appeals for employment, and at length, early in 1915, he was appointed in charge of the Surgical Division of the 21st General Hospital. Pending this hospital's organization, for six weeks he was surgeon to the British Hospital established at Wimerex by Sir Henry and Lady Norman. In May Sir Victor was gazetted Major R.A.M.C.(T.), and on May 20, 1915, he left Southampton with the staff and nursing staff of the 21st General Hospital for Egypt, the hospital being located at Alexandria. Nothing was ready, and, as Horsley wrote: "We shall be frantically busy licking into shape the rotten old barracks which has been handed over to us to convert into a hospital. The Israelites in Egypt were not in it *re* making bricks." On July 14 he was appointed consultant to the Mediterranean Expeditionary Force with the rank of full Colonel, A.M.S. He was in Egypt from June, 1915, to March, 1916. In August, 1915, Lady Horsley joined him, and later their daughter Pamela (Mrs. Stanley Robinson). In October Horsley visited Mudros and Gallipoli, inspected field ambulances and casualty clearing stations, as well as dressing-posts in the trenches and firing-line, and reported on medical conditions. In Egypt, after operating and visiting patients all day, he would work through the hot evenings writing letters and notes of his cases.

There was much public concern about the inefficiency of the medical arrangements in Mesopotamia, and, when Horsley volunteered for the campaign, the authorities were only too glad to have a surgeon of his eminence and standing to report on the matter. He reached Bombay on March 25, 1916, and visited Delhi and Simla: he left Bombay on April 9 and reached Basra on April 16. Here again he worked indefatigably under a hot tropical sun, operating on head injuries, investigating the medical conditions, and collating and preparing notes for his report which he intended to write in India.

Colleagues who worked with Sir Victor at Amara—the late Professor Grey Turner, Sir Zachary Cope, and Dr. Feiling—have told me that he worked too hard for a man of his age in a hot climate. He was frequently urged to curb his extraordinary energy and not to put too severe a strain upon his physical capacity. But to Horsley the work was all, the man nothing.

Sir Victor was working on July 14, when the shade temperature was over 110° F. (43.3° C.), and his last call was on a sick officer whom he knew. On the 15th he became ill and was moved to No. 2 British General Hospital. On July 16 his temperature rose rapidly, he became unconscious, and died of heat-stroke that evening.

Palms were laid on his grave. Later, a cross of white marble was placed over it. He had fought the good fight, he had finished his course, and so Mr. Valiant-for-Truth "passed over and all the trumpets sounded for him on the other side."

I am indebted to the late Mr. Stephen Paget, the author, and to Messrs. Constable and Company, Limited, the publishers, for permission to use certain material in the preparation of this lecture contained in *Sir Victor Horsley: A Study of His Life and Work*, Stephen Paget, London, 1919.

A short pamphlet entitled "The Doctor and his Patients, the Parish Priest and his People" has been published by the Guild of St. Raphael. The Guild consists of clerical and lay members of the Anglican Communion who are anxious to "restore the Ministry of Healing as part of the normal functions of the Church." The pamphlet discusses "the Christian view of Medicine, the Church's Ministry to the Sick, and the practical issues that stem from these considerations." The practical issues include the ways in which doctors and priests can co-operate to provide "a service to the sick which will be truly adequate to all their needs." Three doctors and three priests have jointly written the pamphlet, which is obtainable from the Guild of St. Raphael, 77, Kinnerton Street, London, S.W.1, price 6d., post free.

REMINISCENCES OF AN AMERICAN STUDENT

BY

ERNEST SACHS, M.D., F.A.C.S., F.I.C.S. (Hon.)

It is a great pleasure as well as a very great privilege to have this opportunity to pay tribute to Sir Victor Horsley. Unquestionably he was the father of neurological surgery, for, although sporadic attempts at brain surgery had been made before him, he was the first man to devote himself exclusively to this work.

It is my good fortune to have received my training with him. In 1907 no one in the United States was doing this work. While I was a student at Johns Hopkins, Harvey Cushing was just beginning his first efforts in neurological surgery, but the only place to obtain training was with Sir Victor. I applied to him and was given an opportunity to work in his laboratory in University College. He immediately took me under his wing and very promptly gave me every opportunity to learn his methods and follow his work from every angle. He withheld nothing and gave me most generously of his time. He treated me like a son in his home, and Lady Horsley was equally cordial.

Horsley at Work

I had been trained in surgery under Dr. Halsted at Johns Hopkins and was thoroughly imbued with the methods he taught; therefore it was something of a shock when I first saw Sir Victor operate. He practised antiseptic surgery while I had been trained in aseptic surgery. He worked under a stream of antiseptic solution with which the wound was constantly irrigated by an assistant. His opening of the skull was crude. He always sacrificed his bone flap, but I soon learned that this was unimportant, and that what really counted was his superb knowledge of anatomy and physiology. As soon as the brain was exposed, his handling of the tissues was exquisite and very delicate, and his knowledge of brain anatomy with all its possible variations was outstanding. I recall one occasion when he exposed the occipital lobe and remarked he would make an incision, avoiding Genari's streak. I doubt whether there are many neurosurgeons to-day who know their brain anatomy so thoroughly that they could do that.

Sir Victor spent every afternoon in his laboratory, and the only time I ever knew him to give up that session was when he had an opportunity to deliver an address on the subject of alcohol. He was an uncompromising teetotaler, and I have seen an audience spellbound by his wonderfully well documented discussion of the harmful effects of alcohol. He was convinced of this, and I frequently heard him say that no one could have heat-stroke who did not take alcohol. It is, of course, well known that this conviction of his was responsible for his death from heat-stroke while serving with the troops in the first expedition in Mesopotamia. A medical officer who was with him told me that Sir Victor absolutely refused to wear the helmet or spine pad required of all personnel, and as a result died of a heat-stroke.

Sir Victor was in his element when he was with a group of physiologists. I recall a meeting of the Physiological Society at which were Sherrington, Bayliss, Starling, Page May, and Gotch. Someone brought in a chicken that was ataxic, and Horsley, who with Clarke had just completed his experimental work on the cerebellum, upheld the thesis that the attacks were cerebellar in origin. There was considerable animated discussion and some difference of opinion. What the final outcome was I never learned, but the way Sir Victor stood his ground I shall never forget.

Animal Experiments

Sir Victor was much interested in comparative anatomy and would go to any lengths in order to obtain the brain of some unusual animal. When a walrus died at the Zoological Gardens, the first time in years, he gave up all his consultations that morning in order to take out the brain. When I remarked about this, he said: "If people want me to learn they must be willing to wait." Whenever any of his former students went to the Tropics or Far East he urged them to send him brains of wild animals. One day while I was with him a huge barrel arrived from India. In it, packed in salt, was an elephant's head. One of his former assistants had taken with him on an elephant hunt formaldehyde and injection bottles to inject the carotids after decapitating the animal. The specimen was accompanied by a letter and photographs showing the natives standing around gaping while this performance was going on. Sir Victor got a great thrill from these pictures and immediately took out the brain. In this way he collected a large amount of material and had innumerable photographs of various brains. These he photographed himself in his laboratory in his home in Cavendish Square, but, so far as I have heard, none of this material has ever been worked up or published.

Sir Victor was one of the most prominent vivisectionists at that period; consequently when Parliament was reviewing the laws about vivisection he was one of the important witnesses. A disgruntled former laboratory boy testified before the commission that he had seen Sir Victor pull the heads off living cats. The next day, when Sir Victor appeared in the laboratory, he told the laboratory assistant to bring up a cat, killed it with chloroform, and then told the boy and me to pull at one end of the cat while he pulled at the other. Of course we all knew nothing would happen, but Sir Victor

had to have positive proof before he would testify before the commission. The episode illustrates one of his fundamental characteristics—every statement he made had to be backed up by incontrovertible evidence.

Wide Interests

In the autumn he always rented a place for the shooting rights and went at the shooting as strenuously and enthusiastically as he did everything else. But the first thing he did when he rented a new place was to familiarize himself with the surrounding country. By the time I went down for my Christmas holiday he took me around in his high-powered Daimler, which he loved to drive, and showed me an interesting chancel in one church, a beautiful rose window in another, and a Roman ruin in another place. His interest in art he came by quite naturally, for his father had been a Royal Academician and his uncle was the famous etcher Sir Francis Seymour Haden.

Of Sir Victor's many admirable qualities, not the least was his generosity towards his younger colleagues. Of this I had striking proof. When I had completed the research I had been carrying on in his laboratory, I presented him with the manuscript and, naturally, had put his name and mine on the title-page. He crossed out his name, with the remark: "As long as it is customary, when two men publish a paper, to give credit to the one who is better known, I shall not allow my name to appear." No amount of persuasion could make him change this decision.

As I look back upon the years I spent with Victor Horsley, I feel he gave me the best possible insight into the life of a broadminded, generous scientist of his generation.

He will always be remembered as one of the great figures in medicine.

GLUCOSE TOLERANCE IN PERIODIC PARALYSIS

BY

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Hypokalaemia and muscular paralysis were first associated clinically in patients with familial periodic paralysis (Biernacki and Daniels, 1934; Aitken *et al.*, 1937). Although the association has since been observed in several other conditions (Jackson and Oakley, 1955), the identity of the original disease remains distinct. Clinically it is characterized by a familial incidence in at least 80% of cases, by a tendency for the paralytic attacks to begin during sleep, and by the fact that the individuals affected are otherwise healthy (Talbot, 1941). Biochemically it is unique because the hypokalaemia is intermittent and evidence of potassium depletion is lacking (Gass *et al.*, 1948). The pattern of the disease is definite enough for "sporadic" cases without family history to be recognized, and exceptional cases without hypokalaemia are also described (Watson, 1946; Tyler *et al.*, 1951; Ecker, 1953).

The metabolic defect in this disease is not understood, but the response to stimuli which lower the plasma potassium level tends to be exaggerated (Aitken *et al.*, 1937). After the administration of glucose or insulin, for instance, hypokalaemia is often excessive, and paralytic attacks may sometimes be induced in this way to confirm the diagnosis. No undue external loss accompanies the fall in level of the plasma potassium, which is accounted for quantitatively by a transfer of extracellular potassium into the intracellular phase (Danowski *et al.*, 1948). In other words, hypokalaemia is

excessive either because too much potassium leaves the extracellular fluid or because too little returns to it. Which mechanism is operative and why it should occur is uncertain, but fortunately oral potassium controls the symptoms.

A sporadic case of periodic paralysis in which glucose tolerance appeared to be abnormal is described.

Case Report

A 33-year-old engineer complained of attacks of paralysis for 13 years. In the intervals between attacks his health was excellent and he often took part in weight-lifting contests. None of his relatives was similarly affected, nor was there a family history of migraine. The paralysis first occurred in 1943, when he was serving in the Royal Marines. At the end of an evening film show he was unable to rise from his seat because both arms and both legs were weak. All subsequent attacks began between 3 and 7 a.m. In a moderate attack he awoke unable to turn over in bed because his arms were weak and his legs were paralysed. In more severe attacks all four limbs were paralysed but he was able to move his head. Coughing and swallowing became difficult only in the most severe attacks, and speech, breathing, and eye movements were never affected. Micturition was impossible early in an attack, and he was constipated afterwards. Sensation was not disturbed, but his muscles were often painfully stiff next day. Consciousness was never impaired, although he became irritable and apprehensive when paralysed. Nothing was known to precipitate the attacks, but they were sometimes predictable from "a feeling