planned event. The drugs that might be used also have to be out of a horse's system before it enters an event so that it is not disqualified. Time is also required for some gentle exercise, and allowing adjustment to a high altitude.

Jet-lag is combated by adjusting feed, exercise, and lighting as close as possible to that of the destination country schedule weeks in advance (Murphy 2004). When successfully prepared, the horse's cardiovascular, neuromuscular and metabolic state will be synchronized with the destination's light-dark cycle. Even surface transport upsets the daily body rhythms of the horse (Ohmura 2003). At least two days' rest before a race is recommended for racehorses transported 500 miles (Friend 2001).

Exercise after long journeys has to be planned. Endurance horses transported thirty-four hours and exercised immediately after arrival suffered inflamed muscle one to four days after arrival. The endurance horses which were rested or only very gently exercised during the first week of arrival did not get stiff or "tied up" (Foss 1999). If "set fast" or rhabdomyolysis develops, the horse's return may have to be delayed a month or more. Apparently recovered horses have been shipped home only to arrive dead on arrival (Harris 1996).

Even for short trips, scheduling should assume a minimum two-hour breakdown or traffic delay. Water, scheduled medications, and feed must be planned to take in this contingency.

Clothing The well-dressed horse should avoid blinkers and blindfolds, sometimes recommended for loading. These were found to raise apprehension, especially during loading, even in horses accustomed to loading and travel (Parker 2004). It's noteworthy, though, that cattle when blindfolded become calmer. Blindfolding sedated zebra prolongs the sedative effect. Some shipping companies do not advise leg bandages. If not wrapped perfectly, the tendon can swell. If they slip, their drivers for safety reasons will not adjust them. Leg wraps can become displaced with trailer vibration and moving around. If it's warm, they become damp, sweaty, drenched with rain or urine. Soggy bandages are known to contribute to van fits. Van fits have been known to contribute to lawsuits.

In North America, you may occasionally have a tailless horse to ship. In the experience of one draft and carriage horse groom, docked horses tend to be sensitive about their hindquarters presenting a danger to grooms. The docked tail also deprives rescuers of a handle on removing a downed horse in reverse from a wreck or stall (Dyson 1966). Docked horses are cruelly defenseless against insects, rain, and chill and will require additional consideration in transport. These are some of the reasons why the British cavalry, unable to control or keep condition on their horses in the insect-ridden colonies, abolished docked horses from their remounts (Bär 1974).

Drivers, if unsympathetic or ignorant, can destroy in minutes all the careful work of months. Crispin Bennet of International Horse Transport in Australia advises that it is much better to hire a horseman and teach him to drive, be a mechanic, gain some veterinary skills, than to train a driver to be a horseman (Kilcarr 1999). A good driver has to drive for the bad drivers sharing the road. Teddy Anderson nearly flipped the van carrying Standardbred Bret Hannover because of driver action ahead (Jacobs 1981).

Driver and air crew must be impressed with the fact that a horse is a perishable product. If there is a mechanical breakdown or a flight delay, it must be treated as an emergency. As does the driver, the flight crew will have a care for acceleration, deceleration, and turning. In addition, the pilot will narrow the angle of lift off and descent.

Lighting kept on in the interior quiets horses when going through tunnels or at night, helping to diffuse following headlights. When the lights go off in flight, horses become restless and start to whinny.

Window placement is crucial to safety. Horses have lunged through the windows placed to their front in standard trailers. For rear face horses, low window placement encourages the horse to maintain its low head carriage. Other shippers prefer to have no windows available for the horses, believing that they travel quieter.

Ventilation in different types of vehicles with various live cargo placement is still under study. In ground transporters, air tends to come in the back or drop through the upper side vents to pick up bedding, dust, gases, bacteria and fuel fumes (Kettlewell 2001; Waran 2002). If horses are accustomed to the trailer, traveling with familiar companions, the trailer is well ventilated, rest stops of 45 minutes for watering and feeding every four hours or less, horses may be able to travel for 24 hours without being over stressed. The study which reached those conclusions measured air borne particulates, gases including carbon monoxide from day and night traffic, different types of vehicle suspension and its effect on trailer vibration,

and the challenge to the lungs. Neverthe- less, significantly less hay and water were consumed during transport, Serum cortisol elevations were high and red blood cells, haemoglobin, and packed cell volume were 30% above controls though the indications of dehydration were only 7% above controls (Smith 1996).

The effect of carbon monoxide and carbon dioxide on four Warmbloods transported in a standard trailer through a city and over a highway for up to an hour was studied. Although the toxic gases increased in the trailer, no significant increase in carboxyhaemoglobin concentration was measured in the horses. However, the venous pH (normal alkalinity/acidity is about 7.40) was significantly higher, returning to normal one hour after the trailer ride. Dehydration was indicated and venous pCO_2 (the pressure exerted by carbon dioxide gas together with other gases, such as oxygen, on the lungs or in fluid such as blood) significantly increased. The recommendation was to give a horse at least one hour to recover from a one hour trailer ride (van der Eerden 1999).

Respiratory distress The late David Holmes pointed out head-free, rear face transport allows a horse to keep its airways clear. There has been a cascade of confirmatory studies since, starting with Australians Rackyleft and Love in 1990. After 10-12 hours of road transport, the horse becomes overwhelmed with bacterial, fungal and ammonia assaults, requiring an additional 12 hours of rest to recover. Interestingly, transporter for the Magic Millions racehorse sales in Australia, Philip Hanna, noted that after ten hours of confinement, horses tend to act up (Cregier 1995).

Dr. Masa-aki Oikawa of the Japan Racing Association compared horses transported in clean and dirty environments for 37 and 49 hours. Those in standard and dirty transport with heads tied up, arrived with fever and respiratory distress. Interestingly, the horses transported rear face in the dirty environment, but unable to lower their heads, registered less weight loss and lower heart rates than their front face companions. However, Dr. Oikawa did not believe the differences to be statistically significant (Oikawa 2003).

In a second experiment, horses transported in a scrupulously clean environment, arrived with no fever. But they and the horses transported in the dirty environment arrived with endotoxin increases in the plasma. These concentrations are commonly associated with colic, laminitis, diarrhea, or tying up. As some of you may recall, endotoxins from transport stress are now medically shown to have caused the death of Phar Lap (Armstrong and Thompson 2003).

Of course, none of the above “best practices” of feeding, resting, sedation, training, or securing a registered groom apply if you are transporting a Hollywood horse. According to Redford’s film, The Horsewhisperer, you do not have to know which end of the horse grazes. Any fashion magazine editor can take a frenzied horse unresponsive to sedation, 55 non-stop hours from New York State to Montana. Your tag along bumper trailer does not need to be in particularly good repair. Hay storage on the trailer tongue is right in front of the exhaust and there is never any water problem.

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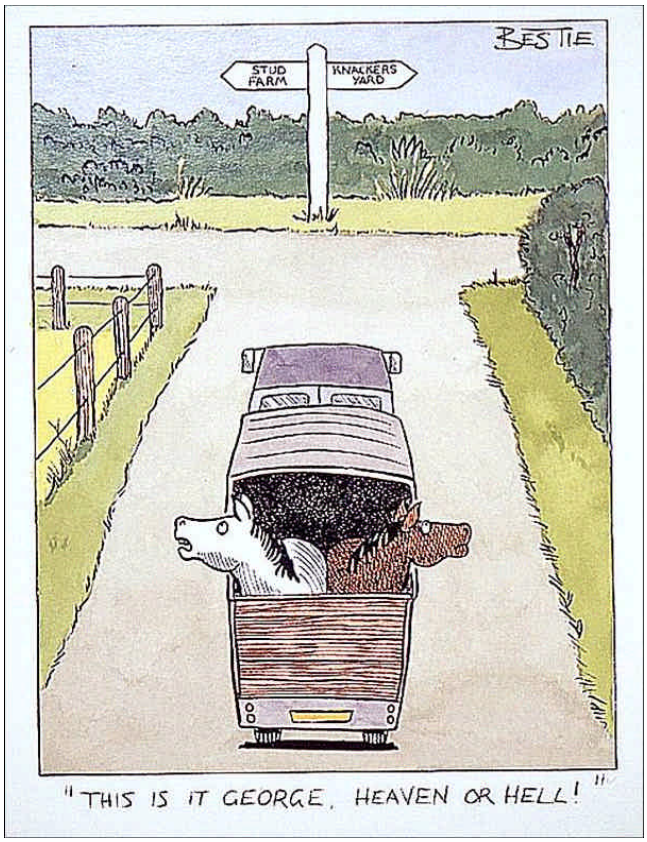

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