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THE HUNTERIAN HERITAGE*

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John Hunter was born 222 years ago and died in October of 1793, on the same day that Marie Antoinette was guillotined in Paris.

To-day we once again commemorate his life and work. When one considers how little direct evidence of his influence on modern surgery can be traced we may wonder if there is not something of myth in our current conception of him. Yet, though standards vary, the core of greatness remains, and it may be said that it is the true mark of genius that it can survive changing standards. Hunter was great to his contemporaries, and when we contemplate his achievements he remains great to us after the passage of nearly two centuries.

The circumstances of John Hunter's early life and his introduction to London by his brother William are, I know, familiar to many of you, but by no means to all, and I think it is worth while considering once again what manner of man he was, what was his education, and the matter and method of his work, and thereby trace his influence on modern surgery.

He was the tenth child of a small Lanarkshire laird who was 68 when John was born—an interesting fact for the geneticists. His mother, 20 years younger, was the daughter of a successful Glasgow maltster, and upon

her fell the main responsibility for John's upbringing, as her husband died when John was 13 years old.

He was sent to school at Kilbride, but seems to have been little disciplined there or in the home. According to the available evidence John was no great help to his mother, and was, moreover, a poor

scholar, or, at any rate, an unwilling one. Anne Baillie wrote that "he would do nothing but what he liked, and neither liked to be taught reading and writing, nor any kind of learning, but rambling among the woods and braes. . . ." He himself remarked in later life that, "when a boy, I wanted to know all about the clouds and grasses and why the leaves changed colour in the autumn; I watched the ants, bees, birds, tadpoles, and caddis-worms; I pestered people with questions about what nobody knew or cared about."

His early education was certainly defective, but in 1755, presumably on the instigation of his brother, he was sent up to

St. Mary's Hall, Oxford—now incorporated with Oriel. It would appear that he spent only one term there and that education in the classics in no way suited his genius, for he said later to Sir Anthony Carlisle, "They wanted to make an old woman of me; or that I should stuff Latin and Greek at the University—these schemes I cracked like so many vermin as they came before me." It is quite clear that the Latin school of Kilbride

John Hunter. By Home.

*The Hunterian Oration, delivered at the Royal College of Surgeons of England on February 14, 1951.

and Oxford of that day had little to offer such a determined naturalist. Verbal felicity and a happy command of language were not among Hunter's attributes. Though inherent in a few, they are characteristics best developed by the system of teaching at our older universities. Of great value in almost any field, they are not necessary to the successful man of action, and I think that John Hunter comes into that category.

An Important Influence

At the age of 17 he was sent to live in Glasgow with his married sister, Jane. Her husband was a timber-merchant and cabinet-maker, and John probably took his share in the activities of the workshop. It clearly did not satisfy him as a career, and when he was 20 (1748) he rode up to London on the invitation of his brother William, who at that time was firmly established as a physician and teacher of anatomy. Sampson Handley in 1939 gave an attractive account of the latter's career and of his teachers, the Douglasses. Sampson Handley considers that the influence of this little group of London Scotsmen was of the greatest importance in the development of John's special abilities. For eight years he lived with his brother in Covent Garden and worked steadily at anatomy, and undoubtedly this was the important educational period in his life. He proved most efficient at his work in the dissecting-room, and made, or helped his brother to make, original discoveries in the placental circulation and on the method of descent of the testis. As dissection in those times was possible only in the winter months, he had much time to spare. Speculations on how he filled it have afforded free play to his biographers. In the century of enlightenment London was certainly an attractive place for a young man, but no reliable facts are recorded of his diversions. By way of study it is known that he attended some hospital teaching in 1749 and 1750 at the Chelsea Hospital, working under Cheselden, who was then just due to retire. In 1753 he was elected Master of Anatomy at Surgeons' Hall—clear evidence of his outstanding distinction in the field of his work up to date. It may be noted that Percivall Pott, though much his senior, was elected at the same time. After the Oxford interlude in 1755 he returned to London, attending St. George's Hospital for lectures, and was appointed house-surgeon to that institution in 1756. This resident appointment he held for five months, and it formed his only close experience of surgery in civil life before he embarked on private practice.

On Active Service

An important break in routine was his appointment in 1760 as a staff surgeon to the Army. It was said by Home that he joined the Army for reasons of health and that he had at that time the threatenings of consumption. It seems more likely that to a man of his energetic temperament the change was inspired by boredom with life in London coupled with a desire to travel and see more of the world. Moreover, it is difficult to believe that even in the eighteenth century a man would embark on active service for the cure of a chest complaint. It may be noted that in his letters to his brother from the Army the matter of his health is never mentioned—postings and pay, as was usual in the days of patronage, being the major issue.

He was appointed to the force destined for the attack on Belle Isle towards the end of the Seven Years War. Robin Adair was Inspector-General of Hospitals about

this time, and, being acquainted with the Hunters, he is presumed to have been responsible for the appointment. The operation was an amphibious one, and most of the wounded men were taken back to the ships for treatment after the two actions, the second of which was successful. In this interlude Hunter gained his experience of war surgery, and in his last work he quotes examples of the primary healing of wounds then observed. In his spare time he also pursued his bent for natural history and dissected eels and other fish. He also dates the draft plan for his work on the blood and inflammation to this period.

In 1762 he was transferred to Lord Loudoun's force in Portugal, being posted as surgeon to a hospital commanded by one William Young. John's letters to his brother during this service give some glimpses of the course of events and his own reaction to them. Of his two chiefs in the hospital he said, "They were as unfit for their jobs as the Devil to reign in heaven"; and, further, "God help the hospital when directed by such two." He was also concerned to augment his salary, which was 10s. a day, and put in a plea that he should be appointed deputy director of the hospital and on another occasion deputy purveyor. In a later letter from Portalegrá dated November 11, 1762, he says he is applying for the post of physician—"If I get that I shall be a Doctor as well as the best of you. I have attended his Lordship in all his marches, and have reason to believe I am well with him."

One may conclude that at this time, when he was 34, he was by no means confirmed in his own estimation as a surgeon, and indeed showed a very simple, human, and opportunist ambition quite natural in an age when patronage was so often the key to advancement in life.

The campaign in Portugal did not result in much fighting, and the hospital problem was mainly one of accommodation and evacuating the large number of sick. The late lamented George Gask wrote an admirable account, based on the Loudoun letters, of the hospital organization and Hunter's relations with it during this campaign. While in Portugal it would seem that Hunter was pretty fully employed in medical and minor administrative duties: his only written reference to scientific observations appeared in his paper, "An Account of the Hearing Organ of Fishes," which was not read till 1782.

Practice in Golden Square

An armistice was signed at the end of 1762 and Hunter returned to London in May, 1763. He then went on half-pay and set up as a practising surgeon in Golden Square. Foot says he opened a room for dissections, but how far this was with the object of teaching or for research is not known. His work and his strong personality must, however, have attracted notice, for in 1767 he was elected a Fellow of the Royal Society and in 1768 appointed surgeon at St. George's. His intense interest in the active pursuit of natural history can be dated from this period, for in 1764 he bought two acres of land at Earl's Court and built a cottage and stables on it; here he gradually established an extensive menagerie and experimental farm.

In 1771 he published his book on diseases of the teeth, illustrated by some excellent engravings by Sharp. The anatomical section of this work is admirable and is said to require little alteration to-day. On the clinical side he brings out his enthusiasm for the transplantation

Mrs. John Hunter.

of teeth and devotes much space to the theory and practice of the procedure. In relation to this activity Foot accused him of being mainly concerned with arousing the attention of dentists and gaining their patronage. Certainly the practice excited much public interest, evidence of which is shown by Rowlandson's cartoon on the subject. It must be said that Hunter, in his convictions on the value of hetero-transplantation, seems to have been unduly influenced by the outstanding successes and was slow to detect the drawbacks and dangers of the procedure. With the improvement in prosthetic dentistry the practice gradually died out except for a remarkable revival staged by Valadier during the 1914-18 war.

In 1771 he married Anne Home, sister of one of his pupils, and went to live in Jermyn Street. His wife was an attractive and gifted woman. She bore him four children, two of whom survived him. Her gift for light verse, her musical interests and social leanings; were in sharp contrast to her husband's scientific and almost asocial concentration, but, despite their divergent interests, she seems to have lived on good terms with him until his death. Hunter's life for the next 20 years continued in London, and, except for visits to Bath and Tonbridge for health reasons, he did not leave it. If we are to believe Ottley (1835), who quotes the faithful Clift, his daily routine was to start work at 5 or 6 a.m. After dinner, at 4 p.m., he took an hour's sleep; then worked till 1 or 2 a.m., and slept for only some four hours.

Experimental Work

The amount of work Hunter got through was certainly prodigious. At his death he had collected and made or dictated notes on 8,000 specimens. Owen, in editing Hunter's *Animal Oeconomy*, states that he anatomized at least 500 species of animals, exclusive of repeated dissections of different individuals of the same species, besides the dissection of plants to a considerable extent. He was progressively more sought after in consultation as a surgeon, and yet had time after 1785 to organize his museum in Leicester Square and, in some degree, control his employees, whom Clift estimated never to number less than 50. He continued up to the end to conduct experiments and dissect specimens at his farm at Earl's Court as occasion arose. Hunter's correspondence with Jenner, of which a good deal has survived, gives an impression of his activities and interest in this field. He was willing to give common-sense advice on surgical problems, but his main theme was always natural history and repeated demands for specimens. The following are some revealing examples:

January 10, 1776.

"DEAR JENNER,

"You must think me very fond of fish when you sent me cheese as much fishified as possible; however, it is an excellent cheese. . . . I have but one order to send you, which is, to send everything you can get, either animal or vegetable, or mineral and the compound of the two, either animal or vegetable mineralized. I would have you do nothing with the boy but dress him superficially; these funguses will die, and be damned to them, and drop off. Have you large trees of different kinds you can make free with? If you have, I will put you on a set of experiments with regard to the heat of vegetables. Have you any eaves where bats go at night? If you have, I will put you upon a set of experiments concerning the heat of them at different seasons.

Ever yours,
J. H."

On January 22 following, the brain fungus is again referred to:

"... if it is brain let it drop off; if it is fungus let it either drop or waste off. Therefore be quiet and think yourself well off that the boy is not dead. . . . You do not mention

Teeth transplantation. By Rowlandson.

a word about bats. . . . Have you got the bones yet of a large porpoise? I wish you had. Is ever the salmon spawn seen after she has parted with it? If it is, I wish you could get some: I want to examine the spawn of fish in the progress of the formation of the young one.

Yr. most obedient servant,

J. H."

Surgery at St. George's

In 1775 he began systematic lectures on surgery at St. George's. The course consisted of 86 lectures, which were read. By all accounts his delivery was poor; the subject matter dealt more with principles than with practice, and attendances were not good. Yet his more able pupils or disciples, such as Home, Cline, Astley Cooper, Lawrence, and Abernethy, valued them highly. His appointment in 1776 as Surgeon Extraordinary to the King is evidence of his established reputation in practice.

In 1780 his conflict with his brother William on the authorship of a discovery in relation to the placental circulation came to a head. They were both hot-tempered and obstinate in such matters, and the quarrel had not been made up when William died in 1783. It was in that year that he bought a 24-years' lease of premises in Leicester Square and expended £3,000 on building a museum and lecture theatre; the project was completed in 1785, and his collection was assembled there by Bell and Clift.

At this time Mrs. Hunter reports him as tormented with the "flying gout," and he went out of town for six weeks for a cure. He seems to have returned in fair health, for in December he carried out his first operation of distal ligature for popliteal aneurysm. Details of this innovation and arguments in favour of it were published after Hunter's death by Home, eight cases in all being quoted, with three deaths. It is interesting to note that until 1785 Hunter had considered the direct approach to be the correct one. Suppuration followed by secondary haemorrhage, however, was so common after this procedure that the English surgeons of that day advised primary amputation as the proper course for popliteal aneurysm if radical treatment became imperative. It may be remarked that even when the distal operation was generally adopted some suppuration about the ligature always took place and that serious secondary haemorrhage remained a common complication.

Hunter's Writings

Hunter's treatise on venereal disease was published in 1786, and French and German translations appeared shortly afterwards. This book forms a landmark in the scientific approach to the subject, the knowledge of which till then had been chaotic and the treatment too often left in the hands of quacks. It is noticeable, however, that Hunter's conclusions did not greatly advance the treatment of the conditions he investigated: he distinguished hard and soft chancre, but held firmly to the opinion that syphilis and gonorrhoea were caused by the same virus—an opinion strengthened by the experimental inoculation he carried out on himself. His advocacy of the caustic treatment of strictures did not remain in vogue for long, and one can guess that it was followed by many recurrences of the primary trouble.

His major work, *Treatise on the Blood, Inflammation, and Gunshot Wounds*, was not published till just after his death. It does not make easy reading, and revision

would no doubt have eliminated many of the repetitions. It is tinged with the metaphysical physiology of the period, and the author discusses at length "sympathy" in the body, subdividing it into three types. He recognized the existence of the red globules, but was sceptical of the detailed description of the blood by Leeuwenhoek and Morgagni, for he says: "These early observers imagined more than they saw." It is noticeable in all his work that in the main he trusted to naked-eye appearances. At most he seems to have used a magnifying glass, although Hooke had completed his compound microscope almost a century earlier. Of inflammation, though systematic, he does not make a very clear picture, which is not surprising considering the poverty of his means for observation: the terms he employed to illustrate his views were new to his contemporaries and do not convey a clear meaning to us to-day. In all his writing, reference to his predecessors' work is seldom in evidence and no acknowledgment of sources is made—to a degree which is surprising to us. However, it had the merit of revealing his independence of authority and his originality in thought. The results of his dissections and observations on the lower animals were mostly left in his note-books, but under the title *Animal Oeconomy* a group of papers on disconnected subjects was published in one volume in 1786. His contributions to the study of comparative anatomy were amplified by Richard Owen, who, from the surviving notes, brought the number of papers up to 48 in his 1835 edition. Interesting as evidence of his industry and curiosity though these various publications are, to-day it is his museum, with its additions and losses, that remains the principal monument of his life. Professor Grey Turner a few years ago devoted a learned and interesting Oration to its birth and development, and in so doing paid one of the outstanding tributes to Hunter's memory.

The circumstances of Hunter's death after an altercation in committee at St. George's are familiar. From the post-mortem appearance of his coronary arteries and aorta it is evident that his hold on life can have been but precarious for some time before his death. Hunter was himself conscious of this, and had said several years back that his life was in the hands of any rascal who chose to provoke him.

Assessment of His Work

In attempting to get a true picture of this remarkable man one realizes how difficult it is to reconstruct the past. It may be simpler to inquire into the views of successive generations of surgeons on his character and ability, and so perhaps trace the gradation from admiration modified by lack of comprehension or jealousy to the more balanced appraisal of his merit which developed in the lapse of time. Hunter's brother-in-law, Everard Home, in virtue of having been first a pupil and later his trusted assistant, was best qualified among his contemporaries to know his work most accurately and to assess it most justly. The fact that Home subsequently pirated much of Hunter's notes and then destroyed the evidence does not, I think, militate against his evidence on an earlier period.

Home's short and somewhat abrupt account of Hunter's life was appended in 1794 to the first edition of *The Blood and Inflammation*. In places it bears evidence of a feeling of annoyance and disappointment that at his death Hunter had left so little provision for his wife and family. The following quotations give the

core of his observations: "In the practice of surgery, where such cases occurred in which the operations proved inadequate, he always investigated with uncommon attention the causes of that want of success." "I had now lived six years with Mr. Hunter, and had completed my education. His expenses had always exceeded his

Portrait bust of Sir Everard Home.

income; I had therefore no emolument to expect from remaining in his house." And so Home went off to the West Indies as a naval surgeon, returning six years later to become Hunter's assistant. Later Home says, "Such was his turn for investigation and so extensive the scale upon which he instituted inquiries, that he always found something more to be accomplished"; and, "He was always solicitous for some improvement in medical

education"; and in 1787, "His collection, which had been the object of his life . . . was now brought into a state of arrangement." "The collection of comparative anatomy which Mr. Hunter has left . . . must be allowed to be a proof of talents, assiduity, and labour which cannot be contemplated without surprise and admiration."

Personal Characteristics

Of Hunter's personal qualities Home says: "His temper was very warm, impatient, readily provoked, and when irritated not easily soothed. His disposition was candid and free from reserve, even to a fault. He hated deceit and he was above every kind of artifice; he detested it in others and too openly avowed his sentiments." "In conversation he spoke too freely and sometimes harshly of contemporaries." "Public-spirited to an extreme, he valued money no further than as it enabled him to prosecute and extend his various and nearly universal researches. . . . He paid too little attention to his own and his family's interest."

Of his practice he records that Hunter's income was never over £1,000 a year till 1774, but that it rose to £5,000 several years before his death, and lastly to above £6,000. "In private practice he was liberal, scrupulously honest in saying what was really his opinion of the case, and ready when occasions arose to acknowledge his ignorance whenever there was anything he did not understand."

Another contemporary biographer, Jessé Foot, whose main claim to respectability was based on his having held the post of house-surgeon at the Middlesex Hospital, broke into print early in 1794. He was so much concerned with decrying Hunter's work and belittling his motives that his testimony is of little value. Jealous spite must surely have inspired such a statement as, "I am authorized to pronounce him, to have been, a very inferior, dangerous and irregular practical surgeon." On the other hand, he recognized Hunter as "one of the most industrious of men," and, in extenuation of his quarrels with his fellow surgeons at St. George's, mentions the poor health which dogged him in his later

years. Some idea of Foot's pretentious style of writing may be gauged from his method of expressing this: "The palpable diseased irritation of his mind, exacts all the apology, which humanity founded upon reason can bestow."

Foot's description of Hunter's physical appearance is probably reliable, and is as follows. "His person was about the middle stature: he was rather robust but not corpulent: his shoulders were broad and high, and his neck remarkably short: his features were hard,—cheeks high—eyes small and light—eye lashes yellow, and the bony arch protruded. His mouth was underhung." Dr. Beddoes, a versatile contemporary physician best known on account of his association with Lavoisier, Davy, and Priestley and for his therapeutic use of gases, makes the following notes on Hunter: "He fancied what he could not find words for, very profound. But he was mistaken. Whenever he found himself at a loss for words he was labouring with the delivery of nonsense." But he also writes: "When one heard of John Hunter as the first surgeon in London one felt a pleasure like that which arises from the distribution of poetical justice."

In the recently published *Diary of Syllas Neville* (1950) there are references to Hunter which throw some light on his contemporary reputation outside London. Neville, born in 1741, was a man of mysterious ancestry, small private means, and strong Whiggish sympathies. Dissatisfied with the life of a small Norfolk squire, he decided in 1771 to try medicine. He also had the intention thereby of augmenting his somewhat precarious income. In this he does not seem to have been successful, perhaps on account of a temperament of artistic sensibility coupled with a hesitating and anxious attitude towards life. His diary covers the years 1767–88. The first entry I shall quote appears in October, 1771, when Dr. Manning, a Norwich friend, is advising him to go to Edinburgh for his medical studies—"He says Hunter is an ill-natured waspish creature"—so to Edinburgh Neville went and completed his time under Cullen. When he left for London in 1776 Dr. Cullen advised him to take "one course of Hunter, to see his preparations accompanied by his demonstrations." In the entry of October 1, 1776, the entry appears: "Began to attend Dr. Hunter's course on anatomy. He gave his first lecture this day. He is an indifferent-looking little man, so that his figure is rather against him and his theatre is neither so large nor so elegant in any respect as Monro's." Regrettably Neville makes no further entry about his medical studies in London, and seems to have been more interested in the theatre and his own financial and domestic difficulties.

The Immigrant Scot

It is hard to assess the degree to which Hunter in the second half of the eighteenth century was affected by prejudice against the immigrant Scot. One may remember that Culloden preceded the period under consideration only by 20 years and that Scotland was still far from prosperous. Jessé Foot's diatribes and the antagonisms of his colleagues at St. George's are plain evidence of the jealousy aroused in small minds, but the sentiment was by no means limited to such. Dr. Johnson's quips have feeling behind them. We are familiar with his apostrophe: "But, Sir, let me tell you, the noblest prospect which a Scotchman ever sees, is the high road that leads to England." Said Boswell: "I do indeed come from Scotland, but I cannot help it."

To which Johnson replied, "That, Sir, I find is what a very great many of your countrymen cannot help"; and again, "Sir, it is not so much to be lamented that old England is lost as that the Scots have found it."

A counterblast to such sentiments from the other side of the Border may be found in a letter from David Hume, the historian and philosopher, dated from Edinburgh in 1776. He was writing to congratulate Gibbon on the first volume of his *Decline and Fall*, and in it he says: "Such a performance from an Englishman in our age would have given me some surprise. You may smile at this sentiment, but, as it seems to me that your countrymen for almost a whole generation have given themselves up to barbarous and absurd faction, and have totally neglected all polite letters, I no longer expected any valuable production ever to come from them." That some mutual prejudice existed is clear, and perchance such feelings are not yet quite dead.

Contemporary Opinions of Hunter

To continue with the views of his contemporaries, Sir Astley Cooper, one of the outstanding surgeons of the early nineteenth century, and a noble figure of a man, had a great admiration for Hunter, having attended his lectures in 1788. In his own lectures Cooper always refers to Hunter with veneration, although he is critical of some of his methods in surgical practice.

Abernethy, an ornament of Bart's, and one of Hunter's few friends among London surgeons, in his oration of 1819 called Hunter "a shrewd man, aye and a benevolent man too." He spoke of "the zeal with which he assisted every poor man of merit," and said he was humble-minded and a man of very considerable humour.

Sir Anthony Carlisle, another contemporary, in the oration of 1820 dressed his tribute in flowery language. Of him he said: "Reared and cherished in the Metropolis, the genial warmth of its public-minded inhabitants expanded all his energies, and their liberal discrimination supported him through those difficult, laborious, and expensive researches which were consecrated to the advancement of Medical Science." As a counter to this I may quote from Green, surgeon, philosopher, and friend of Coleridge, who in his oration of 1840 observed of Hunter: "... who at the sacrifice of fortune and present enjoyment to the cause of science, laboured with undaunted perseverance, amid the sneers of his contemporaries in the execution of his great work."

Edward Jenner was Hunter's favourite pupil and the only scientific friend with whom he regularly corresponded. Otley (1835) published a number of Hunter's letters, some of which I have already quoted. Unfortunately, Jenner's side of the correspondence has not survived. In his life of Jenner Dr. Baron says: "I was interested to hear Dr. Jenner . . . discoursing on the commanding and engaging peculiarities of Mr. Hunter's mind. He generally called him the 'dear man' and . . . described the honesty and warmth of his heart."

Of contemporary opinion abroad the main evidence we have is Hunter's election to membership of the French Royal Academy of Surgery in 1783 and the fact that all his major publications were translated into French and German within a year or so of their publication in England.

When we pass to opinions of the Victorian period the tone changes. Benjamin Travers in 1838 quoted Dr. Latham as saying, "Pardon me if I hold that Hunter

was only nominally a surgeon; he belonged to no isolated district of one profession and he is at this moment rendering aid to the labours of Physicians."

Later Evaluation of Hunter

Sir James Paget in 1877 composed one of the best and most fully documented studies of Hunter's life and work. He analysed the source of his intellectual activity, his power of natural observation, and also his passion as a collector. He said of him: "In all his practical writings we can detect the same scientific mind as was at work in physiology: the same care and laborious activity in collecting facts; the same quickness and usual accuracy in generalizing; but the whole effect is to 'be master of all the facts.'" Paget's conclusion, "Yes! Hunter did more than anyone to make us gentlemen," sounds a note which rings a little oddly to our generation.

Lord Lister admired Hunter and set much store on an annotated copy of Palmer's edition of his works and one of Sharp's engravings of the Reynolds portrait. Godlee in his *Life of Lister* draws a comparison between Hunter and Lister, noting how the first was extraordinarily diffuse in his interests, whereas the latter concentrated his activity, and in the event achieved so much more.

Savory's aphorism on Hunter in 1887 merits quotation: "He affected more by the questions he put than by the answers he worked out."

Later foreign evaluation of Hunter may be estimated from the measure to which his books continued to be translated. Quoting from Mr. LeFanu's full bibliography, one finds there were publications in French and German of his *Venereal Disease* as late as 1859, and of the *Blood, Inflammation, and Gunshot Wounds* in 1892. In a letter to Mr. Holden from Vienna in 1880 the great Billroth opens with the words, "I honour J. H. as one of the greatest men the English nation has hitherto brought forth, and I have often referred to him in my writings."

The substance of the orations of the current century will be more familiar, and I will confine my quotations to a few outstanding examples.

In 1927 Lord Moynihan in one of his polished addresses analysed the work of Lister and Hunter. Of Hunter he says: "There has probably never been a man in one profession with so wide an intellectual interest, so profound a knowledge of so many varied subjects wholly derived from direct personal inquiry and observation. He had no equal either as pathologist or as physiologist; he was already first among comparative anatomists, and was indeed one of the founders of the science." In tracing Hunter's intellectual background he remarked: "William Hunter, who impregnated the mind of his brother, drew his own inspiration and owed his intellectual guidance to the Monro-Cullen school in Edinburgh."

Wilfred Trotter, in 1932, in a characteristically philosophic essay, said: "Hunter was a consistent and expert user of the experimental method in the study of living processes, and it is on this fact that his fame essentially and ultimately rests. Further, it is impossible, however, not to be struck by a certain disproportion between the amount of energy and genius that was expended and the harvest of substantial knowledge that was gathered. Many of the researches were indecisive, not a few of the conclusions were incorrect, and no single advance

was won which could be said to mark an epoch in the history of knowledge."

Trotter attributed this relative failure to the atmosphere of embryonic science of Hunter's time and to the primitive equipment with which he worked on problems which have since only gradually yielded to all the resources of the modern world.

Professor Grey Turner, as I have already mentioned, wrote an outstanding monograph on the museum and its development, a subject to which Sir James Walton also contributed valuable observations. Professor Wood Jones in his new introduction to the museum points out that it may be termed a collection of specimens illustrating the great principles of the interdependence of structure and function.

His Enterprise

An aspect of Hunter's character which has not received much attention was his remarkable enterprise and business ability. This became evident after his return from Portugal in 1763: his aim to devote his main energies to research and experiment in the animal field had by then crystallized. His purchase in the following year of the Earl's Court farm, and his building programme, form the first outstanding move in support of this aim. How he managed it without capital and with the half-pay of a staff surgeon as his only secure source of income remains mysterious and surprising. He was always ready to pay a good price for any unusual specimen of animal life—alive or dead—and his bargain of £500 to the resurrection men for the body of James Byrne, the Irish giant, in 1784 is one of the high spots in this respect. It also illustrates his passion for collecting the abnormal or unusual. Byrne was one of the curiosities of the town, and he is included in one of Rowlandson's cartoons. Syllas Neville went to see him, and makes the following entry in his diary on January 4, 1782: "Saw Byrne, the famous Irish Giant, in whose person Nature has exceeded her usual limits in a most astonishing degree. Even the great Patagonians are nothing to this—8 ft. 2 in. Tall men walk considerably under his arm; but he stoops, is not well shaped, his flesh loose, and his appearance far from wholesome. His voice sounds like thunder, and he is an ill-bred beast, though very young—only in his 22nd year."

Another example of Hunter's independence and enterprise is afforded by his setting up a private printing press in 1786. From this he produced and sold his books direct to the public. The purchase of the lease of the Leicester Square property in 1783 and the consequent ambitious building programme are a further reminder of the big way in which he managed his affairs. Professor Wood Jones thinks it was remarkable that he managed to obtain so many glass specimen jars for his collection at a time when they were not regularly manufactured. His passion as a collector of protean interests is shown by the contents of his museum. At his death it contained, beyond the many preparations pertaining to the animal economy, a large collection of fossils, several suits of armour, weapons, and pictures. At the sale of his effects after his death, pictures and engravings fetched £940, "curiosities" £200, and books £160. How he acquired the Stubbs pictures, which remain in our museum, we do not know. It is unlikely that they were commissions, as it is recorded that Stubbs's recognized fee for the portrait of a racehorse from 1760 onwards was 100 guineas. Hunter admired Stubbs's

paintings, and mentions in a letter to Jenner that he had picked up for £5 one of his studies of a lion attacking a horse—perhaps it was a copy.

In my brief sketch I fear I have given but an incomplete picture of Hunter and a bare outline of the results of his impact on the surgeons of his own and later periods. His influence on the practice of surgery, so far as it was immediate, was not great. He was unquestionably the initiator of the scientific approach; but, technically, surgery could make no substantial advance till the advent of anaesthesia followed by asepsis opened wide the door. It was in the sphere of medical education as a whole that his influence bore more immediate fruit.

Present Aims in Surgical Education

To-day, mainly owing to the vision and energy of Lord Webb-Johnson and the munificence of Lord Nuffield, this college is embarked on a full policy of postgraduate education in surgery. With both the examining and the teaching for an essential diploma in its hands the college is now endowed with an almost monopolistic power whereby it can mould English surgery. We shall therefore have to guard against the imposition of a uniform official pattern on our graduates. Our aim should be to secure in our diplomates an inquiring and critical attitude of mind. Gibbon observed that of the two educations a man had—the one given to him and the one he gave himself—the education he gave himself was by far the more important kind. Hunter certainly relied mainly on the latter type. It is not my intention to suggest that in matters educational we can draw dogmatic principles from the example of genius, but one may emphasize the importance of allowing fair play to independent thought and action at all levels.

Our primary examination is founded on the so-called basic sciences. What these exactly should be is in some degree on trial and *sub judice*. Ideally the subject matter should vary in accordance with the course of undergraduate education undergone by the candidate; but to contrive such adaptability is hardly practicable. There is a general agreement that a full knowledge of human anatomy must remain as the foundation of the surgeon's education. With the ever-continuing extension of specialized knowledge in physiology and pathology, the drafting of a reasonable syllabus in these subjects becomes more and more difficult. Some would add, or substitute for items in the current model, elementary logic and some study of the history of philosophy; others have suggested a knowledge of statistical methods. However, whatever the outcome in the introductory phase our final aim is the education of practical surgeons, and with this in view we should not forget that surgery is a craft as well as a science, and that it deals with human bodies and personalities. I think we should bear this ever in mind and take care that lectures do not hold too prominent a place in our system. They help to get the student through examinations, but do not necessarily make him a competent doctor or give him a working knowledge of human relationships. They impart knowledge but cannot give wisdom. The place to develop this is in the hospital, where contacts with the teacher are on a different plane and where a man's own observations can be brought to bear on the problems of the sick, where responsibility is shared, failure can be analysed, and success appraised. In regard to the method of assessment in the final examination, I cannot help thinking that soon we must allow greater credit to

the practical training the candidate has undergone rather than give too much weight to his mastery of multiple facts and divergent opinions.

A Need of To-day

To turn to another facet of the Hunterian heritage—we all probably accept the truth of Lawrence's aphorism, "Thus we find at last the difference between physic and surgery is a distinction not in science but in practice." Mr. Victor Bonney in his eloquent oration of 1942 made out a strong case for some integration of the many specialties into which medicine of to-day is breaking up. Beyond this there is the need for some corporate body to direct and in some degree associate the multiple activities of medical minds of to-day. If some such joint association is not made effective there is a risk of the all-embracing State machine taking too great a part in controlling our activities. The need for some such organization was envisaged as long ago as 1905 by Sir Clifford Allbutt in his lecture, "The Historical Relations of Medicine and Surgery"; in that he formulated a plea for the foundation of an Academy of Medicine and proposed for it the Wriothesley motto of "Ung par tout et tout par ung." His ideas, I think, in some degree helped to advance the establishment of the Royal Society of Medicine; but this great foundation, successful as it is, does not supply the basis for that spiritual integration in an organized manner which is desirable if we are to present an undivided mind in face of State control and prevent the fragmentation of medicine into progressively smaller groups.

Duke-Elder in 1942 wrote, "British medicine in its present uncoordinated state, lacking central stimulation, guided by unrelated and often competing professional bodies and administered by a dozen Ministries, is in no position to assert itself in an integrated manner to confer the benefits it might upon the population, or to implement the opportunities of the immediate future in reconstruction, research, and international influence." This may exaggerate the incoherence of our present state, but, even if we reduce his dozen Ministries to one or two, it is not so far off the truth. In 1945 Duke-Elder again returned to the subject. He doubted the power of the Royal Colleges to fulfil their proper function if they remained separate and in some degree isolated, and he put the question: "If the practice of medicine becomes more and more an affair of the State, is the profession provided with a body powerful enough to preserve the soul of medicine in its personal and creative aspects without which it cannot live?"

Many members of this and the other Royal Colleges have, I know, felt the need of some such linking of the existing traditional organizations. Practical propositions were launched some years ago with great hopes, but unfortunately they foundered on the shoals of finance and divided counsels.

One cannot but feel that the spirit and heritage of Hunter, his great museum and our library, do constitute a focal point towards which a renewed effort might be directed to bring our forces together before we are utterly fragmented.

Conclusion

In accordance with the Orator's traditional privilege, I have strayed from my main subject, but I wished to show that the inspiration of Hunter was for the whole body of medicine, that the harvest he sowed matured slowly and has been but gradually garnered. If we look back on Hunter's work I think we may agree that he

conformed to Francesco de Sanctis's definition of the man of science: "He is the highest and most virile type who needs no cult, for he carries the sentiment within him; he has no need for external stimuli for medals and titles, rewards or punishments . . . because he feels more powerful stimuli within him, and his conscience is stronger than any flag or banner."

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RELATION OF SHOCK, CARBOHYDRATE UTILIZATION, AND CORTISONE TO MITOTIC ACTIVITY IN THE EPIDERMIS OF THE ADULT MALE MOUSE

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Green and Bullough (1950) showed that following hind-limb ischaemia or the injection of adenosine triphosphate (A.T.P.) there was an early and strong reduction, or complete suppression, of mitotic activity in the skin of the mouse. This powerful inhibition was shown to occur in the presence of a hyperglycaemia which in normal mice is associated with an increased mitotic rate (Bullough, 1949a). Thus we found further support for the hypothesis which one of us (with H. B. Stoner) had gradually evolved, that the state of shock is fundamentally a profound interference with carbohydrate utilization. It therefore became interesting to find what substances known to be operating in the shock mechanism, or, on the other hand, known to interfere in one or more stages of carbohydrate breakdown, were capable of inhibiting mitosis in the epidermis of the mouse. The typical feature of this action and those now to be described is that the affected cells cease to go into prophase though those already in it complete their divisions normally. The general methods have already been described (Bullough, 1948; Green and Bullough, 1950) and we can therefore proceed directly to the findings.

Hormones Released in the Response to Injury

It was suggested that, in view of the protective role of the suprarenal cortex in the response to injury, a hormonal factor from this source might be responsible for the mitotic inhibition found in shock (Green and Bullough, 1950). In an article suggesting a possible mode of action of A.C.T.H. in allergic conditions (Green,