

1. Published in *"Guardians of the Horse: Past, Present and Future."* Ed: Rossdale, P.D., Greet, T.R.C., Harris, P.A., Green, R.E., and Hall, S.. British Equine Veterinary Association and Romney Publications, 1999, pp 175-182.

THE EAR, THE NOSE & THE LIE IN THE THROAT¹

W. Robert Cook²

HYPERION was foaled in 1930. Not that I was aware of this when I too was born later the same year. As a child, I had no real awareness of horses in general, let alone one particular horse. As an adolescent, I regarded horses with the same fascination that I might have had for a cobra. As a student, seeing practice in Newmarket³, during the Spring of 1951, I can remember being with Mr Fred Day as he motored at a snail's pace behind a small chestnut horse that was being led down Snailwell Road. He asked "*Do you know that horse?*" I had no idea. The next time I saw Hyperion, he had changed from chestnut to bronze. During my eight years at the Equine Research Station, I

¹ Chapter for the British Equine Veterinary Association's Millennium Celebration Book, "*Guardians of the Horse: Past, Present and Future.*" Ed: Rossdale, P.D., Greet, T.R.C., Harris, P.A., Green, R.E., and Hall, S.. British Equine Veterinary Association and Romney Publications, 1999, pp 175-182.

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³ My student case book for this period contains the following aside: "The record for the journey from London to Newmarket by road is held by H.H. Aga Khan who, early in the morning, before the war, did it in 59 minutes"

often took a walk down Snailwell Road and paid my respects to John Skeaping's sculpture in the crescent that Lord Derby created for it out of Hyperion's old paddock⁴. By this time, I already had Hyperion's larynx in a museum jar, a gift from William Miller, the previous Director. I was also beginning to appreciate what a most unusual larynx it was.... a 30 year old Thoroughbred larynx with no macroscopic evidence of recurrent laryngeal neuropathy.



Fig 1. Casting with heavy hobbles. This 1860 engraving in Mayhew's book carried the caption, "*The present method of casting a horse for operation.*" It was frowned upon by Mayhew.

If admission to the Royal Veterinary College, in 1948, had depended on the standards required today I might never have become a veterinary surgeon. Leaving school at 16, I worked for a year on a dairy farm and at a riding stables but, as a 17 year old, jumping straight into the second year of a five year course, I was still lamentably unprepared. The student translation of the College motto seemed far too apt;

⁴ Now it has been moved to grace the forecourt of the Jockey Club

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Venienti occurrere morbo ... 'When we come, death occurs'. Most of my class mates were ex-servicemen and, unlike today, there were only a handful of girls in a class of 60. From a rag bag of memories, I pull a random selection.

In those days of steam locomotives and fossil fuel, the nearby railroad stables were full of Clydesdales. I remember 'Jimmy' McCunn, our Professor of Anatomy, telling us in class that no draught horse should ever be worked on the road at a pace faster than a trot. He had hardly completed the sentence, when a great clattering of iron shod hooves was heard in the street below, as a Clydesdale with an empty coal cart struck up a cacophony on the granite cobbles as it cantered homewards. As Edward Mayhew remarked in 1860, *"the pace is always more willing when returning to captivity ..."*

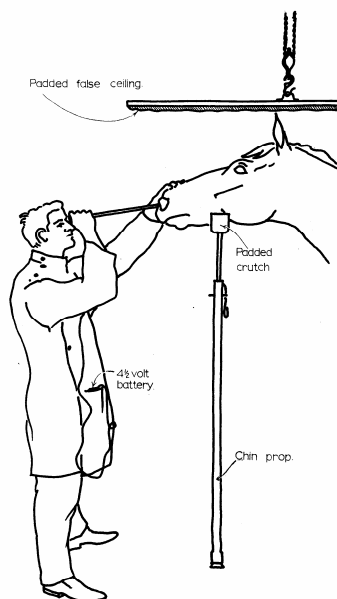


Fig 2. The perils and precautions of endoscopy in the early days. My

equine model for this diagram was PERSIAN WAR, three times winner of the Champion Hurdle.

Thinking of 'nosebag-time', Professor 'Fred' Hobday had instituted, some 20 years before, the 'Nosebag Fund' to raise money for rebuilding the old college. Pennies were collected in miniature paper nosebags⁵. They carried a drawing of a retired cavalry horse by the name of Brenda and the legend "Don't say neigh". Mc Cunn used to tell the story of a predecessor in his chair, Professor Shave, who was on the faculty during the dying fall of the old building, when its walls were shored up with wooden buttresses. Shave was in the habit of lecturing on the move and would pace up and down in front of the class like a caged tiger. Suddenly, a large chunk of plaster fell from the ceiling, narrowly missing one of the students, who exclaimed "Jesus Christ!" The professor paused in his perambulation and addressed the student gravely, *"It is no good calling on that gentleman, Mr Smith, ... he was a carpenter not a plasterer"*.

Physiology was under the command of the great (and terrifying) Professor Amoroso. By the time I entered College, this distinguished member of faculty and Fellow of the Royal Society, who spoke the King's English so beautifully, had won his spurs long ago. But when he first joined the faculty,

⁵ An 1873 entry in *Nature* records the ingenuity of a pigeon that had seemingly learned to fly at the horse's head when the supply of grain had been exhausted from nose-bag droppings. The frightened horse would raise its head suddenly and, in so doing, would sprinkle a fresh supply on the ground

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students gave him a much harder time than we would have dared. Young, inexperienced lecturers, as I was reminded years later, were always considered fair game by students and 'Amo' was no exception. Professor Tony King, who was a demonstrator in anatomy in my time, has given me a couple of stories about Amo's early days. I cannot do better than pass them on in his own words.

"It was related that, on one occasion, a student took a cannon ball into the lecture room and seated himself on the back row at the top of one of those long flights of wooden steps. Half way through the lecture he pushed the ball over the top step, and it descended in a series of thunderous crashes. Amo stopped speaking. When the ball finished moving he said, 'Would the gentleman who has just dropped his head kindly come down here and collect it.'"

"When I was in Amo's class, he used to stamp out minor riots by suddenly pointing in the general direction of the disturbance and shouting 'You there, come and see me afterwards'. Since his finger pointed in one direction and his eyes in two other totally different directions, half the class would be standing before him at the end of the lecture."

The highlight of College days, of course, was the final year at Streatley-on-Thames. Lectures were given in an old Nissen hut in the garden of Streatley House, the Georgian town house to which the Field Station had moved after the College had been evacuated to Sonning during the war. Food rationing

was beginning to end. Professor 'Cliff' Formston, Geoff Arthur, Jim Roberts, Leslie Vaughan, and Teddy Yeats, performed *plein-air* surgery on their knees, in a small paddock on the side of the hill. We learned how to cast horses with heavy hobbles. The method we used can be accurately illustrated by an engraving from Edward Mayhew's excellent book⁶. The only thing that had changed in a 100 years was the dress code (Fig 1). We also witnessed the art of administering chloral hydrate by stomach tube and chloroform by mask. Students had the privilege of watching surgery but not participating. A large and rather cumbersome X-ray machine was housed in the stables at Streatley House, though I do not recall ever seeing it being used. I do remember that we did have one lecture on 'X-rays.' Systemic penicillin was not in use but, in the course on Materia Medica, we learned how to dispense medicines and fold powders into neat little envelopes.

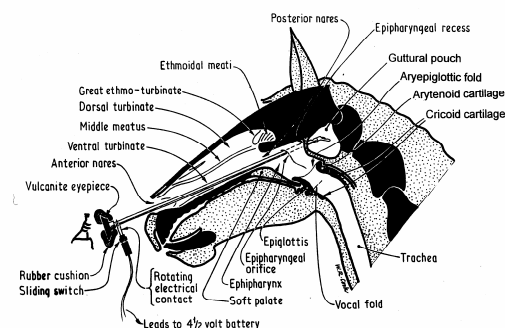


Fig 3. The trick of diverticulostomy

In my final year, I was fortunate to see practice with Colonel 'Mouse' Townsend. Jeffery Brain, who qualified the year before me, was his assistant.

⁶ Edward Mayhew MRCVS (1860): "The Illustrated Horse Doctor" W.H.Allen, London

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Townsend had retired from the Royal Army Veterinary Corps and bought a farm at Southrop, in the Cotswolds. I think he had intended to retire as a veterinary surgeon but his hunting and polo friends would not permit it and before long he had a impressive roster of clients and some difficulty in finding the time he needed to hunt three days a week. His 'Hobdaying' instruments were kept neatly in an old army ammunition box, cushioned and protected by the greasy felt lining. As his 'ollybolly' man, it was my job to lay them out for him on a nice clean towel, placed on top of a bale of straw. I don't remember that they were ever sterilized but I may have forgotten.

Qualified as an 'MRCVS' (there was no University degree to be had in those days) and licensed to learn at 21, I was trustingly employed by Messrs. Hale and Brown, in Chippenham, Wiltshire, the members of which firm had been kind to me as a student over several summers. This was a predominantly agricultural practice. It did not represent a departure from any grand plan on my part because, at the time, I had no thought of being anything other than a farm animal vet. The salary was ten pounds a week and I thought it princely. Derek Hale, the senior partner and a wise and wonderful mentor, did most of the horse work. He was a keen hunting man and much devoted to Robin, his grey cob. It was thanks to Mr. Hale (I never called him Derek) that I was initiated into the pleasures of riding across country. A few years previously, he had done a similar favour for another assistant, Richard Hartley, (later to become

President of BEVA) by introducing him to the gentle art of fly fishing.

In 1955, I had the temerity to propose myself as a partner to Jeffrey Brain who, by this time, was working single-handed in Townsend's old practice, 'Mouse' having died in the saddle during a game of polo. I thought Brain could do with some help, without stopping to question myself as to whether I was the right person to provide it! My first choice of digs was The Fox Inn at Great



Fig 4. "What's he up to now?" From left to right, John Hickman, Leslie Vaughan, Clifford Formston and Derek Tavernor at the RVC in 1961, watching 'young Cook'

Barrington, where my bedroom was lit by oil lamp and the only telephone was downstairs, in the room behind the bar! The custom in this practice, when examining a horse for soundness, was to ride the horse ourselves to test its wind. Not being an experienced horseman, I learned more about riding during the next three years than I ever did about unsoundness of wind! I also learned how to blister and fire a horse; practices which at the time were considered quite acceptable.

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In 1958, the nine year old School of Veterinary Medicine at Cambridge advertised an appointment for a Hospital Surgeon. Although having had no special training in surgery, I nevertheless thought I was an eligible candidate but the Appointments Committee thought otherwise. Professor Leslie Pugh, however, mentioned that a House Surgeon position was vacant and advised me that if I took this for a year, I might be in a better position to compete for a faculty appointment when one cropped up. It was good advice. Under the tutelage of John Hickman, Leslie Hall, Mike Littlewort, Rob Walker and many others, I benefited from a much-needed year of further education. My flat mate, the other House Surgeon at Cambridge, was Mike Rex, who went on to achieve academic distinction in Australia. It was his Labrador/Retriever that ate my first research project.

Being expected to carry out research, but having no idea what to research or how, I eventually recalled that the function of the horse's guttural pouch was unknown. Clutching at this research straw, I determined that this is what I would discover. I started by making a plaster cast of the guttural pouch from a fresh cadaver and laboriously pencilled in every landmark on its blood-stained surface. After several weeks, the cast was crowded with information, none of which was backed-up, as it should have been, with photographs and a paper record. I kept the cast on a bookshelf in the flat where, in our absence, it was eaten by Mike's dog. I never have discovered the function of the guttural pouch, though I have toyed with a

number of hypotheses over the years. Currently, my favorite hypothesis is that this diverticulum of the auditory tube in the horse and hyrax amplifies the voice for long distance communication. But the great tragedy of science is, as Thomas Huxley said, the slaying of a beautiful hypothesis by an ugly fact. How does this hypothesis survive the embarrassing presence of a guttural pouch in that almost silent animal, the tapir? Perhaps the tapir is only silent to our ears but not to those of other tapirs?

After Cambridge, I moved to a newly-established lectureship in the Department of Surgery at the recently opened Royal Veterinary College Field Station at Potters Bar. Professor Formston took me into his office and said, *"Well I don't know what you are going to teach, as the syllabus is already being covered by existing members of faculty. But I'll tell you what we'll do. I have been lecturing on the head, neck and chest. As your interest is the guttural pouch and my interest is the eye, I will keep the eye and you can take the rest"*. In this way, Formston set my career compass. I groped around to discover the medical specialty that most nearly corresponded to the current veterinary surgical work in this region and decided it was the ear, nose and throat specialty. Accordingly, I browsed through the medical literature in this field and did what I could to model my veterinary studies along ENT lines.

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Fig 5. BEVA crest designed by Frank Palmer Cook

In this I was helped by a fortuitous turn of events. Fred Day 'phoned to say that he was sending me a Thoroughbred colt of Bernard Van Cutsem's with a septic sinusitis and that a friend of Van Cutsem's, a Harley Street ENT surgeon, wished to be present when I operated. This, I recognized, was a kind way of telling me that they wanted the horse to get the benefit of medical expertise. I spent a feverish weekend in the necropsy room, knowing that the first question an ENT surgeon might ask me would be the exact position of the sinus ostia, a detail on which the veterinary surgery texts (there were very few in those days) maintained a majestic silence. On Monday, a scholarly but sympathetic man arrived, wearing pince-nez glasses. Thus I came to know Alfred Alexander: surgeon, musicologist, farmer, foxhunter, linguist, and author. Alfred became both mentor and friend. During many a weekend at his farm in Hampshire, I enjoyed a day's hunting, interlarded with frequent discussions (often in the saddle) about comparative

aspects of laryngology. Thanks to him, I was at Covent Garden for a performance of Lucia di Lammermoor on the night that Joan Sutherland took 14 curtain calls.

The equipment grant for the new Field Station had funded the purchase of a rhinolaryngoscope. When I joined the faculty, there it was in its clean wooden box, untouched by human hand. The trick was first to discover how to get this rigid metal endoscope, with glass optics, safely into a conscious horse's nasal cavity and then to recognize what it was I was looking at by the dim light of a distal bulb (Fig 2). Xylazine sedation would have been a boon and a blessing but, in those days (1960-65), there was no such thing as a tranquillizer. I bent several endoscopes (Formston was amazingly patient and forgiving) and bled a few noses but, finally, endoscopy became a routine part of my examination and opened up a field of research that, at the time, had been only scantily explored. Michael Simons, for example, referred a horse to me with an interesting vascular mass in the roof of its nasal cavity; my first sighting of a disease that Mike Littlewort and I were to later dub "Progressive Ethmoidal Haematoma".

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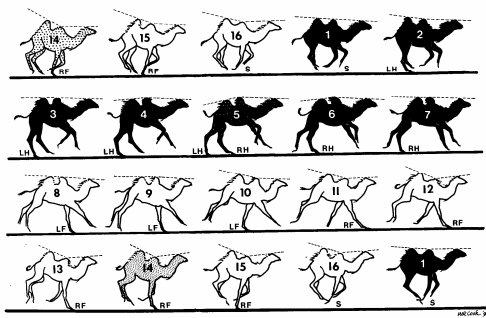


Fig 6. Respiratory/locomotor coupling in the camel. A series of diagrams I based on Eadweard Muybridge's classic work, to show how inspiration (solid camels) takes place when the hind legs are weight bearing and expiration (open camels) when the fore legs are weight bearing. For 'camel' read 'horse'; the respiratory sequence is identical.

The winner of the Epsom Derby in 1934 was WINDSOR LAD, owned by the Maharajah of Rajpipla, familiarly known as 'Mr. Pip'. Later the same year, the Maharaja found himself with a cash flow problem and sold the horse to Martin .H. Benson, owner of a well-known bookmaking firm with the motto 'Duggie Never Owes'. At stud in 1938, and heavily insured, Windsor Lad developed a mysterious and possibly malignant disease of the sinuses. Benson filed a claim with the insurance company to have the stallion destroyed on humane grounds, but the underwriters debated the necessity and a High Court action followed. Distinguished medical and veterinary pathologists were called as expert witnesses but a definitive diagnosis was never arrived at, and the debate as to whether this was or was not a cancer was left an open question. Twenty years later, thanks to Benita

Horder, the Librarian at the RCVS, who allowed Littlewort and I to examine the court transcript, we felt confident that it was possible to make a retrospective diagnosis of Progressive Ethmoidal Haematoma.

With the help of an angled bulb and some sleight-of-hand, one could even get the 'borescope' into the guttural pouch (Fig 3). As a result, I began to recognize the frequency of a problem that had not then been fully described or recognized as a disease entity. Now it seemed to be turning into an epidemic. To Formston's bemused incredulity, there was one week in which the majority of the loose boxes assigned to the surgery department were occupied by horses whose case record sheets carried the unfamiliar diagnosis, 'guttural pouch mycosis' (Fig 4).

Which brings me to another retrospective diagnosis, this time on HUMORIST; winner of the Epsom Derby in 1921, ridden by Steve Donoghue. A vivid description of this horse's death by exsanguination on a Sunday afternoon, soon after Ascot week in 1921, is provided by Sir Alfred Munnings, in his autobiography. At the time, the cause of death was attributed variously to pulmonary tuberculosis or a ruptured aorta but, in hindsight, a diagnosis of guttural pouch mycosis seems much more likely.

When the British Equine Veterinary Association (BEVA) was formed in 1961, I became its first Honorary Secretary and prevailed upon my father to submit a design for the BEVA crest. This is the one that was accepted and is still used today (Fig 5). An alternative

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logo was offered by a veterinary surgeon/artist by the name, I think, of Murphy. His delightful engraving of a horse was rejected on the grounds that it had something wrong with its left hind leg. But horsemen are notoriously difficult to please on such matters. I am reminded of John Singer Sargent's definition of a portrait as being "*a painting with something wrong about the mouth*".

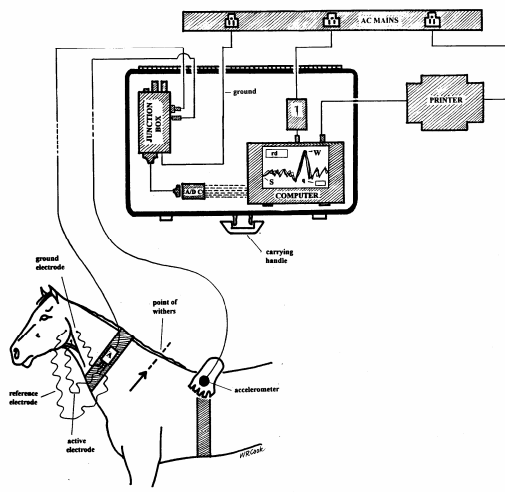


Fig 7. The circuit for the Mark III Electrolaryngeograph (ELG)

Prior to forming the association, there was a great throwing about of brains concerning the feasibility of such a project. Looking back it now seems incredible that one of the very real fears was that horse vets, being such fiercely territorial, suspicious, jealous and secretive individuals, would surely never be prepared to talk to each other, let alone share their knowledge! Needless to say, these fears were dispelled at the first meeting. It is one of the unsung achievements of BEVA that these barriers were removed overnight. Removal of the Berlin wall was not

more impressive! I cannot resist slipping in an item of trivia at this point. The first paper given at the first Congress was entitled "*Observations on the Equine Soft Palate*" and the author was the person that John Hickman always referred to as 'young Cook'.

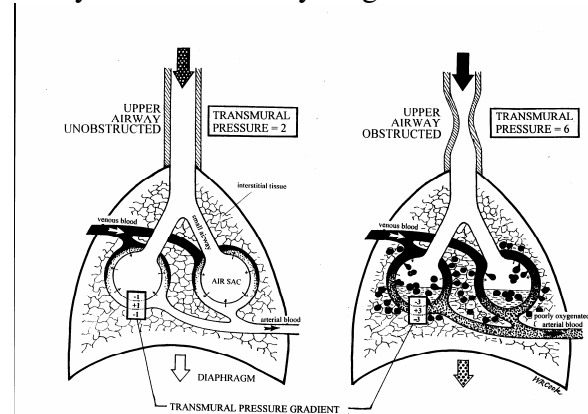


Fig 8. Explaining the mechanism of the upper-airway-obstruction hypothesis regarding the cause of pulmonary haemorrhage. The transmural pressures shown are fictitious units but serve to demonstrate the principle involved

After three years as "Hon Sec" for BEVA, I became its Public Relations Officer. The congress that year was in London, with a trip to the Field Station at Potters Bar on the last day. In those days, the strictures against advertising were so rigorous that a veterinary surgeon whose name was mentioned in the press ran the risk of being struck off the register. Because of this, the Executive Committee⁷ wanted the name of the association to be mentioned and the topics under discussion but

⁷ Members of the Executive Committee attending meetings at BVA headquarters in London, arrived wearing bowler hats and carrying furled umbrellas

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absolutely no human interest. I spent the first two days of the Congress shepherding the press members around and pointing out the significance of all the fascinating material that was being presented by these necessarily anonymous speakers, but all to no avail. Not a paragraph appeared in the newspapers. On the last afternoon, a large group of practitioners, together with members of the press, were gathered around a horse in the paddock outside the Field Station's operating barn (we were still operating on our knees at this period) as Derek Tavernor and I gave a joint demonstration. Derek was introducing the relatively new concept of closed circuit Halothane anesthesia and I, with my head under a black cloth to keep out the sun, was giving a running commentary on what I could see, endoscopically. In the guttural pouch, of course, I mentioned the fascinating throb of the external and internal carotid arteries. In parrying questions from one curious spectator, Derek overlooked the fact that, in the meantime, oxygen was still bubbling merrily through the Halothane in the vaporiser. I shall long remember the moment when he joined me under the shroud and asked, in a whisper, "*Can you still see those arteries pulsing?*" I checked quickly and confirmed his worst suspicions. As soon as the spectators realized that an emergency had occurred they began to take an intense interest. Many were already of the opinion that this new-fangled method of anaesthesia was too clever by half and here was the proof ... a dead horse. By this time, Derek was busy squeezing the rebreathing bag and I, for want of something to do, invented on the spot a

method for carrying out external cardiac massage ... kicking the horse repeatedly on the sternum. Neither Derek nor I had

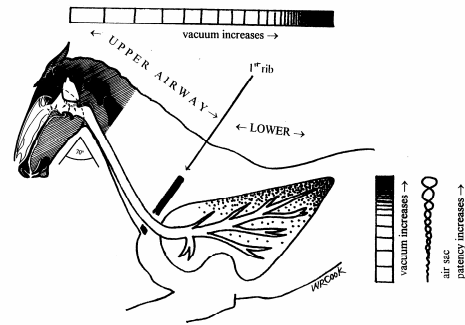


Fig 9. Showing how the upper airway obstruction hypothesis is consistent with the distribution of lesions in pulmonary haemorrhage. In this particular instance, the source of obstruction is poll flexion, elevation of the soft palate, and flaccidity of the nasopharynx.

- **Bilateral symmetry** of lesions is what the hypothesis would predict
- **Dorsal distribution** is what would be predicted on the grounds that the dorsal alveoli are more patent than the ventral and, therefore, more exposed to barotrauma on inspiration, when exaggerated negative pressures are developed
- **Caudal distribution** is what would be predicted on the aerodynamic principle that in gas flow along an obstructed tube, the pressure drop distal to the point of obstruction increases with distance from the point of that obstruction. On inspiration, therefore, pressure would be lowest at the caudal extremity of the lung.

ever known a horse to recover from cardiac arrest. Nevertheless, we felt

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obliged to show willing and to be seen to be doing something. So, sweating profusely, we persevered with our pumping and kicking. Remembering, after a while, that the press were watching and guessing that they might misinterpret my good intentions, I stopped the 'massage' for a moment to take off my shoes. After what seemed like an eternity and, much to our surprise, the horse gave a gasp and began to recover. The crowd melted away. The next morning, while shaving in the bathroom and listening to the BBC news I heard, to my dismay, that "*Bob Cook kicked a horse to life yesterday at the Royal Veterinary College.*"

This same bathroom was where I later had the Eureka experience of knowing that one could cure unilateral guttural pouch tympany by cutting a hole in the median septum. Another happy experience at the Royal Veterinary College occurred one Spring morning in 1963. While riding a client's horse to test its wind, I suddenly realized what it was about a canter that made me want to burst into song. The poetry of motion was engendered by the synchronized rhythm of hoof beat and breath; the horse was breathing in time with its legs. Like Chaucer's Cook, I could have clawed myself with pleasure. The joy of this discovery, however, concerning what has since become known as respiratory/locomotor coupling and found to be a feature of many mammals (Fig 6), was somewhat dissipated when I searched the literature and found that Dr Wittke in Germany had already made the same observation a few years previously.

After London, there followed five years at Glasgow, under the guidance of Sir William Wiepers. Whenever I think about him, I recall Basha's Haiku,

*"Unknowingly, he
guided us
over pathless hills
with wisps of hay"* –

One of these 'hills' included a memorable year teaching small animal medicine and surgery in Kenya. Margaret and I recall, among many other treasured family memories, the anachronistic charm of racing at Nairobi and Limuru.

I moved, in 1969, to the Animal Health Trust's Equine Research Station in Newmarket. Dr Richard Archer, the 'king of the eosinophil' and Director of the ERS, arranged for me to be registered at his own college, Trinity Hall, to study for a PhD at Cambridge. Kenneth Wilsdon, the senior ENT consultant at Addenbrookes Hospital, volunteered to become my supervisor. Once again, I profited by the comparative medicine approach and the enthusiastic interest of a member of the medical profession. One of my examiners, however, was less than fascinated by my eventual thesis on idiopathic laryngeal paralysis. Tiring of his task, during a train journey between London and Edinburgh, he heaved my weighty tome onto the luggage rack and left it there. My deathless prose traveled up and down the country for three months, quite undisturbed.

At Newmarket, I came to the conclusion that, for physiological reasons, laryngeal surgery was never likely to restore

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normal function to the larynx of a horse with recurrent laryngeal neuropathy (RLN). There being no satisfactory treatment, the next logical step was to focus on prevention. Firmly believing that RLN was largely inherited, I spent many years chasing a genetic will o' the wisp. It was my fond hope that a measure of the coefficient of inbreeding of a Thoroughbred might provide an effective method of selection. The less inbred the better, I argued, as this would reduce the likelihood that a given horse would develop diseases caused by harmful recessives. Unfortunately, having struggled to develop a method for measuring the coefficient based on 20 generations, I came to realize that even this depth of analysis was insufficient and that, even if it had been practical to measure the coefficient right back to the foundation animals in the General Stud Book (which it wasn't!), there would be insufficient variation in the coefficient for this parameter to be useful as a basis for selection.

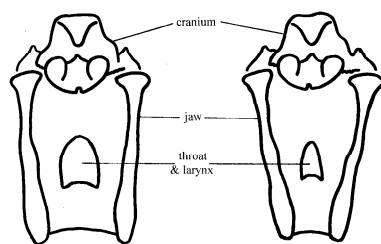


Fig 10. Two diagrams of skulls, viewed from the rear, illustrating good (left) and poor (right) conformation of the lower jaw, together with the effect this has on the cross-sectional area of the nasopharynx. The diagram on the left is drawn from the skull of

BROWN JACK, one of the most famous stayers in English racing history. He won the 2 mile 6 furlong Alexandra Stakes at Royal Ascot six years running

A population that has a closed stud book and has been inbreeding for 30 or more generations is, inevitably, becoming more inbred with each succeeding generation. It is only to be expected that such a breeding policy, coupled with

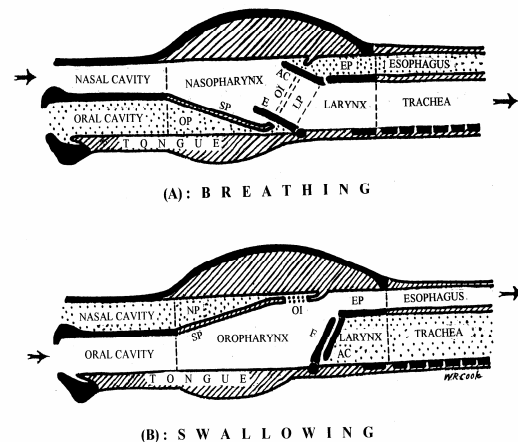


Fig 11. Showing the physiological conflicts caused by placing a bit in a horse's mouth. The bit promotes the swallowing orientation of the pharynx rather than the breathing orientation.

inadequate culling, will result in the inexorable escalation of recessive diseases, infertility and loss of stamina. Thoroughbreds are destined, therefore, to become increasingly delicate. Like the problem of breakages with precious porcelain, owners may in future find that they are too fragile for everyday purposes and will not withstand being thrown in the racecourse "washing machine" Those who can afford the replacement costs will continue to use 'porcelain' but others may decide that a

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sturdier equine 'pottery' is more practical for daily use. The heretical solution comes to mind that, in the next millennium, perhaps the racing world will come to recognize the virtue of the hybrid. This, after all, is the basis for success in most commercial animal and plant breeding ventures. Mule racing, as a vehicle for gambling, would be as good as Thoroughbred racing and might even prove better. Mules would have a wider appeal and mule athletes, lasting longer, would become more familiar to the punter. The policing of mule racing would be relatively simple as each animal would be earmarked and, being infertile, there could be no cheating. The sturdier mule would require less maintenance and there would be savings for the owner on veterinary fees and replacement costs. Dream on Cook!

While at Newmarket, I tried to find a way to make a horse close its larynx on demand, and in such a way that the larynx could be observed endoscopically, without any interference. I thought that such a test would enable adductor function to be better assessed. After a number of false starts, it occurred to me that, during defaecation, we close our glottis. What if, I thought, I placed something in the rectum and an endoscope in the nose and waited for the grunt from the glottis? Accordingly, I inserted a cylindrical party balloon in the rectum, then filled the balloon with warm water. But the horse just stood there, with its ears cocked, not a bit concerned about the foreign body under its tail and, certainly, quite 'unmoved'. After a while, I realized that my idea was not going to work. Nevertheless, I went on watching

the larynx as Bill Foster, my assistant, withdrew the balloon. I was still watching a moment later when Foster walked up the left side of the horse and consoled the horse with a pat on the back. "Do that again!" I cried. And every time he slapped, the right side of the larynx gave a little adductory flicker. Soon I found that this was a crossed reflex and that, if a healthy horse was slapped on the right side of the back, the left side of the larynx would respond. So was established the existence of the thoraco-laryngeal reflex, popularly known as the slap reflex. Another decade passed before it dawned on me, as the result of discussions with Hans Thalhammer⁸ when we were both on the faculty at Tufts University, that if the latency of the reflex was measured, this would provide an objective method for grading both recurrent laryngeal neuropathy and degeneration of the cervico-thoracic spine⁹. After another decade of development, I have the Mark IV version of a portable instrument I call an electrolaryngeograph, or ELG (Fig 7). With a 10 minute examination, it is now possible to measure the recurrent laryngeal status of a horse accurately and assign it a letter grade. Early results hint at the presence of a correlation between

⁸ Currently Dean of the School of Veterinary Medicine at the University of Vienna, Austria

⁹ J.F. Smithcors noted in "Evolution of the Veterinary Art" (1957) that the French phrase *mort du chain* (death of the spinal cord) was corrupted in the late Middle Ages by the British into the phrase that Shakespeare used in "Taming of the Shrew" ... *mourning in the chine*. The theory was that excess bile in the horse, an animal without a gall bladder, was carried to the spinal cord, then the brain and on into the nasal cavity, from where it was discharged at the nostril and recognized as Glanders.

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ELG grades in yearlings and their racing performance as three year olds.

As my early interest in guttural pouch mycosis 'bleeders' became known, I was given the chance to examine many racehorses that exhibited what was then referred to as "epistaxis" or the "broken blood vessel" problem. I was able to rule-out the likelihood that such bleeding



Fig 12. A reminder that the problems of the bit, as illustrated by Mayhew are still very much with us today, over a hundred years later. This engraving carried the caption *Various modes of forming that which all men speak of with admiration, as 'a good mouth'*

originated in the nasal cavity, as we used to think, and concluded, in a 1974 paper, that it was coming from the lungs. This conclusion was subsequently supported by Richard Pascoe and has since become widely accepted. So much for the source of the blood. Unfortunately, another suggestion which I inserted as a tailpiece to the 1974 paper has also been widely accepted, that the cause of the bleeding might be some low grade pulmonary inflammation. Since then, as a result of collecting new and conflicting evidence,

I have abandoned this hypothesis but it still has many adherents. I now support the theory first suggested by James Rooney, that this is a problem caused by asphyxia. Any obstruction of the upper airway can, I believe, produce this secondary effect on the lungs (Fig 8). Shakespeare seems to have unconsciously crystallized this domino effect when, in Hamlet, he minted the phrase "*the lie i' th' throat as deep as to the lungs*". The causes of obstruction are legion for, sadly, horses are often required to draw their breath in pain. The list includes but is not limited to poll flexion and soft palate mobility (both commonly caused by the bit; see below), narrow jaws (therefore, stenotic nasopharynxes), recurrent laryngeal neuropathy and tracheal deformity (Fig 9). I now propose that a suitable name for the problem is asphyxia-induced pulmonary edema (AIPE).

Anecdotal support for the AIPE hypothesis comes from a diary entry for 7th May, 1662, when John Evelyn attended a meeting of an assembly which, three months later, was to receive a charter and be named the Royal Society. "*I waited on Prince Rupert to our Assembly where we tried several experiments in Mr. Boyle's vacuum. A man thrusting in his arm, upon exhaustion of the air, had his flesh immediately swelled so as the blood was near bursting the veins: he drawing it out we found it all speckled*"

During a sabbatical leave from Tufts University, in 1986, I was able – thanks to Michael Osborne and the support of Sheikh Mohammed – to do some research at Kildangan Stud in Ireland. It

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was there that I first became aware of the importance to the horse of a wide jaw. Since then, I have had no reason to change my mind. Width of jaw is, I believe, one point of conformation that really does correlate with performance. Having come to this conclusion, I was delighted to be told by Sheikh Mohammed that the Bedouin horseman has always regarded width of jaw as being a factor that can make the difference between life and death. In tribal warfare, the Bedouin knew that he had a far better chance of outpacing his pursuers following a raid if he was riding a horse with a wide jaw. The citing of individual instances in support of a general theory is rightly frowned on as being unscientific. Nevertheless, as a matter of anecdotal interest, I would encourage anyone to spend an afternoon in the bone room basement of the British Museum and contemplate the lower jaw of BROWN JACK (Fig 10).

Alternatively, visit the Irish Horse Museum at the National Stud and ogle ARKLE.

Two years ago, I received a telephone call from Allan Buck, a dressage instructor in California. He told me that he had developed a new bitless bridle but was having some difficulty in persuading the horse-owning public of its merit. Having read my book¹⁰ he thought that I might be interested. To cut a long story short, he sent me a bridle. I put it on an awkward Thoroughbred that, with a snaffle bit was a headshaker, a stumbler, and a pain to ride; and I was an instant convert.

¹⁰ "Specifications for Speed in the Racehorse: the Airflow Factors" (1993), The Russell Meerdink Company Ltd Menasha, WI 54952

Many similarly enlightening experiences since then have led me to ask myself some fundamental questions about what a bit does to a horse? As a result, I have realized that the bit is physiologically contraindicated, counter-productive and, in the wrong hands, cruel. Many physiological facts can be mustered to support this conclusion but I will content myself with explaining only one.

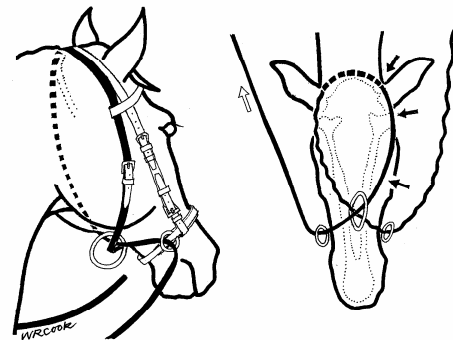


Fig 13. Showing how the Bitless Bridle 2000 controls by pushing, diffusely and painlessly, unlike the bit which pulls, focally and painfully.

As soon as a bit is placed in a horse's mouth, alimentary reflexes are initiated. Accordingly, the lips and muzzle start to move, salivation commences, a chewing reflex is stimulated, the mouth opens, the tongue constantly explores the bit and, because of the tongue's mobility, the soft palate intermittently rises and obstructs the nasopharynx. So far so good. But now the horse is mounted and set in motion and an entirely opposite set of cardiovascular reflexes are initiated. For exercise, the lips should be 'set', the oral cavity should be dry, the jaw stationary, the mouth closed, the tongue immobile and the soft palate lowered.

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By using a bit, man is asking a horse to eat and exercise simultaneously, something that nature never intended (Fig 11). Digestion is governed by the parasympathetic nervous system, whereas exercise is governed by the sympathetic nervous system. A horse can graze or it can gallop but it should not be expected to do both at the same time. Yet this is what man has been expecting of the horse for 6000 years.

I am now convinced that the bit is responsible for a number of serious problems, over and above the long list of bit aversion and associated problems that have been well recognized for generations (Fig 12). The problems as yet unrecognized include many manifestations of laryngeal stridor (especially intermittent laryngeal stridor)¹¹, dorsal displacement of the soft palate, headshaking and poor action. I now have no hesitation in recommending that the first thing to do by way of investigating all four of these problems, is to remove the bit.

Curiously enough, horses have been controlled reasonably well without bits for quite as long as they have been controlled with bits. The bosal, the hackamore and the sidepull are not perfect but they cause fewer and less serious problems than the bit. Buck's bitless bridle overcomes these problems and offers riders and drivers the advantages of going bitless without any of its disadvantages. The new bridle,

known as the Bitless Bridle 2000¹², does not control the horse by pressure on the mouth, nose or chin, which is the principle mode of action of all bits, the bosal and the hackamore. Instead it controls primarily by applying pressure behind the ears and over the poll (Fig 13). Its overall effect enables the rider to put a benevolent grip on the whole of the head, including nose and chin. The bridle provides effective control, without inflicting pain. It represents a humane and physiologically defensible method for controlling the horse at exercise. As a new millennium commences, it is good to be able to recommend an acceptable alternative to the Bronze Age technology of the bit.

Before I become as tedious as a tired horse, let me close with an item that is for the welfare of the veterinary surgeon and any one else who, like myself, has an aptitude for falling asleep at inopportune moments, such as when driving a car. It might save a life or two. My advice is to overcome any inhibitions you may have about the habit, and chew gum. The rationale for its effectiveness becomes apparent if you watch a horse grazing. At every chew, a pulse of blood can be seen travelling towards the heart in the jugular vein. This results from compression of the large venous sinus that lies within the masseter muscle. In the horse, this muscle pump assists the cardiac circulation to overcome the effects of gravity when the head is lowered. In sedentary man, the same effect maintains

¹¹ Laryngeal stridor can be caused by nasopharyngeal obstruction and is not specific to laryngeal obstruction, caused by the ubiquitous recurrent laryngeal neuropathy or the occasional laryngeal chondritis

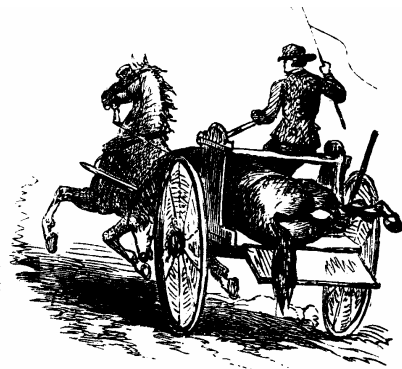
¹² ELG Inc., 206, Birch Run Road, Chestertown, MD 21620. USA Tel: (410) 778 9005 and on the web at www.bitlessbridle.com

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a good circulation to the brain and keeps one alert¹³.

I would like to thank the horse for teaching me so much; the owners for trusting their horses to my care; and the referring practitioners for giving me the opportunity to learn. I am grateful for the encouragement I have derived from the times when colleagues have agreed with my clinical conclusions. I am especially grateful for the stimulation I have derived from the many occasions when they have disagreed. I wish all future seekers after knowledge, 'Good Hunting', coupled with the hope that they will enjoy the hunt as much as I have.

*For there is good news yet to
hear
and fine things to be seen,
Before we go to Paradise
by way of Kensal Green
-G.K.Chesterton*



THE END

¹³ Robert Louis Stevenson noted that Yoshiba, a Japanese scholar, avoided falling asleep over his books by stuffing mosquitoes up his sleeve.