

THE MUSCLES OF OWEN

by A. J. E. CAVE

THE purpose of this trivial notice is merely to direct attention to two small muscles, and those non-human, which were the minor and incidental discoveries of that monumental figure in comparative anatomy and palaeontology — Sir Richard Owen. Even to mention such minutiae in the light of Owen's prodigious and profound contribution to zoological science is flagrantly antithetical: yet such mention in these pages may be excused on two grounds, the one domestic, the other educative. Owen was a Bart's man, and its greatest scientific alumnus: to the generations which succeed him within the Hospital and Medical College, even his smallest anatomical discovery cannot fail to occasion pride and interest, and no apology is necessary in defence of a little family gossip. The moral pointed by his minor myological discoveries is salutary for all, whatever corner of the scientific or clinical field be tilled: it is the perennially valid counsel that careful observation, of whatever material, is always rewarding.

The finding of hitherto unknown muscular slips in an animal carcase may nowadays be considered no great matter and perhaps not even a 'scientific' business at all. But the exploring hand and the observant eye which noted these admitted trivialities were equally responsible, under exactly similar difficulties of operation, for no less momentous a discovery than that of the mammalian parathyroid glands¹. This lesson should be pondered, the more so perhaps in these present days, when, in so many scientific disciplines, an essential but increasingly complex exploratory armamentarium threatens to mask the fundamental necessity for direct observation of whatever material be under study.

Before describing the two small muscles which Owen discovered, some brief reference to his early days, and to his association with Bart's, may not be regarded as irrelevant.

After serving professional apprenticeships (1820-23) as was the old custom in medical education, Owen matriculated in 1824 at Edinburgh University, wherein he suffered the notoriously unprofitable lectures of Monro Tertius, but most fortunately came under the stimulating extra-mural influence of Dr. John Barclay, whose courses in practical anatomy he attended. Barclay made a great impression on young Owen, by whom henceforth he was held in the most affectionate regard. In April, 1825, Barclay persuaded Owen to migrate to London that he might study under John Abernethy at Bart's and to this end gave him a letter of introduction and recommendation. Abernethy greeted the young man in characteristically off-hand fashion, but invited him to breakfast, when, impressed equally by Barclay's testimonial and the obvious qualities of his guest, he appointed him forthwith prosector for his anatomical lectures. Thus began Owen's memorable and valued connexion with St. Bartholomew's Hospital and its Medical College.

In 1825 Owen was elected to membership of the Medical and Philosophical Society of St. Bartholomew's (now the Abernethian Society) and the following year read before it two papers, one entitled 'On encysted calculus of the urinary bladder', the other 'A case of gluteal aneurysm with ligation of the common iliac'. That same year he qualified M.R.C.S. (old style) and set up in medical practice among the lawyers of Lincoln's Inn Fields — more precisely, at 11 Cook's Court, Carey Street — almost next door to the Royal College of Surgeons Museum, wherein so much of his future professional life was to be spent. In 1827, doubtless through Abernethy's wisdom, he was appointed Assistant Conservator of the Hunterian Museum, William Clift being Conservator, and his son, William Home Clift, Assistant Conservator with the assured promise of succession to his father's office. The next year Owen became

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Lecturer in Comparative Anatomy at Bart's, in which post he continued until 1835, establishing therein his great reputation as an impressive and successful lecturer. It would seem that for most of this period Owen lectured at the request of the Hospital Staff, for it was not until October, 1834, that he received formal appointment by the Hospital Governors. Howbeit, it is to the memory of this historic teaching association that the 'Owen Laboratory' is dedicated in the present Department of Zoology and Comparative Anatomy of the Medical College in Charterhouse Square.

About this time Owen inaugurated his long-sustained and meticulous anatomisation of animals dying in the menagerie of the Zoological Society of London (of which he was Fellow by 1830 and Council Member by 1834), thereby laying the foundations of his exhaustive and unrivalled knowledge of vertebrate morphology. (The minor myological discoveries detailed below were made in this connexion.)

But by 1832 Owen found himself in a quandary. His practice was small, his work at the Royal College of Surgeons and at Bart's was not very remunerative, the succession to the Conservatorship of the Hunterian Museum was promised to young Clift, and Owen himself, engaged to Caroline Clift, was anxious to marry. He had published that year his classic 'Memoir on the Pearly Nautilus', which established his reputation as a first-rank scientist both at home and abroad. Yet nowhere appeared any channel of permanent employment congenial to his bent and affording scope to his distinctive and undoubted talents.

This dilemma, however, was unexpectedly and tragically solved by the accidental death in the September of William Home Clift. Sustaining a fractured skull from a cab accident in Chancery Lane, he was admitted to St. Bartholomew's Hospital (being received by Owen) and died therein some days later. By this stroke of fate William Clift lost a son and gained a son-in-law, and Owen's professional life settled into its predestined course, first at the Hunterian, later at the British Museum.

Inevitably, a full-time Assistant Conservatorship of the Hunterian Museum necessitated the severance of formal academic ties with Bart's. Henceforth, Owen's labours were

to be directed wholly away from medicine and into those fields of comparative anatomy and palaeontology wherein John Hunter had pioneered. But private ties continued to bind Owen to his old Hospital and Medical College, and many of his erstwhile colleagues and students remained his life friends. Nor did he ever forget John Abernethy, who had sat at Hunter's feet and whose devotion to his master's ideals secured for the Hunterian Museum the services of his former prosector, the one man then capable of organising and developing its collections.

Hunter-Abernethy-Owen : Hunter-Clift-Owen. In double measure the Hunterian tradition devolved upon the receptive Owen, whose native genius, thus fortified and stimulated, rendered him the greatest of a distinguished line of Hunterian Conservators and the one perhaps most sympathetic to Hunter's distinctive outlook on biology.

That story, however, is outside our present purpose, and we return to Owen's anatomical labours in the Prosectorium of the Zoological Society. Here a prodigious amount of hard work was achieved upon a wide variety of comparative subjects, and over the years there issued in consequence a voluminous output of memoirs and papers whose classic importance time has not diminished. Perhaps only personal experience of the dissection of large mammals can bring realisation of some of the difficulties involved — the laborious business of flaying and dismemberment, the unwieldy nature of parts and organs, the impracticability of employing preservative injections and the inevitable race against the onset of putrefaction. Under such conditions, and anatomising such desperately awkward carcasses as those of rhinoceros and elephant, the discovery of even insignificant muscles is both a tribute to acuity of observation and an object lesson in prosection.

M. depressor palpebrae inferioris.

(Owen, *Trans.Zool.Soc.*, 1852, 4 (Art. 3), 55)

Commenting on the structure and mobility of the lower eyelid, Owen² remarks that 'rarely in mammals has it a proper depressor'. He himself was the first to observe such a special depressor muscle, and this during his dissection of a male Great Indian Rhinoceros (*Rhinoceros unicornis*) which he anatomised

during the winter of 1849-50. His specimen was the first example of this species to be acquired by the Zoological Society of London, in whose menagerie it lived from 1834 to 1849. Owen refers to the *M. depressor palpebrae inferioris* both in his classic monograph³ on the Indian Rhinoceros and in his monumental treatise² on vertebrate anatomy and physiology.

It seems most unlikely that his muscle had been observed by Vicq d'Azyr and his colleagues, in their earlier (1793) dissection of a male Great Indian Rhinoceros in Paris. This animal (whose skeleton is now No. A7974, Mus.Nat.d'Hist.Nat., Paris) had lived for some twenty-one years in the Royal Menagerie at Versailles and was dissected in July, 1793, by Mertrud, Vicq d'Azyr and S. Rousseau. No published account of their work ever appeared, Vicq d'Azyr dying the next year; but thirty-four relevant folio plates, executed by Maréchal and by Redouté père et fils, and annotated in Vicq d'Azyr's hand, remain unpublished in the Muséum National d'Histoire Naturelle. One of these plates depicts the eyeball and its attached muscles but none of them concerns the eyelids and their musculature.

Unfortunately, Owen gave no details of the attachments and relations of his depressor muscle, contenting himself with the single statement³ that 'the lower eyelid has a special depressor muscle', and subsequent authors have adopted a morphological rather than a physiological nomenclature for the various components of the mammalian facial musculature. It is therefore uncertain whether Owen's *M. depressor palpebrae inferioris* represents the *M. preorbicularis ventralis* or the *pars palpebralis* of *M. sphincteris profundus* of Boas and Paulli⁴, but in either case it is clear that a special depressor fasciculus to the lower eyelid is not confined to the rhinoceros, for Virchow⁵ has noted its presence in the elephant.

M. nictitator.

(Owen, *Comp.Anat.Phys.Vert.*, 1868, 3, 260)

In the elephant the nictitating membrane is supported by a special cartilage to assist its action as a cleanser of the surface of the eyeball. Owen observed³ that 'there is a special "nictitator" muscle, the fibres of which pass at first over the base of the membrane in a curve, then form an angle to include the ex-

tremity of the nictitating cartilage, which is consequently moved in the diagonal of the contracting forces, and pushed forward and outward over the front of the eyeball'.

This 'nictitator' muscle consists essentially of slips which proceed from the deep aspect of *M. orbicularis oculi* to the upper and lower aspects of the 'handle' or posterior process of the cartilago nictitans. It recalls, but is not necessarily homologous with, the *pars lacrimalis* of *M. orbicularis oculi* in Man (= Horner's muscle, *M. lacrimalis posterior*, *M. sacci lacrimalis*, *M. tensor tarsi*). Innervation is similar but is here an uncertain guide, for in the elephant a lacrimal sac and nasolacrimal duct are wanting, and it needs yet to be established whether a cartilago nictitans is invariably provided with a *M. nictitator*, likewise the nature of anatomical arrangements in those species wherein a lacrimal sac and a nictitating cartilage co-exist.

The elephant has attracted the attention of anatomists from antiquity, when both Aristotle and Galen made observations upon its structure: later dissectors of this animal, before Owen's day, include Moulin⁶, Blair⁷, Duvernoy⁸ and Perrault⁹, Camper⁹ and Hunter¹⁰, but none of these appears to have anticipated Owen in his notice of the *M. nictitator*. The presence of this muscle has been subsequently confirmed by Virchow⁵ who, however, appears curiously silent as to Owen's previous finding.

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