



Mark Johnston's

THE WEIGHT MYTH

IN THE old weighing room at Doncaster, before the new stand was built, where trainers were not only welcomed but were given a cup of tea and a sandwich, there used to be an old 'handicap' scale on the wall which showed the weights allocated to horses of different heights. Smaller horses were allocated less weight than taller horses.

I'm not sure what era that scale dated from but I believe that there were handicaps running in the mid-18th century. Then, approximately 100 years later, Admiral Henry John Rous gave us the weight-for-age scale and some credit the same man with inventing handicapping as we know it now. Amazingly, his theories and calculations have hardly been questioned, never mind changed, since.

Many of you will know that I am a great believer in using official handicap ratings to assess the strength of races and I have done so since very soon after I started training. I still believe that I am right to do so as, like it or not, the vast majority of horses in the UK will be stuck in the handicap system after they have won and/or had three runs. It is not a system that I like or which I believe to be of benefit to our sport but, for the moment, we are stuck with it and so, if I am to place horses well, I must always be very conscious of their handicap rating and of the rules and conditions under which they must run.

IMUST admit that, in my early days as a trainer I had much greater belief in the principles of handicapping, as applied in our official system, and the idea that it was an arithmetical calculation whereby 3lb in weight slowed a horse by one length over five furlongs through to 11lb in weight slowing a horse by one length, or being equivalent to one length, over 15 furlongs.

It seemed to be a logical approach and,

while I might have questioned how accurately it could be applied to living creatures, it seemed to make sense. If a stone makes a difference, a pound must make a difference, even if it is more difficult to measure. The principle of 'marginal gains' – the new buzzwords in sports training – must apply. Or does it? Do all horses have the same ability to carry weight? Clearly not. So why would weight have the same effect on all horses?

As I observed more gallops and races over the years, I started to question the principles and the scales. It didn't seem to be the case that a small amount of weight, equivalent to a bag of sugar, would alter the result of a race. As one American handicapper recently said, a horse running with a pound or two extra is like you or

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me running with an envelope in our back pocket. Marginal gains or not, it is illogical to think that such a small difference will affect the result and the evidence of my eyes was that small differences in weight make little or no difference to performance.

It seems to me that the class of opposition is far more important than the actual slowing effect of any weight burden and James Willoughby presents some evidence of this in his column on page 6. I'd like to suggest that the handicap system is mostly about grouping horses into races with others of similar ability and that there is little or no evidence that small changes in weight can have a consistent, measurable effect on performance.

THAT said, I still struggled to explain to myself why, if a large amount of weight hampered a horse and slowed it relative to those carrying lighter weights, a smaller amount of weight would not also have an effect, albeit that this would be relative to the amount of weight carried. The answer, or what I believe to be the answer, came to me when out cycling recently.

It is one of the things I love about cycling. I have time to think and I often think about the physics of motion and the factors which might affect bicycles and horses alike – or, sometimes, not so alike.

Now don't be misled into thinking that I am an academic or a physicist, mathematician, or statistician of the calibre of Mr Willoughby. I have neither the skills nor the patience to even try to think on James's level, but I like to believe that I have an enquiring mind. I like there to be a logical explanation for the phenomena that I observe and I often try to explain the effect of physical forces affecting horses in mechanical terms despite my being well aware that there are countless more forces and factors at play in animals that there are with inanimate objects.

I often describe the conformational differences between sprinters and stayers in mechanical terms and draw

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comparisons with drag cars and boats with small outboard motors. And you may be aware that my beliefs on horses running their races at, as near as possible, a constant speed, without any extreme acceleration or deceleration, came as much from considering the fuel consumption gauge in my father-in-law's BMW as it did from seeing Martin Pipe transform jump racing.

AND so, while cycling along, I tried to consider why adding more weight to one horse might not slow it down relative to its opponents and to explain it in mechanical terms. This is what I came up with . . .

If you take two identical cars with 300 horsepower engines and a top speed of 150mph and race them on a track – let's say, to exclude the variable of acceleration, from a 'flying start' – over a given distance, they will, of course, finish together. Now put four passengers and a couple of bags of cement in one and repeat the exercise. The lighter car will finish in front – simple.

Now, we introduce another identical car, of exactly the same weight but with its engine producing 500 horsepower. We fit a 'governor' to this car restricting it to 150 mph and so, when matched against the less powerful car, it still will finish upsides. However, adding four people and a couple of bags of cement to this one will not slow it down. It has power to spare and will still achieve the 150 mph despite the extra weight.

Racehorses have countless 'governors' restricting their performance from the maximum length of their stride to the elasticity of their tendons, and from the size of their larynx, which limits the flow of air, to the power of their lungs pulling air through that aperture. Their muscular strength and ability to carry weight might not be the limiting factor. They are not machines.

IAM sure I can expect to be challenged on this theory. James Willoughby might question the physics, Pat Sells of Chasemore Stud might take me to task on some of the

physiology, and retired trainer Bill O'Gorman will no doubt put me right on the history of handicapping, but it is surely long past time for someone to question the principles of handicapping horses by adding weight. Even if it could be established that increasing the weight carried by an individual horse had a linear correlation with its speed, it is surely totally inconceivable that the effect would be the same on all horses or even close to it.

James Willoughby replies to Mark:

THIS is exactly my lifetime belief. Differences in 'class' dominate differences in weight, where class is a proxy idea for a horse's mechanical limits.

Where two horses happen to be closely matched in class, the result actually has a sensitive dependence on weight, but there are precious few of these instances because, as the researchers I quote in my column have proved elegantly using maths, racehorse talent is exponentially distributed because it cascades from genetic inheritance multiplicatively.

If a horse happens to be born with the potential to have 'fast twitch' muscles and be strong, the effect multiplies because the muscles will contract twice as quickly with twice as much force. There's a limit to how much of a dose you can have of both, because big, powerful muscles don't contract so fast, but a horse such as Frankel or Flightline shows what happens when you get a double-six on the generic dice three or four times consecutively.

Racehorse talent should be measured on something like the Richter scale - but we measure it on something like the Celsius scale. Differences in the magnitude of talent drown out small linear differences in the effect of weight through a mechanism that I believe is closely analogous to the one you describe.

For a high-profile example of weight-carrying, we need only to look at Trueshan in the Northumberland Plate this year in which he carried 10st 8lb off a mark of 120. But the same effect is at play

in every race every day as the statistics underline.

Why we can't make the sport more interesting by explaining things like this is something I've never understood. There are countless other ideas that affect results and the racing system that are similarly fascinating. Not to mention horses themselves as creatures.

My daughter is teaching me a little genomics because I am teaching her to write super-fast, efficient computer code to analyse DNA. She sends me these massive text files of protein sequences and you can start to see how it all works when you find sequences that encode for various things.

This code for life is amazing to consider. I'll only get to a certain level working on my own - just like I have with racing because I have no practical experience - as the numbers only get you so far, but she is going to do amazing things as a scientist, I'm certain, and I can at least understand why. She can hypothesise processes such as where the 'stop codons' are and why they are there, and a computer will find the pattern she describes.

Then, when I show her how to use neural networks to let the computer 'think' for itself and hypothesise, she will send me back vast explanations beyond my understanding of why the computer might have found what it did. Who knows whether she is right, but this is the first stage of understanding - creative intelligence or wonderment, as it might be called.

So, I'm like a racing novice should be when it comes to genomics. My curiosity is kicking in every time I take on more. I'll never be a scientist but I can reach a level where they become my idols.

We have to feed that same regard in racing for racing professionals, but we are doing a pitiful job and always have done in my time. We end up seeing jockeys and trainers only through a haplessly conducted whip debate, for instance, without feeding the understanding of what they are doing in the round.

I am 100% in agreement with your piece Mark. I'm sure it's what happens.