Vladimir Mikhaylovich Bekhterev (1857-1927)

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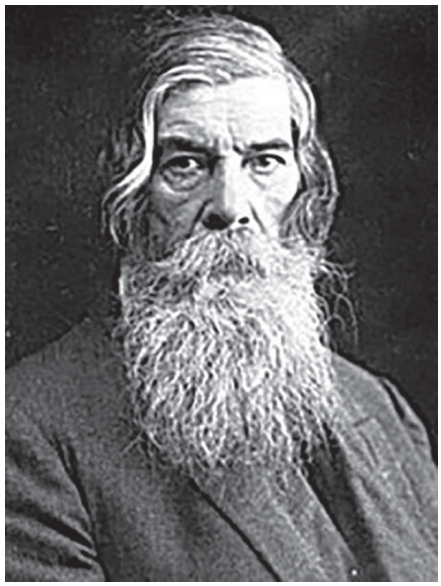

Figure 1

Among many Russian neuroscientists (who included Vladimir Betz, Konstantin Tretiakoff, and Alexander Luria) was Vladimir Mikhaylovich Bekhterev, (1857-1927) (Figure 1). Neurologist, morphologist and experimental psychologist, he was a most industrious, inventive and inexhaustible physician. Born in Sorali, a remote village between the Volga and the foothills of the Ural mountains, he became a distinguished neurophysiologist and psychiatrist who advanced the functional anatomy of the brain, experimental psychology, clinical neurology, and conditioned reflexes.[1] Paradoxically, Bekhterev's disease (ankylosing spondylitis) is better known than his neurological works where he described: the acromial reflex, Bekhterev's superior vestibular nucleus, labyrinthine nystagmus, the pectoralis reflex, a paradoxical reflex: pupillary dilatation to light, and several arcane reflexes in the limbs.

As a child Bekhterev spent much of his time reading the natural sciences. Aged 16, he enrolled at the Military Medical Academy in St Petersburg, and graduated in medicine in 1878. Already curious about the workings of the brain, from 1884-5 he secured a travelling scholarship to study under Flechsig in Leipzig and there described the superior vestibular nucleus—another Bekhterev-bearing eponym. When he visited Meynert, Westphal, Wundt, and Charcot, stimulated by their work he widened his enquiries. In his 1928 autobiography, he explained his curiosity about the brain:

> "That time the old expression "*textura obscura, functiones obscurissimae* [an obscure texture, and the most obscure functions]' could be fully applied to our knowledge of the brain. My desire to light this darkness was the reason to study the brain structure and functioning".[2]

When in 1885 he returned to Russia he had already secured a considerable reputation. Aged only 28 he became Professor of Psychiatry at the University of Kazan, where he established the first laboratory of experimental psychology in Russia. In 1893, having published more than a hundred papers, he became Professor of Psychiatry at the Military Medical Academy in St. Petersburg, continuing both neuropathology and neuropsychology studies.[3] As well as his discovery of the superior vestibular nucleus, succeeding Freud's work he described the central tegmental tract, the connections of the olivary nucleus and cerebellar peduncles.[4]

The second edition of his *Conduction Paths in the Spinal Cord and Brain* 1896 was the most comprehensive anatomical description of the time. So famous had Bekhterev become that the German anatomist Friedrich Kusch, said,

> There are only two persons who know the anatomy of the brain perfectly—God and Bekhterev.

He founded the first Russian journal on nervous disease, *Nevrologichesky Vestnik* in 1896 and set up the Leningrad Psychoneurological Institute in 1907. Here he furthered his investigation of the relationship between human brain physiology and behaviour. In politically troubled times he was forced him to resign his Chair in 1913; it was restored following the Russian Revolution of 1917 when he headed the department of psychology and reflexology at the University of Petrograd in St. Petersburg.

Bekhterev wrote ceaselessly with extraordinary endurance: he was said to need only five hours of sleep. The result over 50 years was more than 600 scientific papers and 10 books. His book on reflexology (1921) was translated into German and English.[5] Among his more significant writings are *Conduction Paths in the Brain and Spinal Cord* (1882; 2nd ed., 1896) and *Objective Psychology* (1907). His lasting legacy was on brain morphology, function, conditioned reflexes and several original clinical papers.

In the same decade as Strümpell and Pierre Marie,[6] Bekhterev in 1893 described ankylosing spondylitis: known both as Bekhterev's disease, and Marie-Strümpell disease,[7] observing the rigidity and curvature of the spine, and the

> 'Ankylosing inflammation of the spine and the large extremity joints.'

But these accounts were long after the convincing 17th century instance in a skeleton discovered in a French graveyard reported by Bernard Connor to the Royal Society:

> Vertebrae and ribs "were so straightly and intimately joined, their *Ligaments* perfectly *Bony*, and their *Articulations* so effaced, that they really made but one uniform continuous Bone; so that it was as easy to break one of the *Vertebrae* into two, as to disjoint or separate it from the other *Vertebrae*, or the *Ribs*".[8]

Benjamin Brodie (1783-1862) also had described a probable case observed in 1841, who complained of pain and stiffness in the dorsal and lumbar spine, buttocks, and knee joint, plus iritis.[9]

In his studies of conditioned reflexes he competed with Ivan Pavlov (1849-1936) who won the Nobel Prize in Physiology or Medicine in 1904. Bekhterev independently developed his own theory though it differed little from Pavlov's notions. After their early years of friendship there developed considerable personal acrimony and disagreement. He insisted on a purely objective approach to the study of behaviour. He was convinced that complex behaviours could be explained through the study of reflexes, a notion that influenced the growing *behaviourism* that surfaced in America.

Bekhterev married twice, and had six children with his first wife Natalya Bazilevskaya. While she was living abroad after the Russian revolution, Bekhterev met the much younger Berta Gurdzhi. After Natalya died in 1926, he married Gurdzhi at the age of 70. The circumstances of his sudden, unexpected death in 1927 are much debated. He was summoned to the Kremlin to perform a medical examination on Stalin and reported: "I examined a paranoid with the dry hand". This comment, reaching Stalin (who had a left arm deformity after childhood injury and infection), angered him, as he would not admit rumours about his mental state. Within a day or two, on Christmas eve 1927, Bekhterev was dead. The day before his death he had chaired a congress of Soviet

neurologists in Moscow. Many believed that the Russian authorities poisoned him,[10] though there was 'no proof.'[11] However, the Kremlin authorities insisted on cremation[11] and, his name and all of his works were erased from Soviet literature until Stalin's death in 1953.[12] The most plausible explanation of Stalin's late paranoia is 'the dimming of a superior intellect and the unleashing of a paranoid personality by a multi-infarct state.'[13]

Bekhterev was a dynamic, gifted man who explored new fields in psychology and brain morphology in a career marked by vagaries and incident. Eventually, a sculpture was erected in the Volkovo cemetery at St. Petersburg in the 1970s and a 5-ruble stamp in 2007 commemorates him (Figure 2).

Figure 2.

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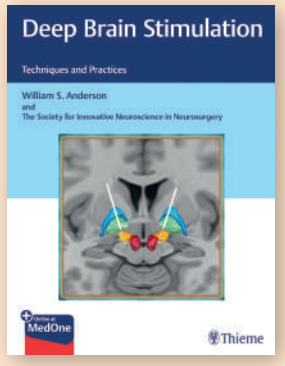
Deep Brain Stimulation: Techniques and Practices



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Deep brain stimulation (DBS) is an area of practice within Neurology perhaps analogous to DMT for multiple sclerosis, and selection of epilepsy patient for surgery. That is, a subject with which a general neurologist might be familiar only in a very general sense but nonetheless see patients for whom the treatment is exactly the right option to pursue, maybe sooner rather than later. While sitting in a colleague subspecialist clinic might appeal as a means of increasing familiarity, it is hardly realistic in view of the demand on our time.

This multi-author volume with contributors from The Society for Innovative Neuroscience is edited by William Anderson, and has the same level of polish as all the Thieme neurosurgical textbooks. It is concise and has a reasonable price tag, and is intended primarily for practising neurosurgeons as a quick reference. For Movement Disorders neurologists contributing directly to DBS services, it might also be used as a basic reference text. For most of us, it is best considered as a broad-ranging, accessible and authoritative update on DBS, obviously better suited to most of our diaries than arranging to sit in on a suitable colleague's clinic.

If we consider the volume's potential readership geographically, rather than by specialism, its North American readers are offered some pointers on the practicalities of setting up a DBS neurosurgery 'business' in the last chapter. It is also noticeable that some, but not all, of the individual chapters' authors adopt the style of referring to authorities of past and present by title, i.e. Dr Smith rather than just 'Smith' having done or written such-and-such. I think that may be a North American practice. That quaintness and slight inconsistency aside, the chapters read very well, and the volume as whole is very coherent.

I was about make note of an omission for this review, that the role of DBS in status dystonicus was not mentioned. But, while it is not covered in the Dystonia chapter, I found that it was described in the chapter on DBS in Paediatric practice.

In the historical introduction, I was interested to hear that Horsley in the early 1900s treated a patient suffering involuntary movement of one hemibody, by contralateral resection of the motor cortices, i.e through causing paralysis. By the 1930s, however, lesions of the basal ganglia were deployed to relieve movement disorder symptoms, without necessarily causing weakness, although the pioneers of this approach had to contend with criticism from those who held to the prevailing wisdom that any surgery to the basal ganglia would lead to coma. While such reservations seem conceptually bizarre to us, of course, it's a mere hair's breadth from some points in the basal ganglia to parts of the brainstem where damage would indeed switch off the lights.

As to the sequence of chapters, they range from sections describing DBS treatment in specific conditions, from PD through other movement disorders, to psychiatric conditions and epilepsy. The ordering seems reasonable, but it would have felt more natural for me if tic disorder has been grouped with the movement disorders rather than after the psychiatric ones. A factual tidbit I won't forget, not least because I should have been able to work it out for myself, is that the internal segment of the globus pallidus is a bigger thing than the subthalamic nucleus and, therefore, technically easier as surgical target. But of course, there are other interesting, practical insights.

Holistically, the volume's ethos is very much pro-DBS, which is obviously fair enough for the business-minded DBS neurosurgeon in jurisdictions other than ours! I must say, I think that ethos is also appropriate for clinicians on the front line of managing a whole range of 'DBS-able' diagnoses, be they neurologists, other physicians or psychiatrists. On the whole, I think we should be more alert to the suitability and availability of DBS for our patients, and this volume contributes usefully to that.