

The relevance of Rudolph Magnus to the Alexander Technique

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Rudolph Magnus was the scientist who worked out the neurophysiology of vertebrate posture in the early decades of the twentieth century. He has suffered the fate of many great scientific pioneers. His work was groundbreaking at the time but has become so much the everyday furniture of science that he is no longer remembered for it.

He never had an Alexander lesson and he probably never heard even heard of the Alexander Technique (AT). He did not deal with the “integrated individual”. His research was almost entirely concerned with the reflex or unconscious elements in posture as opposed to the “conscious control” that concerned Alexander.

But Magnus nevertheless had an important impact on the AT. When Alexander came across Magnus’ work he believed it provided a direct scientific underpinning for his own discoveries about the importance of the head-neck relationship which he began to refer to as *the primary control*. It also gave him the confidence to challenge the medical profession publicly on its own ground. This he did, for example, in a letter to the British Medical Journal in 1932 in which he said:

On the strength of forty years’ practical experience I am bold enough to believe that this would result in proof of the soundness of my technique as conclusive as has been the case with regard to my employment of the primary control, the existence of which has been conclusively proved by the experimentation of the late Rudolph Magnus of Utrecht.¹

Alexander’s staunch supporter, the philosopher John Dewey, too, believed that Magnus’ work provided supporting scientific evidence for Alexander. In his introduction to Alexander’s book, *The use of the self*, Dewey says:

Magnus proved by means of what may be called external evidence the existence of a central control in the organism. But Mr Alexander’s technique gave a direct and intimate confirmation in personal experience of the fact of central control long before Magnus carried out his investigations.²

Magnus, despite his lack of direct involvement thus has an important role in the evolution of the AT. The full story of how his findings on posture relate to the AT is considerably more complex than Alexander envisaged and has been a fruitful subject of debate within the AT profession. Almost a hundred years on from his death, Magnus’ work remains a rich and relevant source of scientific insight into the neurophysiological underpinnings of the AT.

Biographical details

Rudolph Magnus’ life, like that of most famous scientists, was fairly undramatic. He was born in Germany in 1873 and grew up a bright and studious child. He studied medicine in Heidelberg University and was awarded his PhD *summa cum laude* in

¹ Alexander (1995)p134

1898. After he was awarded his doctorate, he was appointed Associate Professor of Pharmacology in Heidelberg. Pharmacology is the study of drugs, mainly poisons, and how they affect the functioning of the body and the nervous system. Magnus' research interests at this stage in his career were focused on the functioning of the lungs and digestive system.

In addition to his scientific interests, Magnus was a deeply cultured man. He was interested in the visual arts and philosophy, especially Emmanuel Kant. He also had a particular interest in Goethe (1749–1832) who in addition to being a poet and dramatist was interested in the theory of colour and published an influential book on the subject in 1810.

In fact, Magnus took time off from his university and research duties in the early 1900s to repeat Goethe's colour experiments using the original laboratory instruments in the Goethe museum. He gave a series of ten lectures on Goethe's scientific work which were published as a book in 1906; an English translation appearing in America in 1949 under the title *Goethe as a scientist*.³

He became interested in the detailed workings of the nervous system in the early 1900s. These were the years when Charles Sherrington was publishing his groundbreaking neuroscientific papers and laying the foundations of modern neuroscience. Magnus heard Sherrington lecturing at a couple of conferences and was impressed by his work. Magnus, meanwhile, was trying to establish whether a discovery made in the study of starfish, that when a nervous centre is stimulated the stimulus tends to spread to comparable stretched rather than relaxed muscles, also applied to mammals. He realised that this could best be researched by going to England and working on it with Sherrington. He therefore spent his 1908 Easter vacation in Sherrington's laboratory in Liverpool University experimenting on dogs.⁴

This visit was a life-changing event for Magnus. Working with Sherrington revealed the complexity of the issue he was investigating⁵ and gave Magnus his interest in the study of posture which lasted for the rest of his life and on which his reputation mainly rests. It was while he was with Sherrington that he got the news that he had been appointed Professor of Pharmacology at the University of Utrecht in the Netherlands and he remained in that position until his death. Over the years, he and his team in Utrecht kept up a steady output of scientific papers. They were mainly on different aspects of the neurophysiology of posture though he maintained his interests in the functioning of the lungs and digestive system. In his lifetime, he published well over 300 papers.

As a result of his work on animal posture he was nominated for the Nobel Prize in 1927 and was widely expected to receive it but he died suddenly, at the age of 53, while on a walking holiday in the summer of that year; the prize is not awarded posthumously. As a person, Magnus was said to be widely liked and respected and in the Introduction to the Lane Lectures book he is described as having a candid, generous and open-hearted personality.⁶

³ O. Magnus (2002)p145

⁴ Ibid.p143

⁵ Ibid.p250

⁶ Magnus (1930)p10

Sources of information on Magnus

The full report of Magnus' researches was published in 1924 under the title *Körperstellung*. The fact that it was only published in German would not have been the problem it would be today. Most scientists of the time had a working knowledge of German, which was known as the language of science, and was part of the normal scientific curriculum. Things have obviously changed since then and the full text of Magnus' results became largely inaccessible to a wider audience. In 1987, however, the United States Department of Commerce recognising the enduring significance of Magnus' work sponsored an English translation and publication of the book by the Amerind Publishing Co in New Delhi. The full title of this version is *Body Posture: experimental-physiological investigations of the reflexes involved in body posture, their cooperation and disturbances*.

The first English-language public presentation of the main results of Magnus' work was the 1925 Croonian Lecture which he gave at the Royal Society. Fittingly, his old mentor, the now-ennobled Sir Charles Sherrington OM, who was also the President of the Royal Society was in the chair. The lecture was entitled *Animal Posture*. The following year Magnus delivered two further lectures, called the Cameron Prize Lectures, in the University of Edinburgh in 1926. These were published in the medical journal, *The Lancet*, in the same year.

Magnus' exposure to English-speaking and non-scientific readers is thus limited. If he had lived, and especially if he had been awarded the Nobel Prize, his book on posture work would undoubtedly have been translated into English, generating a wider range of interest and comments. And he would have been available for the conferences, lectures and visiting professorships by which most scientists make their work known.

As it was, he had been due to give a series of five lectures, the Lane Lectures, at Stanford University in California in 1927. Three of these were published in book form by the University in 1930. One of these, entitled *The physiological a priori*, reflects Magnus' interest in the philosopher Immanuel Kant; it is particularly interesting in the way it parallels Alexander's ideas on the potential unreliability of sensory perception, and is discussed later in this paper.

Another source of English-language information on Magnus is a rather fragmentary and very belated biography written by his son Otto. This was published by the Royal Netherlands Academy of Sciences but only appeared in 2002, some 75 years after Magnus' death. Walter Carrington, a close colleague of Alexander and a prominent teacher of the AT in his own right, wrote a paper called *The work of Professor Magnus and the F. Matthias Alexander Technique* in 1950 which provides a valuable overview of Magnus' work in an AT perspective. This was reprinted together with a paper entitled *The foundations of human well-being* on the work of the scientist George Ellett Coghill in a booklet published by the Society of Teachers of the Alexander Technique (STAT) in 1994.⁷

The question of posture

AT teachers are wary of using the word posture, not because it is unimportant to their work, but because of its importance and the fact that it is so widely misunderstood. Few AT teachers on mentioning to someone what they do have not

⁷ Carrington (1994)

been greeted by the person stiffening themselves up, sticking out their chest and saying: "Must watch my posture when I'm with you."

This is, of course a complete negation of what AT teachers mean by posture. It is also far from the subtle, complex and dynamic idea of posture embraced by scientists such as Sherrington and Magnus. Posture is to do with how the body is when a person is awake, alert and ready to go into action but still in repose. It is about the natural dynamic disposition of the body parts relative to each other when the person is not deliberately holding a pose or actively doing something.

During the course of his own work, Sherrington had felt posture provided a very useful entry point into the study of the whole neuromuscular system. In his book *The integrative action of the nervous system* he wrote:

*...much of the reflex reaction expressed by the skeletal musculature is postural. The bony and other levers of the body are maintained in certain attitudes both in regard to the horizon, to the vertical, and to one another...Innervation and co-ordination are as fully demanded for the maintenance of a posture as for the execution of a movement.*⁸

Posture thus involves a surprisingly large amount of complex neuromuscular activity normally involving both reflex and voluntary acts. It was this complexity and the promise that studying it would lead into a deepening understanding of the reflex functioning of the neuromuscular system that attracted Magnus.

He said in one of the Cameron Prize lectures:

*...posture is an active process, and it is the result of the cooperation of a great number of reflexes, many of which have a tonic character.*⁹

"Tonic" in this context means connected with tone – the level of tension required to keep a muscle firm but not sufficient to cause movement of the body parts to which it is connected

Since Magnus' work was deliberately focused on the reflex elements in posture it meant he had to devise a research approach which enabled him to distinguish the voluntary from the reflex in his laboratory animals. In the normal vertebrate animal, the upper part of the brain, the cortex, consisting of the two cerebral hemispheres, is where conscious thinking and decision-making take place. Within that, the motor-cortex is where deliberate actions involving the various muscles in the body are initiated. The connection between the brain and the rest of the body runs down from the cerebral hemispheres through the mid-brain and the brainstem into the spinal cord.

This provides a two-way channel of communication from the brain to the body and from the body to the brain. It also means that if there is a break or a transverse cut, through this communication channel, there is no passage of nerve signals between the areas of the body above and below the cut. This is why people whose spinal cord has been seriously damaged are not able to exercise any conscious control of the parts of their body below where the damage has occurred. This is also true if

⁸ Sherrington (1906)p339

⁹ Magnus (1926a)p

transverse cuts are made inside the brain; the parts of the brain above the cut cannot influence whatever is happening below the cut.

The area of the brain below the cortex is often described as sub-cortical. It is where a variety of automatic and reflex functions are controlled without any conscious thought. It consists of the brainstem which connects directly to the spinal cord and the part above it which is usually referred to as the mid-brain. Sometimes, the lower part of the brain referred to as the reptilian brain, since it emerged in the early stage of vertebrate evolution and is found in fish and reptiles. The cortex and its functions emerged much later in evolution which is why it is sometimes referred to as the neocortex.

It is also necessary to be clear what is meant by reflex in the context of Magnus' work. The word is used in a variety of ways, even by neuroscientists, often meaning no more than a rapid habitual response, but Magnus adhered to Sherrington's definition in which he carefully distinguishes between habit and reflex:

*Habit arises always in conscious action; reflex behaviour never arises in conscious action. Habit is always acquired behaviour, reflex behaviour is always inherent and innately given. Habit is not to be confounded with reflex action.*¹⁰

Reflexes thus predate any learned activity in the growing animal; they might be likened to the operating system in a modern personal computer.

Since Magnus and his research team were interested in reflex, as opposed to deliberate or learned postural behaviour, they normally made the cut below the level of the cerebral hemispheres in their experimental animals. Much of the time they removed the cerebrum completely and the animal was referred to as decerebrate. By removing any involvement by the thinking part of the brain, they could be certain that the responses they were evoking were purely reflex.

They were also interested in establishing which parts of the lower brain were involved in the various elements of posture. In order to do this they began with animals from which the whole brain had been removed from the top of the spinal cord. They then progressively left more of the brain in place. As Magnus said:

*If a new function appears when a new part of the brain is left one may localize this function with confidence in the part of the brain that was added.*¹¹

It was an approach which required extraordinarily precise brain surgery on large numbers of laboratory animals. But its very directness left little room for doubt or ambiguity when the research team were assembling their results.

Magnus' results

In presenting his results in the Croonian Lecture in 1925, Magnus chose to look at the organisation of the postural process under four aspects. It is easy for AT teachers to relate to these as their implications are explored in various ways in Alexander teacher-training schools.

¹⁰ Sherrington (1906)pxvi

¹¹ Magnus (1924)p655

The first of these aspects of posture, Magnus called “*Reflex Standing*”. About this, he said:

*In order to carry the weight of the body against the action of gravity, it is necessary that a certain set of muscles, the ‘standing muscles’ should have by reflex action a certain degree of enduring tone, to prevent the body falling to the ground.*¹²

By this he simply meant that when someone is standing, they must have a sufficient level of tone in their standing muscles to resist the downward pull of gravity so that they do not collapse in a heap on the ground.

The second aspect of posture he called “*The Normal Distribution of Tone*”. He said:

*In the living animal not only do these standing muscles possess tone, but also the other muscles of the body, especially their antagonists, the flexors. Between these two sets of muscles a certain balance of tone exists so that neither set of muscles gets too much or too little tone.*¹³

In other words, standing properly is not just a question of being in the upright. There must also be an appropriate balance between the extensors and the flexors. Both sets of muscles should be doing just enough to keep the person in a nicely free state of balance, rather than competing with each and keeping the person in a state of rigid tension.

The third aspect of posture Magnus called “*Attitude*”. About this he said:

*The position of the different parts of the body must harmonise with each other; if one part of the body be displaced, the others parts also change in posture, so that different well-adapted attitudes, evoked by the first displacement, will result.*¹⁴

This is considerably more complex than the other two aspects and involves compensatory changes in muscle tensions throughout the body when one part of it changes position. This means that if a person is standing quietly and moves a part of their body, lifting an arm or twisting the head, for example, the postural reflexes will bring about an automatic adjustment of all the muscles in the other parts of the body so that the overall posture is maintained in a balanced and harmonious state.

The fourth aspect of posture, Magnus called “*The Righting Function*”. About this he said:

*If by its own active movements or by some outside force the body of an animal is brought out of the normal resting posture, then a series of reflexes are evoked, by which the normal position is reached again.*¹⁵

This is quite a dynamic aspect of posture. It means that if a person in a balanced standing posture is displaced from this by an external force or a movement on their own part, the righting function reflexly takes them back into the balanced posture again.

¹² Magnus (1925)p339

¹³ Ibid.339

¹⁴ Ibid.340

¹⁵ Ibid.340

Distinguishing these aspects of posture from each other helps the scientific investigation of how they are controlled by different nerve centres in the brain. But they do not occur in isolation from each other except in laboratory animals that have been subjected to the necessary brain surgery. In normal life all these aspects of posture are present together and interact with each other.

Magnus also looked at the influence of movements of the head on the rest of the neuromusculature. He found that when he moved the head of one of the experimental animals up, down or sideways this had an automatic effect on the muscles throughout the whole of the animal.

He said:

*The mechanism as a whole acts in such a way that the head leads and the body follows.*¹⁶

This observation, when applied to the behaviour of the human body, is particularly familiar to AT practitioners. One of Alexander's crucial discoveries, long before he had heard of Magnus, was the dominant role of the head-neck relationship in the overall functioning of the body's neuromusculature.

Incoming signals to the brain

The continual flow of outgoing, or efferent, signals from the brain which bring about the above postural adjustments to the changing circumstances of the environment and the body itself need to be reconciled with the various flows of sensory data coming into the nervous system. Posture, in other words, does not happen in a sensory vacuum. These inputs come from the various sensing organs within the body itself and from the environment; these incoming sensory flows are referred to as afferent.

The sensory organs which tell the body about itself are collectively called the proprioceptors; their task is to provide the brain with signals about the changing state of the body and they come from a variety of sources. The vestibular apparatus in the inner ear responds to changes in the position and movement of the head. Various types of sensors are distributed through the rest of the body especially in the joints and muscles; they include muscle spindles, tendon organs and different kinds of pressure sensors which respond to changes in the tensions and pressures in the different parts of the body. The soles of the feet are particularly rich in pressure-sense organs; shifts of the weight forward towards the toes and back towards the heels, and between the feet, evoke copious afferent flows of nerve impulses.

Nor should the skin be forgotten. It is the body's largest sense organ. It is sensitive to temperature and the texture of objects with which it is in contact. It is responsive to a large range of different kinds of pressures ranging from the sensation of an insect walking upon it, to an AT teacher's hand, and the kind of things that happen on a crowded commuter train. Sitting forward or backward in a chair, lying on the floor, leaning back against a wall all evoke characteristic responses from different sets of pressure sensors in the skin. It is easy to underrate the versatility and importance of the tactile sense.

¹⁶ Magnus (1926b)p588

In addition to these sensors responding to changes in the body and its immediate relationship with the environment, there are what Sherrington calls the teleceptors, the sensors which are stimulated by objects or events outside the body. For humans, the eyes are the most important, but for dogs and other animals the nose is equally if not more important. Other animals which are active in the dark depend much more heavily on their sense of hearing. In the case of humans, as the eyes flick between objects or fix upon those of interest, whole swathes of the musculature are brought into anticipatory alertness or released from it.

A central apparatus

The dynamic requirements of posture thus involve a huge data-processing task. At every moment, both the afferent and efferent flows of nerve impulses must be transmitted through the nervous system and reconciled with each other so that the body is maintained in a continuing state of harmonious posture.

As Magnus put it in the Croonian Lecture:

In fact a very finely elaborated central apparatus is needed to combine and distribute all these afferent impulses, depending on and adapted to the always changing circumstances of environment.¹⁷

Magnus' use of the phrase *central apparatus* in the Croonian lecture gave rise to an impression in AT circles that he was referring to a unitary mechanism which controlled posture. This was certainly not the case. In *Body Posture* he makes it clear that he is referring to a set of interacting neural structures which serve to coordinate the body's postural performance. The way he put it was:

The result of the present study is that in the brain stem, from the upper cervical cord to the midbrain, lies a complicated central nervous apparatus that governs the entire body posture in a coordinated manner. It unites the musculature of the whole body in a common performance.¹⁸

He goes on to say that

...the central apparatus in the brain stem is arranged in three large functional groups...¹⁹

He broadly divides the postural functions between these groups but goes on to say that

For the majority of the reflexes it is not yet known what anatomically known structures (nuclei), localized physiologically in specific regions are involved, in which anatomically known pathways the afferent and efferent excitation runs in the central system, and by which neurones these pathways are formed. For many reflexes it is still not known whether the pathways run on one or on both sides, whether and where they cross, etc.²⁰

Such details are far beyond the scope of the present paper. The important point in the present context is that the main neurological centres controlling and coordinating

¹⁷ Magnus (1925)p340

¹⁸ Magnus (1924)p653

¹⁹ Magnus (1925)p653

²⁰ Ibid.p655

posture are located in the brainstem. Magnus' work showed that the complex task of maintaining and adjusting posture, involving as it does the coordination of the afferent and efferent flows of neurological impulses, is still carried out even when the cortex, the thinking part of the brain, has been completely removed.

This is not to say that the conscious brain is excluded from any role in posture. It is perfectly clear that an infinite variety of postural disposition can be deliberately adopted. In such cases, when a decision to make a particular movement or adopt any particular posture has been made, or the motor cortex sends out the necessary signals and the muscles carry out their allocated tasks. But this means that conscious decision must be able to override the postural reflexes, as Sherrington had pointed out in *The integrative action of the nervous system* some twenty years earlier. In normal circumstances the reflexes provide what he called *a nervous background of active equilibrium* but for volitional activity to take place this equilibrium must be easily interrupted by voluntary impulses from the cortex

*... so that the animal may respond agilely to the passing events that break upon it as intercurrent stimuli.*²¹

Magnus' insight was that the role of the postural reflexes is restorative; they bring the musculature back to its natural resting state after it has carried out a voluntary act. This demands a separation between the control centres for the postural reflexes and the volitional parts of the brain. As Magnus said:

*It seems to be of the greatest importance, that the whole central apparatus...is placed subcortically in the brainstem and by this means withdrawn from all voluntary action.*²²

Thus when the muscular activity dictated by the cortex has been completed, the reflex postural mechanisms waiting in the background come into action to perform their restorative task and bring the neuromuscular system back to its balanced resting position. As Magnus put it:

*The brainstem centres... restore the disturbance and bring the body back into the normal posture so that the next cortical impulse will find the body prepared to start again.*²³

A squirrel illustrates the point. When it is busy nibbling a nut, it pulls itself into its nut-nibbling posture, not unlike a person using a small laptop computer. Once the nut has been eaten and the shell thrown away the squirrel instantly and automatically reverts to its normal posture and goes about its business.

Magnus also talked of the role of the postural reflexes in what he called *recalibrating the senses*. The way he puts it is:

By the action of the subcortical mechanisms described in these lectures the different sense organs are always brought into the normal relation with the external world...The result of all these arrangements is that the sense organs are righted in relation to the external world...In this way the

²¹ Sherrington (1906)p232

²² Magnus (1925)p349

²³ Ibid.349

*action of the involuntary brain-stem centres plays a very important in conscious activities, especially as regards spatial sensations.*²⁴

This process is necessary because when an action is performed, not only is the normal resting relationship between the body parts altered, the body's relationship with the external world is also changed. By their ever-present influence, the postural reflexes restore the datum for each of the senses, most obviously in relating the body to the horizontal, vertical and other spatial aspects of its surroundings.

The physiological a priori

In the short time left to him after the announcements of his results, Magnus gave some tantalising indications of the direction of his further thinking. His posthumously published lecture, *The physiological a priori*, is of particular interest to AT practitioners and is remarkable in the extent to which it parallels Alexander's thinking. This lecture may even have planted the seed which led to Sherrington's endorsement of Alexander in his final book *The endeavour of Jean Fernel*.²⁵

Considering its relevance to the science of the AT, it is surprising at how few references there have been in the AT literature to this aspect of Magnus' work. The reason is presumably because Magnus never actually delivered the lecture as he had planned. It was one of a series he was to have given in Stanford University in California in 1927 but he died that year before he had the chance to deliver them. They were published by Stanford University in 1930 in a book called the *Lane Lectures on Experimental Pharmacology and Medicine* and would have had a very limited circulation outside their specialist audience.

As for the lecture itself the title, *The physiological a priori*, comes from Magnus' interest in the German philosopher Immanuel Kant (1724-1804). Kant's great philosophical work was called the *Critique of pure reason* and deals with his concerns about how ideas are acquired, how people know about things. He concluded that the mind has certain innate or *a priori* ideas which form the foundation on which all thinking rests. Although Kant was talking about philosophical ideas Magnus felt the same reasoning could be applied to the way in which the sensory impressions which form the individual's knowledge of the external world are gained. Magnus reasoned that the condition of the senses affects the way sense impressions are received.

In the beginning of his lecture Magnus refers to the *Critique of pure reason*, and says:

*In this book Kant showed that in all our observations and in the conclusions we draw from them, in short, that in everything we know of the outer world, there are numerous elements which are given a priori, and which we are therefore compelled to employ in any experience in thinking and in drawing our conclusions.*²⁶

As an example, he takes colour-blindness. He points out that if a person is colour-blind, their sense impressions of the outside world will be different from those of a normal-sighted person. He says:

²⁴ Magnus (1926b)p588

²⁵ Sherrington (1946)p89

²⁶ Magnus (1930)p97

The nature of our sensory impressions is thus determined a priori, i.e. before any experience, by this physiological apparatus of our senses, sensory nerves and sensory nerve centres... Here we have to do with fixed mechanisms of our body, with permanent states of our sensory and nervous apparatus, and these will determine the nature of our observations and experiences... But beside these, other "active" processes (reflexes), acting through the central nervous system, also influence our sensory observations and help to determine them a priori.²⁷

He is pointing out that a person's physiological state, the quality of their sensory awareness, and the way their body is functioning have an influence on how they perceive both ourselves and the world about them. This will have an effect on how they respond to the world from which they are gaining these sense impressions. Some people, to take an example, if they have a few glasses of wine, begin to perceive and respond to the world in a different way. They may come to believe that they are more perceptive, witty, interesting and physically attractive than they are at other times.

The way Magnus put it was:

We possess numerous mechanisms acting unconsciously and partly sub-cortically which prepare the work beforehand for our psyche, and the results of which are a priori present before sensory observation and its psychological appreciation start.²⁸

The state of our sensory apparatus in other words conditions the flow of sensory inputs on which our awareness of the world is based. Most scientists would be prepared to accept this general principle. It is quite evident that we are trapped in our own physiological *a priori* in the sense that we are limited to the perceptions that our sensory organs are able to deliver; we do not, for example, have the auditory capabilities of a bat or an owl, nor the visual acuity of an eagle.

But it is what Magnus goes on to say that is so remarkable:

Since all study, analysis, and understanding of the events in the outer world are conducted through the medium of the senses, a scientific worker surely ought to know what are the fundamental mechanisms of his body and of his nervous system which determine the results of his work.²⁹

This is where most scientists would tend to part company with Magnus. They might be prepared to accept that their day to day perception of the world is indeed affected by their state of health and well-being, but few would be willing prepared to admit that the results of their work are influenced in any way by the state of functioning of their postural reflexes. They would argue that the use of measuring instruments and the scientific habit of looking for independent confirmation of results goes a considerable way to eliminate the dangers of results being distorted by the *a priori* biases or perceptual deficiencies of individual scientists, from whatever cause these may arise.

²⁷ Ibid.99

²⁸ Ibid.103

²⁹ Ibid.103

But Magnus was quite clear in what he said. Scientists' perception of the external world comes to them through the filter of their sensory systems. If the workings of their postural reflexes have been impaired to an extent that they are not performing their sensory recalibration task effectively, their perceptions will indeed be distorted and they will not reach the same conclusions as others from the same flows of sensory stimuli. The implication is that science is not quite as objective as it thinks it is and the personal viewpoints of scientists influence the judgements they make.

This is indeed the case. In the ordinary day-to-day business of science, disputes on the validity and interpretation of results is at the heart of how progress is made. There are numerous examples of distinguished scientists who, despite the evidence which has convinced their peers, have found themselves unable to adapt themselves to accept viewpoints contrary to those they have cherished for a long time. While there may be a broad scientific consensus on such widely publicised issues such as global warming, AIDS or childhood vaccinations, there are always some scientists who take a contrary view. Magnus is saying that the condition of people's sensory apparatus may have more to do with their ideas and convictions than they realise.

Magnus did not live to develop his ideas on the *physiological a priori* but his findings on the postural reflexes and their role in the functioning of the overall neuromuscular system have stood the test of almost a century's scrutiny since they were revealed. Even for those with reservations about the some of the ramifications of his ideas on the *physiological a priori* there is nothing contentious in the proposition that the postural reflexes need to be working properly if the body is to function as it should; most people are happy to accept it once it is pointed out to them. But there is little awareness of it in the scientific or medical words, let alone among the broader public. The result is that much of what passes for "fitness" and is assiduously cultivated by commercial interests directly interferes with the effective functioning of the postural reflexes and is ultimately detrimental to health and well-being.

It is an area with which the AT has been actively engaged since Alexander started his work in London in 1904. His books are peppered with references to the detrimental effects of conventional fitness regimes. The remainder of this paper looks at how the heritage of Magnus has been fruitfully, if not always explicitly, interwoven with the AT in the years since Magnus' death.

Disentangling habit and reflex

In his 1950 paper on Magnus, Walter Carrington provided a one-line summary of the AT that is difficult to better. He said:

The whole basis of Mr Alexander's Technique is the teaching of how to eliminate interference with the autonomic functioning of the organism.³⁰

It is this that distinguishes the AT from the range of conventional and alternative therapeutic interventions which rely on exercise or cultivating different ways of doing things with the musculature. This is why it is often said by AT teachers that if a person stops doing the wrong thing the right thing does itself.

³⁰ Carrington (1994)p52

In an AT lesson, a teacher may therefore ask a pupil to stand quietly and stop thinking about doing anything and simply “allow standing to happen”. This idea is rooted in Magnus’ observations about the restorative powers of the postural reflexes. As Magnus pointed out such a cessation of voluntary activity creates the conditions under which the postural reflexes controlled by the brainstem centres come into action and bring the body back into its baseline harmoniously balanced posture from which it is optimally positioned to initiate further voluntary actions.

The practical problem is that for human beings handing control to the brainstem and allowing standing to happen is a lot more easily said than done. This is because humans have the capacity to manipulate their neuromusculature in ways that are impossible for other animals. A squirrel or a guinea-pig has little freedom of manoeuvre in how they use themselves. They remain largely trapped in their natural reflex endowment and are only able to use themselves in a mainly stereotyped way. A dog is more versatile and can be taught a few more ways of using itself but is still not going to become a ballet dancer. Once they desist from such externally imposed behavioural patterns, their postural reflexes restore their normal manner of using themselves.

Human beings are able to use themselves in a much wider variety of ways than even the most versatile of other animals. They are able to learn how sit, run, stand and carry out a variety of activities which are quite contrary to the natural harmonious working of their neuromuscular systems. They can adopt damaging postures and ways of using themselves so thoroughly that they drop below the level of consciousness and become habits.

Sherrington, as noted earlier, said habit should not be confounded with reflex but in day to day human living this is all too easy to do. A habit has many of the characteristics of a reflex. Once it is learned or embedded into the neuromuscular repertoire, it is evoked without thought when the appropriate stimulus occurs. People spend years standing, sitting and carrying out their daily tasks in a strained or twisted way, so that what they are doing becomes habitual and drops below the level of conscious awareness; they literally do not know what they are doing. The result is that though they may think they are “allowing standing to happen” they are actually “doing” their standing in their habitual way.

Alexander was well aware of this tendency among the majority of people to be unaware of how exactly they are carrying out their activities, and indeed to think they are using themselves in a way which is quite different from what they are actually doing. He described it as faulty or deceptive sensory appreciation. He also refers to it rather more dramatically as a:

*...debauched kinaesthesia, the result of imperfect co-ordination, imperfect adjustment, and unreliable and delusive sensory appreciation.*³¹

In a passage in his book *The universal constant in living* he says:

It is well known that different people will get a different conception from the same word, spoken or written, and from the same gesture, showing that conception is dependent upon the nature of the impressions taken through the sensory mechanisms which control the functioning of the

³¹ Alexander (1923) p61

cells (receptors and conductors) of the eyes, ears etc. The conception likewise of what is happening within ourselves is dependent upon impressions which come to us through the sense of feeling (sensory appreciation) upon which we must rely for guidance in carrying out our daily activities.³²

He goes on to say:

When a certain degree of misuse has been reached, the deceptiveness of these impressions reaches a point where they can mislead us into believing that WE ARE DOING SOMETHING WITH SOME PART OF OURSELVES WHEN ACTUALLY WE CAN BE DOING SOMETHING QUITE DIFFERENT. This is equally true of things we believe we think, which more often than not are things we feel.³³

The practical result of the years of unconscious training that people put into various ways of misusing themselves is that the postural reflexes are increasingly displaced or overridden. Nor because of what Alexander called a *faulty sensory appreciation* is there any easy way of distinguishing between the acquired bad habit and the suppressed and beneficial postural reflexes.

This is when an Alexander teacher becomes relevant. One way of viewing the AT is that it is a method of making people aware of how they are misusing themselves, a process of lifting the pupil's damaging habits of using their neuromuscular system into their consciousness so that they alter them or get rid of them. Because habit is by definition unconscious, this is not an easy task. It is why becoming an AT teacher requires years of training and practice and why pupils generally need to have more than one lesson.

One of the most interesting experiences in proceeding through an AT teacher-training course and developing as an AT teacher is the way one's awareness of the multifarious ways of misuse which one has adopted oneself is gradually heightened. It is only when such habits have been lifted into consciousness that it becomes possible to deal with them and help diagnose them in others. It is a process which does not end; Walter Carrington remarked that after sixty years as an Alexander teacher, he was aware of how much there was still to learn.

The compatibility between Alexander's *faulty sensory appreciation* and Magnus' *physiological a priori* is remarkable. In his book, *The use of the self*, Alexander says:

We must therefore see the danger of continuing to base our efforts to help ourselves or other people upon beliefs, judgements and convictions which have their source in sensory experiences, without ascertaining whether the mechanisms through which these experiences are conveyed are functioning satisfactorily.³⁴

If Magnus felt that the physiological state of a scientific worker was relevant in determining the results of his work, Alexander was even more emphatic in insisting that physicians were vulnerable to their diagnostic conclusions being influenced by

³² Alexander (1946)p24

³³ Ibid.24

³⁴ Alexander (1932) p108

their own physiological state. He believed that his Technique had a highly relevant contribution to make to medical training.

In *The use of the self* he says:

Although this technique is concerned more with education than with treatment, it is one which, as I have tried to shew, should be incorporated with medical training, for if this were done, and the medical student taught how to consciously direct the use of his own mechanism, he would be developing within himself a satisfactory standard in his sensory appreciation which would stand him in good stead in diagnosing faults in others.³⁵

On a personal note, a much-respected GP of the present author's acquaintance dismissed the importance of the fact that one of her patient's shoulders was higher than the other on the grounds "We're all a bit twisted and distorted – don't worry about it." The twists and contortions of her own physique had altered her own physiological *a priori* and because of this she felt that having one shoulder higher than the other was normal. She made no connection between the distortions in her patient's shoulders and the back and shoulder pains for which a medical remedy was being sought.

Alexander would certainly have said and the evidence is that Magnus would have agreed with him that if a person's sense of themselves is distorted by their habitual misuse of themselves, they can neither correctly diagnose what they themselves are doing wrong nor can they figure out a reliable way of putting it right – let alone provide reliable advice to anyone else

The primary control versus the central apparatus

A further question worth clarifying when looking at Magnus in the context of the AT is the relationship between what he described as a *central apparatus* and what Alexander referred to as *the primary control*. Alexander's letter to the *BMJ* quoted earlier shows that Alexander was convinced the two were identical and that Magnus work provided scientific validation for his Technique.

In *The universal constant in living* Alexander says there is a primary control of the use of the mechanisms of the self and then says:

Those who laid the foundations of our present knowledge of physiology and anatomy were ignorant of the existence of this primary control....Some twenty-eight years after I discovered this control and employed it in a technique, the late Rudolph Magnus announced his discovery of it and its function, and Sir Charles Sherrington referred to this announcement in his Presidential Address to the Royal Society.³⁶

From the publication of Magnus' lectures in the 1920s up into the 1950s, there were various discussions among Alexander's medical supporters about whether Alexander was right in saying that Magnus had scientifically proven the existence of the primary control. A Dr Andrew Murdoch delivered a paper on the relationship between the sub-occipital muscles – a set of tiny muscles located in the atlanto-occipital area – and

³⁵ Ibid.97

³⁶ Alexander (1946)p109

Alexander's primary control to the Sussex Branch of the BMA in 1936. The paper is partly reprinted in Appendix B of *The universal constant in living*.

In it Murdoch says that the action of the sub-occipital muscles:

...creates the correct conditions in our external body wall for the functioning of the vital organs, and constitutes the primary control which Alexander had postulated and taken advantage of and which Magnus described, but did not locate, many years after.³⁷

Murdoch thought he had identified the actual primary control and Walter Carrington told the present author that Murdoch was quite disappointed when Alexander did not agree with him. Looking back on these discussions, Wilfred Barlow, Alexander's most prominent medical supporter and, himself, a teacher of the AT, rather waspishly commented in his 1973 book *The Alexander principle* that:

Alexander and some of his supporters at one time seemed to impute an almost magical significance to the 'Primary Control' and some of his medical friends gave him information about 'controlling centres' in the mid-brain in terms which seemed to imply a subjective awareness of such a centre, which could exert a 'Primary Control' over the rest of the body. Shades of Descartes and his Pineal Body.³⁸

In a paper he wrote on the issue in 1950, Walter Carrington addresses the question directly. Although he does say directly that Alexander was mistaken in his belief that his primary control and the central apparatus described by Magnus were the same thing he nevertheless makes it quite clear that what Magnus had discovered was not Alexander's primary control.

The way he put it was:

Thus, Mr Alexander's term "primary control" describes something far more extensive than Magnus' "central apparatus", for it embraces all the postural activities of the organism, not only the "brain-stem" mechanism but also the higher centres of the brain, and in particular, the cortical centres which Magnus did not investigate.³⁹

Magnus was fully aware of the capacity of the voluntary system to overrule the postural reflexes. His concept of the *physiological a priori* encapsulated the consequences of the voluntary system being unwilling or not knowing how to relinquish its control over the reflex systems so that their restorative functions are suppressed. Carrington phrases this in Alexandrian terms, saying:

What Mr Alexander saw was that not only is human behaviour integrated by a central agency, but in a large number of individual instances, his own included, this integrity was being impaired by interference with the working of this central agency.⁴⁰

In his book *The use of the self*, Alexander describes his long search to find a way of dealing with his voice problems. The need was for method which could be

³⁷ Ibid.p196

³⁸ Barlow (1973)p28

³⁹ Carrington (1994)p52

⁴⁰ Ibid.p52

consciously employed to eliminate his habitual, hence unconscious, interference with the working of his postural reflexes. Empirically, he developed a technique which placed a major emphasis on the importance of the head-neck relationship, and enabled him to achieve his objective. The centrality of the head-neck relationship to this endeavour justified Alexander in referring to it as a *primary control* of what was happening and perhaps justified its retention as technical term in the AT. But it has little if anything to do with Magnus' identification of a set of neurological structures in the brainstem which he described as a *central apparatus* controlling posture.

Epilogue

Magnus' influence on the AT has been mainly indirect and to a considerable extent founded on a misunderstanding but nevertheless it has been profound. The discussion provoked by Alexander's claim that Magnus had scientifically proven the existence of the *primary control* has led AT teachers to a much deeper investigation of the postural reflexes and their importance to the overall functioning of the human neuromusculature. A prime example of the benefit of this thinking is Carrington's insightful description of the AT as a means of eliminating interference with the functioning of the postural reflexes.

The striking parallels between Magnus' *physiological a priori* and the thinking of Alexander make it reasonable to speculate that had he lived, Magnus, like Sherrington, would have come closer to recognising Alexander's achievement. That, of course, did not happen but the body of Magnus' work remains a rich resource of continuing relevance to the development of the AT profession.

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