pions and the pyramid, down to the lateral column of the spinal cord. When this condition has been fully developed, no kind of treatment is of any avail; and it appears, therefore, for this reason alone, that your therapeutical efforts should not be postponed a day longer than you can help it. Ergot, in the form of the liquid extract, for the cure of any military aneurisms which may be in the process of formation; phosphorus, for improving the nutrition and function of the injured nerve-cells in the neighbourhood of the lesion; galvanisation and faradisation, for the stimulation of the paralysed parts, are our sheet-anchors in the treatment of this condition; and, if sagaciously used, will do infinitely more good than the merely expectant plan of treatment, which has hitherto been somewhat too much the fashion in these cases.

A FEW PERSONAL FACTS CONCERNING EXPERIMENTS ON ANIMALS OPPOSED TO THE FALSE FANCIES OF THE PERSECUTORS OF VIVISECTION.

By CHARLES J. B. WILLIAMS, M.D., F.R.S.,

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1. IN February 1835, assisted by several able physicians and surgeons, I conducted an investigation of the causes of the sounds of the heart. Two young donkeys were the subjects of the experiments. They were killed by the insertion of woorara poison (twenty and fifteen grains) into a small wound in the thigh. When they ceased to breathe, and every sign of sensation and voluntary motion was extinct, the chest was cut open, and the heart was found still beating; by the aid of artificial respiration, it continued to beat regularly for upwards of an hour, during which time I made the series of observations on the sounds, and on the means of stopping or altering them, which gave the first complete knowledge of those sounds. This knowledge has ever since supplied the profession with the means of distinguishing the signs of the heart's action in health and in disease. It is difficult to overrate the value of this discovery in the practice of medicine; yet it was obtained at the cost of the lives of only two young animals, with only the suffering of a trifling wound, much less painful than one of the common blows with which these poor brutes are belaboured in their common work. The large dose of woorara destroyed all possibility of suffering; in fact, however doubtful may be the action of small quantities of this poison, it is certain that these animals were dead in all respects except the heart's action, and this was automatically sustained for awhile by artificial respiration.

2. In a series of researches, in which I proved the muscularity of the bronchial tubes and shewed the modes of acting on it in cases of asthma, I made use only of recently dead animals; and the intelligent physiologist knows that there are often residues of life which may be thus profitably questioned by experiment long after the cessation of all feeling. Yet, such cases are ignorantly or mendaciously branded as instances of animal torture.

3. In 1841, I was long engaged in studying the circulation of the blood in the web of the frog's foot; and, among other results, I was enabled to trace the process of determination of blood to enlargement of the arteries on the application of an irritant. Yet, so gentle were the means which I used, and so little hurtful to the feelings of the animal, that I needed no ligature to the toes, but simply spread the web on glass with a wet camel's hair brush; and, by patiently waiting, could best observe the size and current of the vessels during the periods of tranquillity when the animal seemed quite at ease. The nature of the inquiry excluded all strong or painful irritants, and the best results were obtained when there were no signs of uneasiness. These observations have been referred to by Professors Virchow and Burdon Sanderson as the first to demonstrate the true cause of determination of blood in health and in disease, a chief element in the processes of growth and inflammation.

These and other important results of investigation by a private individual, seeking after truth, with full consideration to brute as well as to human suffering, would never have been obtained had that law been in force with which it is now proposed to shackle and insult the members of an enlightened and humane profession.

ON VIVISECTION AND SCIENTIFIC SURGERY.

By SAMPSON GAMGEE, F.R.S. (Edin.),

Surgeon to the Queen's Hospital; President elect of the Birmingham and Midland Counties Branch of the British Medical Association.

THE Parliamentary Committee of the Association has worked so well, in eliciting the opinion of the profession on the Vivisection Bill, and the eminent men who have spoken for us have done so with such weight of authority and discreteness of utterance, as to supply very convincing proof of the power to which the British Medical Association has attained.

Yielding to none of my brother associates for sincerity in acknowledging the obligation imposed on us by those who have fought our battle, I submit that, in the contest for freedom of experimental investigation, the great influence which experiments on living animals have exercised on scientific surgery has been somewhat overlooked.

When Lord Cardwell* put the question "Have the great performers of these painful experiments on animals been generally great surgeons?" Sir William Fergusson is reported to have answered, "No, I am not aware of any great surgeons having been very great experimenters on the lower animals".

Omitting the obvious instance of John Hunter, and his immediate followers in this country, what were Scarpa, Dupuytren, Travers, Syme, Ribès, Jobert, Sédillot, and Porta, unless great surgeons and great experimenters on the lower animals?

In the whole subject of the arrest of hæmorrhage by pressure, ligature, and torsion, in the selection of the best materials for sutures, in the treatment of wounds of the intestines, in the discovery and demonstration of the pathology of pyæmia and allied states of blood-poisoning, in the repair of tissues, experiments on living animals have preceded, and been the foundation of, progress in scientific surgery.

Some proof of this proposition is to be found in the Report of the Royal Commission on Vivisection, but much more evidence might be adduced. While the Hunters in this country were raising surgery towards the dignity of a science, the French school was labouring successfully in the same direction, through the happy coincidence which made Bichat the pupil of Desault, and the editor of his works. It is needless to say how the very brief and brilliant career of Xavier Bichat affected the sciences of anatomy and physiology. If any one doubt how directly his teaching influenced the study of surgery by experiments on living animals, and by clinical observation, let him consult such a work as that of his pupil Ribès' *Mémoires et Observations d'Anatomie, de Physiologie et de Chirurgie* (Paris 1841).

Dupuytren's clinique was one of the greatest schools of practical surgery the world has ever known; not merely pupils in the ordinary sense, but surgeons from all countries crowded round the great teacher in the Hôtel Dieu. Admitting the paramount influence of his intellectual endowments and of his iron will, there is no doubt that Dupuytren's success, as a promoter of surgical science, was largely due to the completeness of his medical education, particularly in anatomy, in chemistry, and in experimental physiology: he worked in Thénard's laboratory, and repeatedly had recourse to experiments on living animals.†

As a pioneer to new truths, as an anatomist and physiologist, as a draughtsman and linguist, as a dissector and a mechanician, as an operator and a clinical teacher, Antonio Scarpa has had few rivals in the history of medicine. What a school he was reared in! A favourite pupil of Morgagni, who, when stricken with blindness, made him his amanuensis, and closed his long and glorious life in his arms, Scarpa, as a pathologist, proved himself a worthy follower in the work *De Sedibus et Causis Morborum*. The pupil in Paris of Vicq-d'Azyr and Frère Côme, in London of Pott, the Hunters, and Cruikshank, the companion of Volta in his visit to the Universities of Germany when Wrisberg, Blumenbach, Gmelin, and Richter professed at Göttingen, Scarpa was educated in the highest school of science, and pre-eminently qualified

* Report of Royal Commission on the Practice of subjecting Live Animals to Experiments for Scientific Purposes. London: 1876. Question 1026, p. 49.

† Eloge du Baron Dupuytren in *Histoire des Membres de l'Académie Royale de Médecine*, par E. Pariset et E. F. Dubois; Paris. 1850, tome second, p. 103, et seq. See also *Parallèle de Delpech et de Dupuytren in Tribut à la Chirurgie*, par E. F. Bouisson; Paris et Montpellier, 1861, tome second, p. 1, et seq. *Propositions sur quelques points d'Anatomie de Physiologie et d'Anatomie Pathologique*, par G. Dupuytren, an. xii, 1803.