

at describing the apparatus and procedure for chronaxie determination, one cannot treat in detail the results which have thus far been obtained. One might mention the beautiful experiments with repetitive stimulation of known intensity, duration, and interval, which have been employed with such success by the Chauchards in analysing the action of the chorda tympani and the vagus, and by Koenig in his investigations on the excitability of the vaso-motor and "pigmento-motor" nerves. These investigations have shown that a difference in chronaxie between a nerve and its effector is overcome by repetitive stimulation. Bourguignon in his monumental work on chronaxie in man has shown that the extensors have in general one chronaxie (0.10-0.16σ) while the flexors have another (0.44-0.72σ).

Lapicque has refrained as yet from any detailed consideration of the application of the work on chronaxie to the theories of the functional activity of the central nervous system. He has, however, made several suggestions (*J. Psychol. norm. path.*, 8, 1), one of which (*Rev. gén. Sci.*, 21, 103) must be mentioned. With double condensers the ascent of the discharge, instead of being instantaneous as with a single condenser, is gradual, not unlike a sine curve. If, therefore, two sciatic-gastrocnemius preparations, one from a toad (chronaxie 1.3σ), the other from a frog (chronaxie 0.3σ), are placed side by side across the same pair of electrodes, each receiving in consequence the entire effect of the discharge, when the condensers are charged at a small capacity, only the frog's muscle will contract, and only the toad's at a higher capacity. This is the

effect when the intensity is small; if now the intensity of the discharge is increased, both muscles will contract simultaneously at either capacity. "Cette expérience est pour moi une image de la façon dont pourrait fonctionner un centre nerveux quand il y a quatre neurones, deux centripètes et deux centrifuges" (p. 116).

Another fact of singular importance, which must be taken into consideration in enunciating a theory of central action based on chronaxie, is the influence which the higher centres (the region in front of the optic lobes in the frog) have on the chronaxie of the sciatic nerve (M. Lapicque, *C.R. Soc. Biol.*, 88, 46, 1923). In a normal frog when these centres are intact the chronaxie may be as small as 0.19 or 0.2σ, but *immediately* the brain is sectioned behind the optic lobes the chronaxie rises as high in some experiments as 0.4 or 0.42. Usually the effect of cutting off the higher centres, or of cutting the nerve itself, is to double the chronaxie. This obviously represents a type of nervous influence which, wholly unlike the propagated disturbance, has never before been described. It is akin to a polarisation which, if it passes via the pyramidal tracts, must be able to exert its effect across synapses. Perhaps this accounts for the greater facility with which reflexes are elicited in the spinal preparation than in the decerebrate preparation.

I should like to take this opportunity of expressing my most sincere thanks to Prof. and Mme. Lapicque and to Dr. Laugier for their great kindness, especially in granting me the facilities of their laboratory at the Sorbonne in January 1924.

The Memorial to Lord Lister.

IMMEDIATELY after the death of Lord Lister in 1912, the question of a memorial to him was discussed by fellows of the Royal Society and of the Royal Colleges of Physicians and Surgeons. Some delay, necessarily occurred before action could be taken, but eventually a provisional committee consisting of representatives of the Royal Society and the Royal College of Surgeons met and agreed to issue, not only to men distinguished in science and surgery, but also to men of eminence in public life and in various branches of knowledge, both at home and abroad, a request that they would consent to form themselves into a general committee for the purpose of considering the question of a suitable memorial and taking such steps as they might think fit to organise the collection of subscriptions. This invitation met with a ready response and a large and influential committee consisting of foreign ambassadors and ministers, representatives of universities, scientific and learned societies, city companies, and men eminent in every branch of knowledge was constituted.

An executive committee, with Sir Archibald Geikie, then president of the Royal Society, as chairman, Viscount Hambleden as vice-chairman, Lord Rothschild and Sir W. Watson Cheyne, treasurers, and Sir John Rose Bradford, honorary secretary, was appointed. This committee considered several proposals for a memorial and came to the conclusion that the most suitable would be one comprising:

1. A tablet with medallion and inscription to be placed in Westminster Abbey.

2. The establishment of an International Lister Memorial Fund for the advancement of surgery, from which either grants in aid of researches bearing on surgery, or awards in recognition of distinguished contributions to surgical science should be made, irrespective of nationality.

3. A monument to be erected in a public place in London.

This proposal was put forward at a public meeting held at the Mansion House and unanimously adopted. Subscriptions were received not only from all parts of the Empire, but also from Buenos Aires, Denmark, France, Germany, Greece, Holland, Hungary, Italy, Japan, Portugal, Sweden, Switzerland, and the United States. The Glasgow Lister Memorial Committee also contributed a substantial sum. The work of the committee was to a great extent held in abeyance during the War, but a memorial tablet was unveiled in the north aisle of Westminster Abbey in November 1915 without public ceremony. The unexpended balance of subscriptions received was invested, eventually increasing the sum collected for the memorial by 2600*l.*, making a total of nearly 12,000*l.* Towards the end of 1920, 5000*l.* trustee stock was handed over to the Royal College of Surgeons of England to provide a fund from which every three years a sum of 500*l.* is to be awarded, together with a bronze medal, in recogni-

tion of distinguished contributions to surgical science, irrespective of nationality, the recipient being required to give an address in London under the auspices of the college. A further considerable sum will be handed over to the Royal College of Surgeons to be devoted either to increasing the capital of this fund, or to the furtherance of surgical science by means of grants.

A site for the monument was secured in Portland Place, London, not far from Park Crescent, where Lord Lister lived for many years. The monument, which was designed by the late Sir Thomas Brock, R.A., consists of a pedestal of grey Aberdeen granite, surmounted by a bust of Lord Lister in bronze (Fig. 1). The pedestal is enriched with bronze cartouches and the Lister escutcheon, while in front is a bronze group consisting of two figures—a woman and a boy; the former symbolising humanity, with right arm uplifted, points to the great surgeon and man of science, while the boy offers a garland of flowers as the world's tribute to the greatest benefactor to mankind. Sir Thomas Brock was engaged on the monument up to the time of his death; and in the opinion of those competent to judge, it forms a fitting and worthy memorial to one of the greatest men of science and one of the most signal benefactors of humanity the world has ever seen.

The unveiling ceremony took place on March 13. Viscount Hambleden, vice-chairman of the executive committee, opened the proceedings and gave a brief outline of the history of the memorial: he said it was worthy of note that although the work of the committee had extended over a period of twelve years, the actual expenses of administration amounted to less than 400*l.*, and he concluded by asking Sir John Bland-Sutton, president of the Royal College of Surgeons, to unveil the memorial in the absence through illness of Sir Charles Sherrington, president of the Royal Society.

Sir John Bland-Sutton in a brief address said: "This memorial has been raised to the memory of a great surgeon, Lord Lister, who by his discoveries in science and his devotion to surgery united surgery and science, ennobled the art he practised, and launched it on the most wonderful era in its history. It is an honour to unveil this monument as a memorial to a genius who did so much to unveil the secrets of Nature, and taught surgeons safe methods for relieving men, women, and

children from the dread consequences of septic infection. Veterinary surgeons apply the same principles when performing operations for the relief of physical suffering on horses, cattle, cats, and dogs. Lord Lister had the rare advantage of seeing his principles adopted by surgeons throughout the world. His influence will remain as long as surgery is practised as an art, and the principles he discovered will remain as a blessing on every race of mankind. He was inflexible in the pursuit of truth and may be truly described as patience personified."

Viscount Hambleden then requested the mayor of St. Marylebone to accept the custody of the monument. The mayor accepted, on behalf of the present and future Borough councils, the duty of doing everything that was necessary to maintain and preserve the memorial.

Among those present at the unveiling of the monument were Sir Rickman Godlee; Sir William Lister, the Misses Lister and other members of Lord Lister's family; Viscount Hambleden, vice-chairman of the executive committee; Sir John Rose Bradford, honorary secretary; Sir Frederick M. Fry, member of the executive committee; and the Mayor of Marylebone. The Royal Society was represented by Sir David Prain, treasurer; Mr. W. B. Hardy and Mr. J. H. Jeans, secretaries; Sir Arthur Schuster, foreign secretary; Sir David Ferrier, Sir Frederick Mott, and Sir Arthur Keith. The Royal College of Phy-



Photo.]

[Miller and Scott.]

FIG. 1.—Lister Memorial, Portland Place, London.

sicians, London, by the president, Sir Humphry Rolleston; the Royal College of Surgeons of England by Sir John Bland-Sutton, president, and several members of the council; the Royal College of Surgeons in Ireland by the president, Sir William de C. Wheeler; the Royal Society of Medicine by the president, Sir William Hale-White; the Lister Institute by Dr. C. J. Martin; the Medical Society of London by the president, Dr. H. R. Spencer; the University of London by Mr. H. J. Waring, vice-chancellor; the University of Glasgow and the Royal Society of Edinburgh by Prof. F. O. Bower. The Glasgow Lister Memorial Committee was represented by Lord Blythwood, Sir John S. Samuel, Prof. Robert Kennedy, and Prof. Magnus Maclean. There were also present Mr. Fred Brock and other members of Sir Thomas Brock's family, Sir Charles Ballance, Sir D'Arcy Power, Sir George Makins, Sir Cuthbert Wallace, Sir Alfred Fripp, Sir Anderson Critchett, Sir George L. Cheatle, and many others representing medicine, surgery, and the sciences.