RELATIONSHIPS BETWEEN BRITISH AND RUSSIAN MEDICINE AND NEUROLOGY, AND THE ROLE OF THE NATIONAL HOSPITAL, QUEEN SQUARE, LONDON, IN THE DEVELOPMENT OF RUSSIAN NEUROPATHOLOGY*

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The links between Russian neuropathologists and the National Hospital are only a historical and logical continuation of the fruitful relationships which have long existed between the medical professions in the two countries. These are rooted in the distant past. One of the first English doctors to visit Russia was Jacob Robert in the sixteenth century. He was sent in 1581 by Queen Elizabeth to the Russian Tsar, Ivan the Fourth, better known as Ivan the Terrible, as a personal physician for the Tsar himself, his family, and the Court. In Russia at that time there were no European-trained physicians, although there were "healers", most of them attached to the monasteries, who, in the treatment of their patients, made wide use of the medicinal herbs in which Russia, with her multitude of different climatic and geographical conditions, has always abounded. The lore connected with the preparation and use of these herbs had come from Byzantium and had been considerably extended in Kiev Rus. After the fall of Kiev Rus and the renaissance of Central Russian Slavdom, this experience was inherited by Muscovite Russia.

England "discovered" Muscovy in the sixteenth century through the northern sea route and developed extensive trading and, at the same time, cultural relationships with Muscovite Russia. These relationships were particularly fruitful and extensive at the time of Elizabeth and Ivan the Terrible. It was at this time that the English physician, Jacob Robert, was sent to Russia. He lived there for a long period and enjoyed great influence over the Tsar. In addition to his activities as a physician, Jacob Robert fulfilled various diplomatic commissions, including the negotiations for a match

between the Tsar and Lady Hastings. Robert also enjoyed Elizabeth's confidence in equal measure and she entrusted him with some very responsible diplomatic missions at the Moscow court. Jacob Robert became so steeped in the Russian life and customs of that time that he was even called by a Russian name, Roman Elizarov.

At the very end of the sixteenth century (1598) during the reign of Ivan the Terrible's son, Theodore, another English doctor, Mark Ridley, was sent to serve as the Tsar's personal physician.

A number of features in the historical development of England and Russia at that time made the seventeenth century less favourable for the continuation of extensive interchanges between the two countries.

From the very beginning of the eighteenth century, however, as a result of the changes wrought by Peter the Great in Russia, particularly his introduction of the European system of training physicians, Holland and England were the favourite countries from which experienced doctors were drawn for training Russians in the Russian medical schools, and to which Russians were sent to learn medicine or to extend their knowledge of it in the universities. Among these Russians, one example who might be quoted is Daniel Pischekov, son of a priest. He was to train in the medical school of the Moscow Hospital founded by Peter the Great. After graduation, Pischekov was sent for further training to London, Edinburgh, and Aberdeen, where he studied obstetrics. Yuri Bakhmetev studied medicine in London and Edinburgh and was given a degree of Doctor of Medicine.

Still wider use was made of British universities and hospitals for the medical education and further training of Russian doctors in the first half of the nineteenth century. As an example, I could give the names of just a few outstanding Russian

* This paper was prepared for the celebrations to mark the centenary of the National Hospital, Queen Square, London.

† In choosing historical material for the article, the author was helped by his colleagues, Drs. Vein, Hekht, and Fishman.

medical men trained in Russia but who went to England for further study and trained there in preparation for work as professors, in the first instance in Moscow University. Thus Professor Ilya Gruzinov, the anatomist, at the very beginning of the nineteenth century (1801-04) carried on postgraduate studies in England under the famous anatomist, Willis. After this, Gruzinov returned to Moscow and took over and developed the Department of Anatomy and Physiology in Moscow University. Another outstanding medical man was Ivan Glebov, who graduated from Moscow University and then trained for a further three years abroad in various laboratories, such as Claude Bernard's, and in Bouillaud's clinic in Paris, the laboratory of Johannes Muller in Berlin, and Rokitsanski's laboratory in Vienna. In 1839, Glebov worked in various London hospitals, in laboratories of pathological anatomy, in a department of comparative anatomy, and in the laboratory of the famous Hunter. During his work abroad, particularly in London, Glebov set up what was for that time a wonderful collection of comparative anatomical preparations covering 500 different animals. On his return from abroad, Glebov taught human physiology, general and comparative anatomy and histology, and also general and special therapy in Moscow University. He was the first man in Russia to establish and begin the teaching of comparative physiology, and he also reformed the teaching of general physiology. In particular, he introduced a more extensive course of practical training, including training in the physiology of the nervous system and comparative physiology, and brought in the practice of demonstrations being given at lectures. His contemporaries classed him as an excellent lecturer. Among his many dicta is his statement that the teaching and learning of physiology must be based on a knowledge of physics, chemistry, and natural history. The *leitmotiv* of his statements and personal researches was the demonstration of the role of the nervous system in regulating the animal and human organism. His doctoral thesis, for example, was on the theme of "Mental phenomena from the physiological, therapeutic and pharmacological points of view". Glebov was subsequently appointed vice-president of the St. Petersburg Medico-Surgical Academy, as a result of the need for a sharp improvement in its teaching and scientific activities. He soon made the Academy into a first-class teaching and research establishment. In particular, he founded an institute of anatomy and physiology and promoted the establishment of various well-equipped nervous and mental disease clinics and many other teaching and research laboratories. He

developed and carried out the idea of training in the Academy scientific research workers from the ranks of doctors and biologists and of giving further training to physicians and to other scientists. This new system of training scientific and professorial staff within the Academy from among particularly gifted students who had graduated from it was responsible for the training of a number of outstanding Russian professors of medicine, among them Vladimir Bekhterev, whose name is well known to this audience. Among the pupils of Glebov while he was still at Moscow University we may mention Ivan Sechenov, who subsequently founded modern Russian physiology of the nervous system (he was a forerunner of Pavlov), as well as the outstanding clinician, Sergei Botkin. Both were closely linked by personal friendship and a unity of ideas in their views on science, particularly concerning questions of experimental and clinical proof of the leading role of the nervous system in physiological and pathological processes in animals and man. They both developed the concept of "nervism" (the leading role of the nervous system), and the importance of reflexes in physiology and pathology, an idea which guided the experimental research and theoretical generalizations of I. P. Pavlov throughout his life. After three years' advanced training abroad and while they were still very young, Sechenov and Botkin were invited by Glebov to become professors in the Medico-Surgical Academy in St. Petersburg. They swiftly won great authority and became leading professors, Sechenov in physiology and Botkin in clinical medicine. Botkin was the leading clinician in Russia and not only in Russia, and he established at his clinic an experimental physiological laboratory and called upon the young physiologist, Pavlov, who had only just begun his scientific activities, to run it. For 10 years Pavlov was head of the laboratory and within its walls he completed his first stage in physiology, the study of the physiology of blood circulation. In this laboratory, under the direct influence of Botkin and Sechenov, the views of Pavlov on nervism were formed and consolidated. These were reflected in his experimental physiological research on the circulation of the blood and subsequently in his completely new treatment of the physiology of digestion (his second stage in physiology). His researches were crowned by his work on the physiology of the cerebral hemispheres or physiology of the higher nervous activity (Pavlov's third stage in modern physiology). Consequently, the idea of nervism, originated by Glebov, worked upon and developed by Botkin and Sechenov, was provided with extremely firm experimental and theoretical foundations by the brilliant research of I. P. Pavlov

and his many pupils and followers in Russia and abroad.

Another remarkable worker was a contemporary of Glebov, Vassili Basov, who also spent one year in England (1844) out of three years' advanced training abroad, working in hospitals on general surgery, particularly the surgery of the gastrointestinal tract. On his return to Moscow, Basov had a decisive influence on the development of surgery in Moscow and other university cities in Russia. However, even before he went abroad for further training, Basov in 1842 had described a new method of forming a gastric fistula with an outlet outside the body which made it possible to observe the work of the stomach (its motor functions and its secretions) which up to that time had been unknown. This method was widely used and modified by I. P. Pavlov and made it possible for him to give a completely new interpretation of the physiology of digestion. As you know, Pavlov was given the Nobel Prize for this work, which he described in a book published in 1897. At the same time, this branch of research by Pavlov and his pupils proved decisive for further research on the physiology of the higher nervous activity. A contemporary of Basov was yet another outstanding Moscow professor, Aleksei Polunin. After graduating from Moscow University he went for four years' further training abroad, over a year of which he spent working in various clinics and laboratories in London (1847). After his return to Moscow, Polunin founded in 1849 the Department of Pathological Anatomy and Pathological Physiology, and in 1869 the Department of General Pathology. He considered that human pathology or general pathology must include pathological anatomy, pathological physiology, and pathological chemistry. In the newspaper *Moskovskije Vedomosti* (Nos. 102-104, 1848), Polunin published a series of articles on the medical establishments of Paris and some remarkable medical establishments in London. In England, Polunin consolidated his broad biological views and ideas, which he expressed in his lectures on the characteristics of man as a part of nature. The ideas of evolution or the development of all living creatures were already widely put forward in England even before the masterly work by Charles Darwin, which included the ideas and research of his predecessors as well as his own research over many years.

While the links between English and Russian medicine were very fruitful and the influence of English medicine on the development of various theoretical and clinical concepts in Russian medicine and neurology was very great, English neuropathology or neurology in the broad sense of the

word had no less an influence on the development of Russian neuropathology.* In this case the role of the National Hospital, now celebrating an outstanding centenary, was very appreciable. To confirm this statement, let us turn to Aleksei Kozhevnikov (1835-1902), founder of the Moscow (and to some extent the Russian) school of neuropathologists.

Graduating in 1860 from Moscow University, Kozhevnikov worked in the sphere of clinical medicine and began to concentrate his main attention on diseases of the nervous system. As early as 1865 Kozhevnikov wrote his thesis for the degree of Doctor of Medical Sciences on the theme of *tabes dorsalis*. Subsequently, Kozhevnikov went abroad to gain further experience and in particular worked in various neurological establishments and clinics. He also worked at the National Hospital, devoting great attention to the anatomy, physiology, and histology of the nervous system and particularly to the organization of neuropathology as an independent clinical discipline. In this connexion he had a brilliant example to follow in the shape of the National Hospital, which at that time was beginning to emerge as an independent clinical establishment for neuropathology. On the basis of what he saw and learnt in London, Kozhevnikov, on his return to Moscow, founded two independent clinics, a clinic for nervous diseases and a clinic for mental diseases, attached to the Medical Faculty of Moscow University, both of them still existing and active at the present time. It is interesting to recall that Kozhevnikov who, before his visit to London, had worked in a number of laboratories and clinics in Germany and France, took the London National Hospital as his model for the establishment of neuropathology in Russia as an independent clinical discipline. Kozhevnikov did not follow in the footsteps of his colleagues in Germany and Austria, where of course even today combined nervous and mental disease clinics still exist and where, especially in Germany, neuropathology for a long time remained within the framework of general therapy or medicine (a good example of this is Strumpell himself). Kozhevnikov considered that clinical neuropathology should be separated not only from general medicine as an independent clinical subject but also from psychiatry, as the two subjects, despite their many common features, have many differences in their tasks and methods. In the same way, Kozhevnikov considered that clinical neuropathology should be closely linked with general anatomy, with the pathological anatomy and

* In Russia, we mean by "neuropathology" clinical neurology including the neuropathology of nervous diseases.

histology as well as the physiology and pathophysiology of the nervous system, and that it must be based on the comparative anatomy and physiology of the said system. He devoted a great deal of work to the establishment of two separate clinics. He himself became head of the clinic for nervous diseases and entrusted the psychiatric clinic to his talented pupil, Sergei Korsakov, who was essentially the founder of modern psychiatry in our country and whose name the clinic rightly bears. Kozhevnikov became the first professor of neuropathology in Russia. In his research work he devoted particular attention to the study of the anatomy and histology of the nervous system and particularly to a study of the cells of the cerebral cortex and cerebellum. He was also led by his general ideas on the importance of the comparative anatomy of the nervous system to do a great deal of work on anthropology. As a result of these scientific interests, Kozhevnikov set up a neurological museum in the clinic for nervous diseases, which was remarkable for its period and which consisted of preparations on the anatomy, histology, and comparative anatomy of the nervous system. This museum still exists and bears Kozhevnikov's name. In addition Kozhevnikov founded the Moscow Society of Neuropathologists and Psychiatrists, and, together with Korsakov, started in 1900 the *Journal of Neuropathology and Psychiatry*, which also still exists and is known as the *Korsakov Journal*. Kozhevnikov took an active part in international medical and neurological activities. In 1897 he was Vice-President of the Twelfth International Congress and was elected a member of the Vienna Society of Neuropathologists and Psychiatrists, and of various scientific bodies in his own country. In the sphere of clinical neurology Kozhevnikov bequeathed to us a number of classical works which still retain their importance. These include his work on amyotrophic lateral sclerosis and on the type of epilepsy, of which he studied a particular form now known as Kozhevnikov's epilepsy. He considered that this form of epilepsy was of infectious origin in some way. Only when tic-borne encephalitis of viral aetiology was studied were a number of research workers in our country, including myself, able to establish that Kozhevnikov's epilepsy was a form of this encephalitis, although I do not exclude the possibility that viral inflammatory lesions of the brain, especially in young patients, may also occur as a residual phenomenon of classical Kozhevnikov epilepsy.

The majority of outstanding Russian neuropathologists were direct pupils of Kozhevnikov. Among them I might name Rot, Darkshevich, Minor, and others. Most contemporary Soviet neuropathologists were trained in and belong to the

Kozhevnikov school. I consider that the facts I have listed show the noble role played by the National Hospital, now celebrating a glorious anniversary, in the development of Russian neuropathology.

To complete my demonstration of the close ties between Britain and Russia in medicine in general and in neuropathology in particular, I should like to give a few more examples. At the end of the nineteenth century and the first half of the twentieth, there was a very great increase in the numbers of short and long visits by scientists and medical practitioners, both young and experienced, between the two countries to gain further experience, to master new methods, to read papers and lectures, to take part in anniversary meetings and scientific conferences and congresses. The relations between those concerned with physiology in general and the physiology of the nervous system in particular have been and remain particularly fruitful. Everybody knows the friendly relationships between Sir Charles Sherrington and Nikolai Vvedenski, the neurophysiologist and electrophysiologist. A good example of this was that when Sherrington applied for the Chair of Physiology at Liverpool University, Vvedenski sent in a scientific appreciation of his work. These friendly relations between two great physiologists were continued between Pavlov and Sherrington. Everyone knows what a positive influence they had on each other in their formulation of general neurophysiological laws such as the laws of inhibition and excitation, induction, and a number of others. The Soviet neurophysiologist Ivan Beritov worked with success in Sherrington's laboratory at Oxford. There were also many friendly exchanges between the Russian physiologist Alexander Samoilov and Professor Adrian, now Lord Adrian. From 1911 to 1912 in the Cambridge Physiological Laboratory, Pavlov's senior pupil, Leon Orbeli, worked successfully under Langley's leadership. Orbeli afterwards became one of the leading Soviet physiologists. It is well known that Langley's teachings on the sympathetic system were extensively developed by Orbeli and made an integral part of modern physiology and clinical medicine. Among other things Orbeli laid the foundations of neurohumoral physiology on the basis of the work of Levy and Dale. Leon Orbeli and many of his predecessors who studied in Britain developed the theory and methods of comparative physiology of the nervous system and embodied Darwinian ideas of evolution and development in physiology and pathology. Before devoting himself entirely to new branches of physiology, and before he went to work in Langley's laboratory, Leon Orbeli, after graduating from the Academy of Military Medicine, had

served as a medical officer in the Navy and then, when working at Cambridge, regularly visited the National Hospital in London, attended the lectures there, and took part in case analysis. The author of this article is indebted to Leon Orbeli, his adviser and mentor, as, when he went to work in Professor Adrian's electrophysiological laboratory in Cambridge in 1935-36 he, like Orbeli, visited the National Hospital regularly every Thursday, attended the lectures there, and took part in case analysis. Consequently, in his development as a clinical neurologist, he is likewise very much indebted to the National Hospital, now celebrating its anniversary, and to Gordon Holmes and others, its leading workers of that time. As a neurophysiologist, bringing this branch of neurology into line with the tasks of modern clinical practice, he is much indebted to Lord Adrian and his pupil Sir Bryan Matthews.

I have quoted numerous facts concerning the links and mutual relations between British and Russian medicine, physiology, and neurology, and I would like to end by generalizing to some extent, and in particular by pointing out the basic tendencies adopted by Russian scientists from their British colleagues and which, in many respects, have become part of the general achievements of medical science and neurology all over the world.

(1) The general biological concept, and particularly the notions of evolution in biology, medicine, and neurology, both in the pre-Darwin time during his creative life and, subsequently, during the lives of many of those who continued his work in various countries of the world, including Russia.

(2) Comparative anatomy and physiology in general and the anatomy and physiology of the nervous system in particular, including the anatomy and physiology of the autonomic or vegetative (sympathetic and parasympathetic) nervous system.

(3) Numerous facts indicating the importance of the nervous system in the mechanism of physiological and pathological processes in animals and man subsequently developed in Russia into a harmonious system showing the leading role of the nervous system in the processes mentioned.

(4) On the basis of a new technique (radio valves) as a result of interpenetration and creative association between Russian and British electrophysiologists the study of new data on the biological or electrical currents in the sense organs, in sensory and motor nerve endings, the spinal cord, and the brain in animals and man.

(5) The application of all the facts mentioned to current requirements in the clinical practice of nervous diseases, particularly for improving diagnosis by means of instruments, objective checks on

the outcome of therapy, and objective prognosis and assessment of residual conditions.

All this is characterized by the skilful accumulation of experimental and clinical facts and their wide generalization for the purposes of neurology, primarily on the basis of evolutionary ideas. The careful accumulation of experimental and clinical facts, together with a cautious attitude towards them and a skilful evaluation and generalization of them, typical of the work of our British colleagues, was taken over from them in its entirety by research workers in our country. It is well known how cautiously I. P. Pavlov approached facts and what a high value he set upon them. It was he who used the striking phrase "I present to you Mr. Fact. Take off your hats to him!" Without the careful and sometimes tedious accumulation of facts and their analysis, it would have been impossible for the generalizations mentioned above to be made and to become a basis of all our further experimental and clinical work, nor would the facts have been so unshakable if new proofs in support of them had not been found at every further stage of research.

The mutual influence between the two countries goes far beyond mere personalities and personal relationships at various points of history. The role of scientific laboratories and clinical establishments has been extremely great, particularly in the training of international cadres, in the dissemination of scientific and clinical literature, in the convening of scientific and clinical symposia, conferences, and congresses and in the participation in such meetings of scientists from the various countries. In this connexion the National Hospital, whose glorious anniversary we are now celebrating, has played an extremely important part, and a truly international one. In the second century of the life of this remarkable neurological institution, we anticipate that it will play an even greater role in the formation and development of theoretical and clinical neurology both in our country and on an international scale. At the present day, when the distance between the countries furthest away from one another in the geographical sense has been reduced to a small number of hours—10 at most—and social and economic conditions no longer appear to be an obstacle to close cultural and scientific relations, both direct personal contacts and numerous indirect contacts will increase in numbers.

For all the healthy criticism of neurological expansionism in modern medicine and physiology, one fact established and confirmed by our British and Russian predecessors remains unshakable, the fact that the nervous system plays a leading role in the physiology and pathology of animals and man.

Despite the importance of this role, as a result of

the natural tendency to attach greater importance to physico-chemical and biochemical changes in physiological and pathological processes, the nervous system itself, at its highest level, that is, in the brain, is gradually being regarded as a more and more

complex physico-chemical aggregate. Nevertheless, even in this case, the nervous system retains its trigger function, its corrective and, to a considerable degree, its organizational role in the processes mentioned.