Introductory address delivered at St. George's Hospital, October 2, 1893, on the centenary of John Hunter's death / by T. Holmes.

INTRODUCTORY ADDRESS

AT ST. GEORGE'S HOSPITAL

ON THE

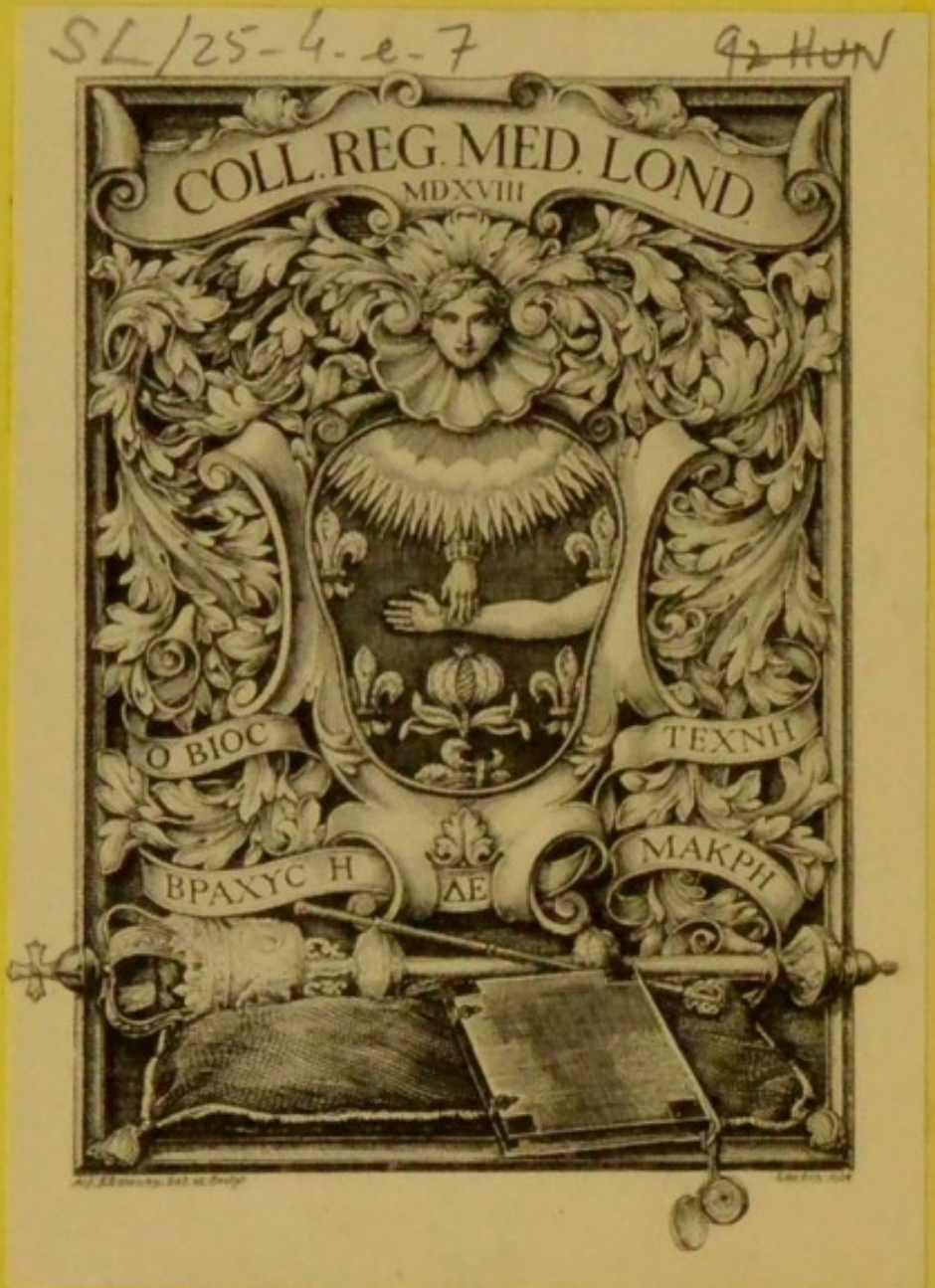
CENTENARY

OF

JOHN HUNTER'S DEATH.

1893.

T. HOLMES.



With the Author's compliments.

INTRODUCTORY ADDRESS

DELIVERED AT

ST. GEORGE'S HOSPITAL, OCTOBER 2, 1893,

ON THE

CENTENARY OF JOHN HUNTER'S DEATH.

BY

T. HOLMES,
CONSULTING SURGEON AND HUNTERIAN LECTURER ON CLINICAL SURGERY.

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1893.

INTRODUCTORY ADDRESS.

GENTLEMEN,

The honorable but very difficult task has been imposed on me, by my old colleagues, of welcoming the new students to the School to-day, and of delivering an Address on the Life and Works of Hunter, in celebration of the Centenary of his death, which took place almost exactly a century ago within the walls of the Hospital. We trust that the epoch will be marked in a more enduring way by the erection of a worthy presentment of the greatest of the many great sons of St. George's, in the school of which he was the real Founder.

My difficulty does not lie in the first part of my task. I can say, honestly, that in my judgment you could not have chosen better than the old school of Hunter. One conspicuous merit St. George's has, I think, always had—its ample opportunities for clinical study. The teachers are, I believe, as accomplished and zealous as are any-

where to be found; but all of you who are to do any good in the profession will soon find out that—

> "Others' follies teach us not,
> Nor much their wisdom teaches,
> And most of sterling worth is what
> Our own experience preaches."*

If you are ever to learn, you must learn from your own observations—from your own successes and failures; and certainly I shall speak of my great subject to-day to little purpose if I do not show you that this was Hunter's way. He took no doctrine for gospel, but tested all he heard by his own independent observation. Try to do the same. I believe there is no hospital in the world where more liberal facilities are given for study in the wards, or more efficient assistance to those who will work for themselves. It was Hunter, as I shall try to show you, who was foremost in securing adequate clinical teaching for our students. I hope those whom I see before me will avail themselves of the fruit of his labours.

The changes in our School during the past year have been fortunately in great part additions. We have to regret, and we do regret most sincerely, the expiration of the term of office of Mr. Carter, whose brilliant talents as a lecturer and ophthalmic surgeon have been appreciated by many generations of students. We have a successor in Mr. Frost whom we can trust to give that important branch

* Tennyson, "Will Waterproof's Monologue."

of pathology and surgery its proper share in the education of the coming race. The inexorable law of the hospital will, I fear, shortly deprive us of the services of our Senior Physician; but as yet I need only allude to what all will feel as a grievous loss to the hospital and School. Dr. Cavafy has taken Dr. Dickinson's place as Joint Lecturer on Medicine. The management of the School has been changed by the appointment of Dr. Owen as Dean in Dr. Whipham's place. We may hope that the new officer will guide the School with the zeal and success which was shown by his predecessor, and for which we all give Dr. Whipham our heartiest thanks—and we have a good omen that this will be so in the share which Dr. Owen has taken in establishing the school of Anatomy and Physiology at Cardiff and the University of Wales. I ought also to mention that Mr. Ross has resigned the Demonstratorship of Anatomy, after long and most valuable services, and is succeeded by Mr. Grimsdale—that Dr. Lee Dickinson has succeeded Dr. Rolleston as Curator of the Museum, and is himself succeeded by Dr. Cyril Ogle as Medical Registrar, and that Mr. Ward has replaced Mr. Allingham as Surgical Registrar, and is succeeded as Anæsthetist by Dr. Davidson.

The additions to our staff afford matter for unmixed congratulation. The appointment of a third Assistant Physician and Surgeon having been found necessary, the choice of the Governors fell on

Dr. Rolleston, who has himself done excellent service to the Hospital, and is the son of a brilliant scholar and physician too early lost to the profession, and on Mr. Marmaduke Sheild, a man already distinguished in Surgery, and who is, I hope, not less pleased to return to his old School than his old friends are to see him back.

The most important change in the School, and one which will greatly increase its clinical efficiency, is the doubling of the number of House Physicians and Surgeons and the new arrangement of their duties. That double the number of students should have the invaluable privilege of serving in these offices is one of the most important practical advances made in my day, and for it we ought to give our grateful acknowledgments to the unfailing liberality of the Governors and their zeal for all that conduces to the welfare of the patients, and (what is much the same thing) the better education of the students. Amongst appointments outside the School Dr. Penrose has been appointed Examiner in Pharmacology and Practical Pharmacy, and Dr. Rolleston in Anatomy to the Conjoint Board. All who know and honour one of the worthiest of St. George's men will congratulate our old friend Dr. Duka on his nomination to the important office of President of the Tropical Section in the approaching Hygienic Congress at Buda-Pesth. Dr. Duka may be called our Ulysses—a man who after serving through a glorious, though temporarily unsuccessful,

war experienced many wanderings and sufferings, and who has made acquaintance with the cities and the manners of men of many lands.* May his ripe experience guide his colleagues to some wiser international policy of public hygiene at this momentous juncture.

So far my task has been an easy and a grateful one. But now I come to the difficult, nay the almost impossible, attempt to give you in the time allotted to my address an adequate idea of the character and labours of the great man whose connection with it is the chief glory of our School.

We claim Hunter as, in an especial sense, our own; for though it may be true that men so great as he become the common property of the race, as Pericles said that "Famous men have the whole earth for their tomb,"† yet to have produced so great a surgeon as Hunter is the special glory of English surgery. And similarly his renown and his memory are more peculiarly the individual glory of this hospital, where he worked and where he died. Yes, it is our peculiar glory, as it is our great responsibility, to show ourselves not unworthy to follow in his footsteps and sit in his chair. And as it has pleased my colleagues to decorate me with the proud title of "Hunterian Lecturer on Clinical Surgery" in this School, I could not refuse when called upon

* "Ανδρα πολύτροπον ὅς μάλα πολλὰ Πλάγχθη ἐπεὶ Τροίης ἱερὸν πτολίεθρον ἔπερσε Πολλῶν δ' ἀνθρώπων ἴδεν ἄστεα καὶ νόον ἔγνω.
Hom., Od. i.

† Ἀνδρῶν ἐπιφανῶν πᾶσα γῆ τάφος.—Thuc. ii, 43.

by them to be the speaker, though when I think how unequal I am to the task I must, indeed, call for the indulgence of my colleagues and friends. Not only is the subject so immense that it can only be just touched on in the allotted time, but it has been treated at the College of Surgeons now fifty-seven times by the greatest surgeons and best orators of their day, from the first Hunterian Oration in 1814, by Sir E. Home, to Mr. Bryant's in the present year,* so that anything like originality is impossible; and yet I do not quite despair of holding your attention. In the lives and characters of these great men there is something of the endless variety and freshness of the nature whose interpreters they were. Their story, therefore, however poorly told, cannot altogether lack interest.† And to surgeons it can hardly be otherwise than useful to meditate for a while on the works of him who laid the foundation and erected so much of the edifice of scientific surgery. Would that that meditation might lead some of you to a deeper study of works so interesting, so profound, so suggestive! For my younger hearers especially—the students of Hunter's school—what better employment for the opening of their session than to contemplate the great example, how success and

* The Hunterian Oration was founded by Sir E. Home and Dr. Baillie, and was at first annual, from 1814 to 1834 inclusive; it was omitted in 1835 and 1836, resumed in 1837, and continued annually till 1853, since which date it has been delivered every other year.—See 'Ottley's Life,' p. 146.

† "His fame is fixed too high for us ever to grow careless or weary of our theme."—Holden, 'Hunterian Oration.'

glory is reached in our profession, the example of a man whose whole soul was given up to his science, who cared nothing for rest, nothing for amusement, nothing for money or rewards; who passed a hard life, chequered with sorrow and privation, embittered by opposition, tormented by disease, and darkened by the prospect of death coming with all his projects unfulfilled, yet a life passed in continual pleasure, the pleasure of thinking, in which he took such delight, and the delightful occupation of building up his great museum and pursuing his endless research into nature, an occupation to which he willingly sacrificed money and leisure and health and everything that lower natures covet; or rather did not so much sacrifice them as pass them by unnoticed. The result is that now, a century after his death, Hunter's fame is infinitely higher than it ever was in his life. Like the great mountains, whose relative height you can hardly judge of till you are far away, the distance of a century enables us to see how far he overtops all other medical philosophers and workers—that he was one of the very few men whose life forms an era in the history of human knowledge. I will not believe that such a story can be altogether spoiled by any defects in the telling, especially before a St. George's audience.

My subject being defined for me as The Life and Works of Hunter, I will take it in that order, and speak first of his life. I must not spend your time over facts which you probably know well, so

shall merely say here that Hunter was born in Lanarkshire in 1728, and lived at home or in Glasgow till 1748, when he came to London to help his brother William in his dissecting room, intending if this did not suit him to join the army. He was, however, most successful as his brother's assistant, and soon afterwards determined to adopt medicine or surgery as his profession; began his studies at Chelsea Hospital in 1749, and continued them at St. Bartholomew's under Pott in 1751; entered as a surgical pupil at St. George's in 1754, and was House Surgeon here in 1756, but only for five months.* He had for some time shared his

* When Hunter first came to London he was engaged merely as his brother's assistant, in preparing the dissections for his anatomical lectures, in helping the students, and making preparations for William Hunter's museum, and then, "during the summer months," as Mr. Marshall says, "and when not engaged in the dissecting-room and the museum, he devoted his time and thought to medicine and surgery, and finally resolved to pursue the latter. Thus early in life he began what was quite an innovation, to interweave pure scientific work with surgery, and so foreshadowed his future great destiny."—Marshall, 'Hunterian Oration,' p. 10.

Hunter's entrance into the profession was remarkably late. There is no evidence that he had ever done anything in anatomy or any of the allied sciences till he first came to London at the age of twenty; then he passed through an unusually protracted student career—was house surgeon at St. George's at the age of twenty-eight, and even after this was absent from England with the army for three years before commencing practice in London at the age of thirty-five.

Holden, in his 'Hunterian Oration,' tries to prove that Hunter studied at the University of Glasgow in the class of Physical Science. It seems evident, however, that the John Hunter whose entry Mr. Holden discovered was a different person; and yet few

brother's anatomical labours and continued to do so after his House Surgeoncy; but in 1759 he was attacked with pulmonary symptoms, of which an elder brother had died; so he was recommended a change of climate. He applied for a post in the Army, was made Staff Surgeon, and went in 1761 to the Siege of Belle Isle and afterwards to the Peninsula, returning in 1763, when he settled in London. He was elected F.R.S. in 1767 and Surgeon to St. George's in 1768, and in 1772 married Anne, the sister of Sir E. Home. He rose rapidly in public estimation, was made Deputy-Surgeon General to the Army in 1786, and Surgeon General in 1789; but is said by his biographers to have been long in obtaining a lucrative practice. The later part of his life, from 1773, was tormented by illness, and he had many severe fits of angina pectoris before the one which carried him off. This was in a dispute at the hospital about the terms on which pupils were to be received. Something said to him by one of his colleagues produced a fit of violent anger, in which he expired on October 16th, 1793.

We have ample information about Hunter's life from the early Hunterian orators who were his friends and pupils, from the sympathetic biographies of Home, Ottley, and others, and from

can read Mr. Holden's 'Hunterian Oration' without admitting the high probability that Hunter may have had some anatomical instruction before joining his brother's dissecting-room, but there is no proof of the fact.

Jesse Foot's snarling, envious diatribe.* Putting all this together, then, what does Hunter's life come to?

No doubt the first thing that strikes the student is its immense laboriousness, at least in his later years, for in his youth he seems to have been fond of society and pleasure. But in his maturity and age his day began with sunrise in the summer and long before dawn at other seasons after about four hours in bed, and from four or five in the morning he used to dissect till eight o'clock breakfast.†

* "Quo fit ut omnis votivâ pateat veluti descripta tabellâ vita senis."—Hor.

† Mr. Thomas, in his 'Hunterian Oration,' 1827, says, "Upon my first arrival in London, on presenting a letter of introduction, he desired to see me at five the next morning! I found him in his museum busily engaged in the dissection of insects." Mr. Thomas then relates how he became Hunter's dresser at St. George's, how Hunter procured him employment as an assistant surgeon in Lord Macartney's embassy to China, and how, on the homeward voyage, "we fell in with a small merchant vessel on its course to New South Wales. When the master came on board he was instantly assailed on all sides with anxious inquiries for news from England. Almost among the first public occurrences he mentioned was the sudden death of John Hunter. That I should, in common with most others who heard the account, deplore the loss which science had sustained was most natural, and that I should individually lament the death of one for whom I entertained such sentiments of gratitude and attachment; but still I was much consoled, and felt a proud satisfaction in hearing a plain unlettered seaman, in the midst of the Pacific Ocean, pay such a tribute of unpremeditated respect to the memory of departed genius and worth."

In reference to this anecdote Sir B. Brodie remarks, "When Mr. Thomas visited him at five on an October morning, and found him already busily engaged in dissecting an insect under the light of a lamp, he was in that state in which any sudden and violent emotion of the mind might have endangered his life."—'Hunterian Oration,' 1837.

Then he saw his patients or pursued his researches till he had to go his rounds to the hospital, or to his office of Surgeon General, or his patients in the city, and after his frugal dinner at four o'clock and an hour's sleep he resumed his labours or went to some scientific meeting till midnight brought the day to an end. This constant work and want of sleep probably shortened his days, and was, in Dr. Ridge's opinion,* the exciting cause of the angina which carried him off. But I have no doubt that this method of life was for him the happiest,† for it kept him always thinking, and thinking was the great joy of his life. He had other joys too. As I said, in his younger days he seems to have been fond of company, he had some taste for the fine arts,‡ and so on; but as life wore on, and as he saw plainly enough by repeated warnings that it could not be a long one, with endless unsolved questions ever rising in his mind, with his museum ever growing and opening out into new vistas of research as every fresh addition was made to it, and with even his one great book—that on the Blood

* Ridge, J., 'Observations on the Life, Disease, and Death of John Hunter,' 1855.

† "His whole life was a series of incessant labour, or rather of delightful occupation; for it was spent in pursuits to which he was devoted, heart and soul. The only relaxation was that afforded by change of employment."—Lawrence, 'Hunterian Oration.'

‡ "Mr. Hunter was particularly fond of drawings and paintings. There was no poor artist of talent in this town that he did not befriend to the utmost of his powers."—Abernethy, 'Phys. Lect.,' p. 192.

and Inflammation—still unfinished after more than thirty years of labour, and never to be finished in his lifetime, his passion for research seems to have "like Aaron's serpent swallowed all the rest," and although he suffered so terribly from angina that his friends feared each attack would be his end, though he knew that "his life," as he said, "was in the hands of any rascal who chose to annoy and tease him," he held all this not as a motive for giving up, but on the contrary for working the harder as he saw the night approaching when no man could work; and I have read somewhere that on the very morning of his death he had been as usual occupied for hours before breakfast on a dissection which he finished much to his own satisfaction.

I hope, then, we may say of the life of this great man that on the whole it was a happy one, cheered by the firm assurance that it had not been lived in vain, that if he had not attained (as indeed no man could attain) to his own ideal, yet he had succeeded in what no man up to that time had even attempted, viz. in uniting together natural philosophy, zoology, physiology, pathology, and surgery, and teaching the art to which he devoted his mighty powers as a branch of the general science of nature. But though I think we are justified in regarding him as a happy man, on the whole, we must allow that he had great sorrows. Since he had his first fit of gout at the age of forty-one he was tortured by

constant ill health, which reacted on, and was no doubt aggravated by, a temper which all his friends allow to have been very irritable.* This disposition kept him in constant disagreement with his colleagues, and even with the brother whom he so truly loved, and to whom he owed so much; though it is pleasant to know that the difference was made up before William Hunter died. And beyond all this, as Abernethy, who knew and loved him well, pathetically says,† "Those who precede others must necessarily remain alone. . . . In such a situation stood Mr. Hunter with relation to his contemporaries. It was a comfortless precedence, for it deprived him of sympathy and social co-operation, and he felt that his labours and merits were not known or fairly estimated." So also Sir A. Cooper, speaking of Cline, his "beloved master," says, "His high opinion of Mr. Hunter shows his judgment, for almost all others of Mr. Hunter's contemporaries, although they praise him now, abused him while he lived."‡

He had indeed few friends, yet some few he had who clave to him with true affection, and that is as much as most of us can expect. He was not a man likely to conciliate everybody and to form a large circle of so-called "friends," but the few who

* "His temper was very warm and impatient, readily provoked, and when irritated not easily soothed."—Home's 'Life,' p. lxv.

† 'Hunterian Oration,' 1819.

‡ 'Cooper's Life,' by Bransby Cooper, ii, 337.

knew him thoroughly, like Clift and William Bell* and Jenner, remained tenderly attached to him, and he had those sterling qualities which win and keep the affections of such men. He was indifferent to money, and far too deeply penetrated with the love of higher things to care for places and titles. So he lived poor, though he earned a large income, and died so poor that his widow could not pay the expense of a monument to him in Westminster Abbey. It was left for the enthusiasm of our generation, under the guidance of a good and loyal St. George's man—our lamented friend Frank Buckland—to supply the omission. And had it not been that the Government, which had shortly before refused with contempt the offer of the gift of William Hunter's Museum, was persuaded to purchase that of John Hunter, his family would have been penniless; for amongst Hunter's virtues that of making provision for those dependent on him was wanting. The purchase, however, was made, and so the long widowhood† of Anne Hunter was not passed in penury. Hunter's family life seems to have been happy and even gay. His wife was a woman of grace and accomplishments. One of the

* Bell, who was engaged to stay in Hunter's house for ten years, remained fourteen, apparently out of pure love for the work and for its master.

† It is mentioned in Chevalier's 'Hunterian Oration,' 1821, that Mrs. Hunter had died on January 7 of that year in the seventy-ninth year of her age, having survived her husband more than twenty-seven years.

songs she wrote, "My Mother bids me bind my Hair," was set to Haydn's music, and is still a favourite; and at his country house at Earl's Court (of which our friend Mr. Roberts has preserved for us so faithful a picture) Hunter seems to have had all that he wanted to make life pleasant. There he could take what repose he chose to afford himself from the constant distractions of London practice, and that repose consisted largely in following out his observations in natural history, among the numerous inhabitants of the menagerie he kept in his house and garden; studying the habits of bees and the functions of plants or making series of experiments on eggs, both for embryological purposes and to illustrate his theory of life. Partly also he enjoyed family life and a little quiet society, and the rupture of his tendo Achillis shows that at the age of forty he had not outlived the Scottish taste for dancing.

All that we know of Hunter's personal habits seems to me to show him as a kindly, humorous man, rough, it may be, in his language (but that was far from peculiar in those days), rough also in his temper, and very eager (as his brother was also) in the defence of his rights in his discoveries, which he prized above all other things; but a fast friend, sympathetic and helpful to his friends in trouble,*

* A pleasant anecdote is recorded how Hunter offered his friend Lynn a loan of £200 when he was labouring under a long illness from syphilitic infection contracted in a post-mortem examination. Lynn

generous in their assistance, even when in want himself, constant in his love and not implacable in his hate.*

His obvious superiority to the men of his time seems to have been early felt; and although we are told of his difficulties in making his way in practice, the facts of his life show little trace of them. It was in 1763 that he returned from the war "with nothing certain to depend on but his half-pay," says his biographer. Yet in 1766 we find him

replied that he did not then require assistance, but would not fail to apply for it should he be afterwards in want. "Nay," said Hunter, "what I offer I will do now, but what I may be able to do a week hence it is impossible for me to say." On his recovery Lynn went to thank him for his kindness and found that Hunter had forgotten the whole matter. Many such acts of generosity have no doubt passed unrecorded.

* Abernethy speaks thus of Hunter's manners and private character: "Harshness, I am convinced, could never have proceeded from a mind attuned like that of John Hunter. I do not wish to deny or conceal that occasionally the candour and susceptibility of his character might incite him to express his vexation and indignation with a degree of energy and openness that would give offence. Yet for this occasional want of temper many and perfectly exculpatory causes may be stated. Mr. Hunter's life was one of continual exertion, perplexity, and irritation. He was constantly engaged in the search and consideration of new facts. 'My mind,' said he to me, 'is like a beehive,' and the simile struck me on account of its correctness, for in the midst of busy and apparent confusion there was great order, regularity of structure, and abundant food, collected with incessant industry from the choicest stores of Nature. It will be generally admitted that the want of money would be an adequate cause of perplexity, yet to Mr. Hunter the very means by which the necessary supplies were to be produced proved sources of irritation. The search for money led him from the more congenial pursuit of knowledge; it broke into his arrangements, distracted his attention, and we find him complaining of this like one who had felt it sorely."—'Hunterian Oration,' 1819.

purchasing the ground and building the house at Earl's Court; and though it is true that he was always in want of money, that is not remarkable when we hear from his brother-in-law that "as soon as he had accumulated fees to the amount of ten guineas he always purchased some addition to his collection."

Hunter's attachment to his wife seems to have been lasting and sincere, yet he postponed his marriage till 1771, because "his income was considerably under £1,000 a year, and scarcely sufficed for his own expenses." In other words, he would not give up his researches to expedite his marriage. A wise decision, and one from which the world is still benefiting, and will always benefit. But it is clear that Hunter must have made a fair income from the first, and must have been looked on as a man of mark. Another proof of this is his election into the Royal Society as early as 1767, "before his brother William, who had been ten years longer in London, and certainly at this time occupied a higher station in public opinion than he did," says Ottley. In spite, then, of the higher social standing of the elder brother, there were influential persons in the Royal Society who saw that the younger was the greater man.

Hunter rose gradually into very lucrative practice, though he was quite incapable of the arts of popularity and though he was far from greedy of fees, and on the death of Pott he became incontestably the

first surgeon in London,* and his income at the time of his death is stated at £6,000 a year. But all his money went into his museum, to the extent, Mr. Marshall tells us, of £70,000; and even after his death it continued to absorb all his available resources, so that his library, his country house, his collections of works of art, all had to be sold in order to keep the museum in saleable condition, while Mrs. Hunter and her two children were supported by "the King's Bounty," a fund analogous to the civil list of the present day, but only available for two years.

Another point from which we must view the life of Hunter on this occasion is as a member of this School. What did he do for St. George's when alive, and what influence has his work and his example had on our school after his death?

Now, it is painful to confess—still the confession must be made—that Hunter's career at St. George's was an unhappy one. He looked with scant respect on his colleagues, and they opposed him bitterly. I do not profess to give an opinion on the rights of this most unfortunate disagreement. Hunter's colleagues, as surgeons to St. George's, were men of respectable abilities, and some of them, at any rate, of distinguished position, nor did all of them take

* "In his riper years," says Sir A. Carlisle ('Hunterian Oration,' 1820), "and when the abstract acquisitions of his study had become blended with copious experience, he was appealed to, equally by physicians and surgeons, as the final judge upon all unsettled questions of pathology."

part in the fray. Those who did so were Bromfield, Gunning, Walker, and T. Keate.* They seem to have regarded Hunter as more of a physiologist and philosopher than a surgeon, and had no great respect for him in those provinces. In fact, I think it was one of them who profanely said of the Hunterian Museum that it was "of no more use than so many pigs' pettitoes." On the other hand, Hunter regarded them—and unfortunately did not hesitate to speak of them in no measured terms—as routine practitioners, hardly fit to teach surgery, because they had never learnt it; useless and lazy in the school, and envious of those whom they could not appreciate.

One fact comes out, I think, clearly from the accounts we have received of this fatal quarrel, viz. that Hunter was a zealous and successful clinical teacher, while his opponents were the reverse. He is reported to have been a dull and ineffective lecturer, and his formal lectures were never largely

* Thomas Keate, uncle to the distinguished surgeon Robert Keate, who was the senior member of the staff in my early student days, is said in the 'Dictionary of Biography' to have been "unpunctual and negligent in his hospital duties." But he seems to have followed Hunter's practice in aneurism, as he was the first, according to Guthrie, to tie the subclavian for aneurism. Bromfield also, though he wrote in depreciation of Hunter's operation, was present at a similar operation successfully performed by his own son.

Mem.—Keate's case is described summarily, and without date, by Guthrie ('Wounds and Injuries of Arteries,' 1846, p. 40). It was a ligature of what we should call the first part of the axillary. Ramsden, in 1809, was the first to tie the subclavian above the clavicle.

attended, though "his classes," says Paget, "included nearly everyone who in the generation after him had any great reputation in surgery in this country." But he seems to have been fond of bedside teaching, and the excellence of the practical remarks scattered broadcast over his works, together with the pithy, lucid style in which these practical aphorisms are conveyed, show that he must have been a clinical teacher of the highest order.* On the other side, two utterances of his colleagues, which Hunter quotes, leave us in no doubt of their qualifications as teachers. One "did not choose to hazard his reputation by giving lectures," which, at

* "Hunter's writings," says Mr. Holden ('Hunterian Oration,' p. 25), "teem with examples which show what an impressive teacher he was, how supreme was his skill in turning all his knowledge to account, and with what happy enthusiasm he started others on the road to gain knowledge for themselves. To take a single instance I would especially point to his description of the organs of mastication and digestion. . . . When I first read it, it filled me with astonishment. 'Would to Heaven,' I said, 'that we had the whole of anatomy described in this powerful way; we should hear fewer complaints of its "dryness and dulness"!' The language is so lucid, so terse, and withal so pictorial. There is an interest too and charm in every detail, and with each fact is given some illustration, with all the text its full and proper comment."

Mr. Holden also quotes Cline as saying, "When only twenty-four years of age I had the happiness of hearing the first course of lectures which John Hunter delivered. I had been at that time for some years in the profession, and was tolerably well acquainted with the opinions held by the surgeons most distinguished for their talents then residing in the metropolis; but having heard Mr. Hunter's lectures on the subject of disease, I found them so far superior to anything I had conceived or heard before that there seemed no comparison between the great mind of the man who delivered them and all the individuals, whether ancient or modern, who had gone before him."

least, as Hunter sarcastically says, "was modest of him." Another "did not see where the art could be improved," and therefore, doubtless did not see that the Hunterian operation for popliteal aneurism was any improvement on amputation. It is no wonder that, under such teachers, the number of students was small, and that of these the great majority wished to be Hunter's pupils. Still, in the precise matter leading to the fatal quarrel Hunter seems to most men to have been in the wrong; and in any case it would have been better if one so far superior to his fellows could have brought himself to treat them with more consideration.* But,

* To my mind one of the most interesting works on Hunter is Abernethy's 'Physiological Lectures,' not a regular biography nor an exact account of Hunter's philosophy, but a blending of the two, a work written by a man himself of no ordinary power of mind, and one who knew Hunter well, respected him as a teacher, and loved him as a friend. Howship says in his 'Hunterian Oration,' 1833, "If you ask who was his most eloquent, most ingenious, and most faithful commentator? it will not be necessary that I should reply —the late Mr. Abernethy." "I was acquainted with Mr. Hunter," says Abernethy (p. 199), "at a period of his life when he must have greatly interested anyone who duly appreciated the results of his talents and labours, or who had any sympathy for the highly susceptible mind of genius, rendered still more so by excess of exertion, and the perturbed feelings incident to bodily disease. He seemed to be conscious of his own desert, of the insufficiency and uncertainty of his acquirements, and of his own inability readily to communicate what he knew and thought. He felt irritated by the opposition he met with in establishing his opinions, and still more by finding, when he had surmounted this difficulty, that those opinions were, by the malice of mankind, ascribed to others. All which, I think, may be fairly inferred from a single sentence he one day addressed to me. "I know, I know," said he, "I am but a pigmy in knowledge, yet I feel as a giant when compared with these men."

though his relations with his surgical colleagues were so unfortunate, his influence on the medical school was beneficent and lasting. Let us never forget that Hunter was the first to introduce the systematic teaching of surgery into this hospital, and that the quarrel in which his life was sacrificed was excited by his proposals for that purpose. His colleagues were not all hostile; two, at any rate, were united to him, both by affection and consanguinity, Dr. Baillie, his sister's son, who united to the most eminent talents and professional accomplishments a sweetness of disposition in which his great relative was deficient, and his brother-in-law, Home, who I have no doubt regarded him with true affection, though in his latter years he was betrayed into conduct which not only darkened his own good name, but involved the most serious detriment to the fame of Hunter.* Then Hunter had many distinguished pupils at the hospital, such as Jenner, Thomas, the younger Gunning, R. Keate, Physick, the celebrated American surgeon,† and many others,

* On the very painful subject of Home's conduct as Hunter's literary executor I need only say that Home destroyed all the manuscript notes which Hunter left of his museum, and also the notes from which Hunter delivered his successive courses of surgical lectures, and which he had corrected and re-corrected with his own hand. Home alleged that he did this by his brother-in-law's own direction; but it is impossible to believe this; and an obvious motive for the destruction of the museum notes is found in the numerous papers which Home contributed to the Royal Society after Hunter's death, and which are believed to have been drawn from these notes. Why he should have destroyed the manuscript of the lectures is less easy to understand.

† Physick was one of those who had a warm personal regard for

who kept up the memory and the traditions of their master till a younger generation arose, in which we may distinguish the great name of Brodie, so thoroughly Hunterian in his principles and practice, of Babington (the uncle of T. Babington Macaulay) who, though he did too little for surgery, yet paid no small service to Hunter's memory by editing his work on the venereal disease in Palmer's edition; of Rose, whose sagacious observations on syphilis * did so much to correct some of Hunter's doctrines, and to limit that indiscriminate use of mercury which was one of the terrors of the older surgery; of Palmer, who will ever receive the gratitude of the profession as the able and judicious editor of Hunter's works; and lastly of Cæsar Hawkins.

These men, and men like these, have handed down to us as a sacred deposit, in trust for our successors, the memory of the greatest man that ever adorned our hospital, the greatest man indeed who ever practised surgery. That deposit was well kept and that trust well fulfilled by your immediate predecessors—the school of Hewett's time. It is for you, gentlemen, to see that it does not suffer in yours.

Having so far dealt with Hunter's life, I now turn to his works. These present themselves to us in three kinds: his work as a surgeon, his work as a natural philosopher, and his museum.

Hunter, as warmly returned by the latter, who would fain have kept him in England as his assistant.

* 'Med.-Chir. Trans.,' vol. viii, p. 349.

As a surgeon Hunter did relatively less than in either of the other two directions. In his surgical writings he seems as if oppressed by his method.* He had set before himself the gigantic task of tracing surgery to its first principles in the qualities of matter, in the operations of that matter when organised, in the laws and actions of the human body, and the effects of remedies in modifying those actions. No other surgeon had preceded him in that arduous path, and the space of thirty years,†

* Hunter's works are naturally divided into Surgical or Practical and Physiological or Scientific. Of the former one can hardly speak adequately without going much into detail, nor is it profitable to read them unless the reader can spare the time to meditate on each separate proposition, to trace the reasoning which led the author to his conclusions, to see where and why he was misled, and to appreciate the profound sagacity, the unwearied labour, and the bold originality which led to the composition of works so far in advance of the surgeons of his time. But if a man has sufficient knowledge of surgery to judge of their value, and sufficient time really to study them, that time could not be devoted to a more remunerative study.

Hunter's practical works are the 'Treatise on the Blood,' &c., the 'Lectures on the Principles of Surgery,' the 'Treatise on the Venereal Disease,' and the 'Treatise on the Teeth,' to which may be added a few detached papers, 'On the Inflammation of the Internal Coats of Veins,' 'On Introsusception,' 'On Loose Cartilages,' 'On Horny Excrescences,' and 'On Artificial Feeding in a Case of Paralysis of the Muscles of Deglutition.' Sir E. Home's two papers on the Hunterian operation for aneurism and the account of Hunter's evidence on the trial of Captain Donellan, though not written by Hunter himself, form also a part of his surgical works.

† We can hardly date the commencement of Hunter's career as a surgical teacher earlier than his return from abroad in 1763, thirty years before his death, though he commenced his studies fourteen years earlier, and was house surgeon at St. George's in 1756. As to the museum, Owen says that "Hunter had passed his thirtieth year before he had collected a single preparation for himself. All that

during which he was permitted to follow it, was too short even for his genius to show a fair sample of the results which might be obtained from it, and which, after the lapse of a single century, we see in so great a degree already attained from studying and practising surgery as a branch of the science of life. All Hunter's work was incomplete. The work of every philosopher must be so, more or less. But his work in practical surgery was the most incomplete portion of the whole. Practical surgery, in fact, was not so entirely the object of his life as were his biological and pathological researches. Hence, we need not be surprised that one of his best critics, Sir J. Paget,* does not hesitate to prefer Pott to Hunter as a practical surgeon. And yet as a surgeon Hunter must rank very high. Not only in the 'Lectures,' but throughout his works, there are abundant proofs of his sagacious judgment and his superiority to that tyranny of custom which binds the practice of inferior men in the chains of an ignorant past. His great work on the Blood, &c., laid a foundation for surgical pathology which can never be shaken, and would of itself suffice to immortalise him as a surgeon; as an operator he was bold (his detractors said even to rashness†), and seems to have been success-

he had made before that time were added to his brother's collection."—(Preface to vol. iv of Palmer's edition, p. xxxvii.)

* Paget, 'Hunterian Oration,' p. 54.

† "The chief operations performed by him at this period out of the hospital consisted in such undertakings as the judgment of able

ful;* and his operation for popliteal aneurism is a splendid achievement in itself, and a model of an advance in surgery resting on the soundest basis of physiological and pathological reasoning. The operations (five in number) which Hunter himself performed were remarkably successful, considering the condition of surgery in those days. Stanley† says, in 1839, "almost to the present time were living the two individuals who were the subjects of the first and the third operations for aneurism performed by Mr. Hunter." (There is a mistake in these numbers. Hunter's first patient died of

surgeons had induced them to decline. Such desperate cases John Hunter was never found to hesitate in embracing; he sought for the opportunity rather than rejected it whenever it offered."—(Foot's 'Life of Hunter,' p. 247.)

* See Home's 'Life,' p. xxxi, for some instances of Hunter's daring and success as an operator; and see Paget, 'Lect. on Surg. Path.,' 1853, ii, 202, for the description of a large enchondroma (preserved in the museum) removed by Hunter in one of the operations spoken of by Home. In his 'Lectures' Hunter speaks of having "trepanned below the insertion of the muscles of the neck and with success," and of having performed the Cæsarean and other rare operations. Other authors speak of Hunter as an unskilful operator, and he certainly in his 'Lectures,' vol. i, p. 210, calls operations "a reflection on the healing art, a tacit acknowledgment of the inefficiency of surgery. It is like an armed savage who attempts to get that by force which the civilised man would get by stratagem." But in this he was thinking, I have no doubt, merely of the amputation or removal of diseased parts, and would not have spoken so of the ligature of a wounded artery, the suture of a ruptured bladder, or any of the numerous operations now undertaken for strictly curative objects. In another place he says, "Operations by which we mutilate a patient whom we cannot cure are an acknowledgment of the imperfection of our art." But surely operations which do not mutilate and do cure are some of its most perfect achievements.

† Stanley, 'Hunterian Oration.'

another cause fifteen months after the operation.) "To each of these individuals about forty years of life, with integrity of limb, was given by this splendid achievement of surgery." One of these men died in extreme old age, and the limb operated on was injected by Mr. Wormald and exhibited at his 'Hunterian Oration' in 1857. Hunter also, though he had no opportunity of tying any artery but the femoral in Hunter's canal, pointed out (vol. i, p. 549) that many other arteries—the carotid arteries and their branches, the subclavian and its branches, and the femoral where Scarpa afterwards tied it—are available for the operation. And I ought to add that the fame of this great surgical triumph attracted the attention of eminent foreign surgeons, who came to London to see what was so novel to them and so admirable.* So that the labours of Hunter raised the reputation of the English school of surgery to a height which it would never have obtained from those of his compeers, even though the latter might be equal or even greater than he as practical surgeons.

It may seem strange that Hunter should have commenced his authorship in surgery by a treatise on the natural history and diseases of the teeth.† Probably he was more easily satisfied with his re-

* Roux, 'Quarante Années,' ii, 89. Assalini imported Hunter's operation into Italy.

† The first part (physiological) was published in 1771, the second (practical) in 1778. The treatise on the venereal disease in 1786.

searches in this limited field than in the more extensive provinces of pathology and surgery. The anatomical or physiological portion of the work has received the enthusiastic praise of one of the best anatomical teachers of our day—Mr. Holden*—and deserves it, for Hunter is never seen to more advantage than in anatomico-physiological description. There he is never laboured, never obscure, never wearisome. His reasoning is usually as clear as his description is terse and luminous; and I do not doubt that the practical portion of the book marks a great advance on the semi-barbarous dentistry of the day, while the section on transplantation is highly curious and of much speculative interest.

Hunter's work on gunshot wounds was a great step towards their rational treatment, and laid the foundation of modern military surgery.†

His treatise on the venereal disease has been very variously estimated by different critics.‡ The

* See footnote, p. 22, supra.

† "As the wounded soldier was rescued by Amb. Paré from the torture of boiling oil, in like manner was he protected by John Hunter from the torture of the knife" (Sir D. Dundas, 'Hunterian Oration,' 1818). "The light of science can hardly be said to have penetrated this important province of military surgery until the great and last work of John Hunter on the 'Blood, Inflammation, and Gunshot Wounds' was published."—(Sir T. Longmore on "Gunshot Injuries," Holmes' 'System of Surgery,' 3rd edit., i, 462.)

‡ Mr. Hutchinson says, "Some of his eulogists claim it as a masterpiece." It has not, however, commended itself altogether to the acute judgment of such eminent surgeons as Lawrence, Brodie, and Mr. Hutchinson himself.

"In investigating the venereal disease," says Lawrence ('Hun-

subject was evidently a favourite one for his researches and speculations, and the work was published and republished in his lifetime. Yet the reader cannot but be conscious of imperfections in it. The first thing that strikes us is the strange

terian Oration,' 1834), "Mr. Hunter abandoned the course of proceeding which he had pursued so safely in other departments of pathology. Instead of taking up the subject *de novo* and examining the facts for himself, he adopted the current notions respecting the progressive and destructive nature of syphilis, and the specific powers of mercury in arresting the disorder. He made the influence of that remedy a test of the nature of the disease, maintaining that affections which admit of cure without the use of mercury are not venereal. Hence his treatise, instead of representing faithfully the course of nature, is chiefly occupied in the endeavour to make facts accord with these pre-conceived notions. As the latter are unfounded the structure built upon them falls to the ground. The high authority of Mr. Hunter confirmed and extended these pernicious mistakes, giving origin to the imaginary distinction between venereal diseases and those resembling them, to the fanciful creation of pseudo-syphilis and syphiloid diseases, by which so much confusion, uncertainty, and embarrassment, have been introduced into an important department of surgical pathology and practice."

Brodie ('Hunterian Oration,' 1837) says, "His treatise on the 'Lues Venerea' is a most elaborate work, and contains a great number of interesting pathological speculations and other important matter; but it must, nevertheless, be acknowledged that it affords but an imperfect representation of the long train of various symptoms which fall under the observation of an experienced practitioner."

And Mr. Hutchinson ("Hunterian Oration," 'Lancet,' 1891, vol. i) says, "Were I to venture an attempt to estimate the value of Hunter's work on the venereal diseases I should be compelled in all honesty to declare that it was in many respects behind the knowledge of the day. It abounds in sagacious thought, but yet, on not a few matters of detail, those who had written before him entertained opinions which to me seem more accurate. It betrays too great confidence in the author's own opinions, and a want of respect for those of others, which would come only from want of knowledge and of facts."

error of insisting on the identity in causation of gonorrhœa and syphilis, in spite of the observation frequently repeated that their cure is totally different. This error was, of course, due in the main to the singular course taken by the inoculation of supposed gonorrhœal matter which Hunter practised on himself, five years before his marriage, and in consequence of which he suffered from symptoms of constitutional syphilis for three years. How far it is justifiable for a man thus to inflict on himself a disease which may be transmitted to his children I will not stop to discuss. That in this instance the experiment was vitiated by a mistake at its origin is now universally admitted. Another blemish on the treatise is that Hunter did not discover, what his successor at St. George's, Mr. Rose, found out twenty years after Hunter died, that mercury is not necessary for the cure of all chancres, but believed, on the contrary, that syphilis, if unchecked by mercury, must go on to the destruction of the parts,* and therefore lent the great weight of his authority to that indiscriminate and ruthless use of mercury, which became really worse than the disease it was intended to cure. Nor is it without disappointment that one reads in a work from so great an observer a flat denial that the testicle "is ever affected with the venereal disease either local or constitutional,"† a doubt whether "a fœtus in the

* Works, ii, 143.

† Ibid., p. 182.

womb of a pocky mother may be infected by her,"* and dubious statements that "there are inflammations of the eyes which are supposed to be venereal,"† and that "we have not seen the brain affected, the heart, stomach, liver, kidneys, or other viscera, although such cases are described in authors."‡

To set against these obvious defects and others which might easily be added, if it were wise to dwell on the errors rather than the merits of so great a man, we have the celebrated description of the Hunterian chancre, which has served for the starting-point of all later investigations; the judicious and eminently practical observations on "the supposed consequences of gonorrhœa," which is really a treatise—though not a formally complete one—on genito-urinary diseases, and shows that Hunter was at home in the operative treatment of the severest forms of stricture and retention; but, above and beyond all, we have that ardent spirit of inquiry which shrank from no method of investigation, which did not spare his own body, nor the possible ruin of his future life, and which, by dwelling so much on the importance of inoculation, encouraged others to persevere in a way which could not fail to lead to juster views than those which he had himself attained. So then, even admitting that

* Works, p. 385.

† Ibid., p. 417.

‡ Ibid., p. 396. So in the 'Treatise on the Blood,' iii, 6, he expresses his belief that "the vital parts are perhaps not at all susceptible" of the venereal disease.

this is not Hunter's most successful work, we are still entitled to regard it as a most useful contribution to practical surgery.

Hunter's 'Principles of Surgery' is a work on which he spent as much labour and time as he did on the treatise on the Blood. He corrected and re-corrected the text with his own hand; and it is most vexatious to think that the work we have is not the original, but only a cento of various copies of notes kept by attentive listeners. Yet these must have been unusually good students and note-takers, for the work is Hunter all over, both in style and matter. Much of the theoretical part is condensed from the 'Treatise on the Blood.' The practical portion, Mr. Power tells us, is less minute and detailed than the contemporary treatises of Heister and Paré, and is of course no longer up to the standard of surgical practice; but as a whole the work is monumental, worthy of the great name it bears, than which no praise can be higher. Sir G. Humphry ('Hunterian Oration,' p. 9), well says, "It is the most comprehensive, the most philosophic, and the best exposition of the subject ever written; the work which it is the most profitable to read, the one which more than any other carries us above craft and technical details into the region of principles and general laws. Would that it was more studied by ourselves, and more commended to those whom we teach and examine."

Another department of surgery in which Hunter

made a commencement, which has since expanded into a wide province of the art of healing, is subcutaneous surgery. Hunter had, indeed, "a body which did him grievous wrong." He was persecuted for many years with fierce pains, with strange confusions of sensation, and obscurations of mental power; and it is one of the most astonishing things in the perusal of his works to see the curious interest with which he studied his own symptoms, even when he thought he was dying, and used the retrospect for the advancement of himself and his scholars in pathological science. All readers of Hunter will recollect the account of the seizure in which he noticed that his pulse was imperceptible and his breathing had stopped, and in which he resorted to voluntary motions of respiration, since "it struck him" that if he did not "he should have died"—though on reflecting afterwards on the matter, he thinks he might not have died after all.* Few can think, without admiring wonder, on the courage and devotion of a man who could thus coolly watch his own mortal agonies and use them for the benefit of the science which he loved. A much lighter affliction befell Hunter when he ruptured his tendo Achillis in dancing. The confinement necessitated by this accident he used for the study of the process of union in tendons, and for

* This seizure is twice described: once in the 'Treatise on the Blood,' &c., vol. iii, p. 193, and again more fully in the 'Lectures on Surgery,' vol. i, p. 244.

that purpose he "divided the same tendon in several dogs by introducing a couching needle under the skin at some distance from it, and killed the dogs at different periods to see the progress of the union" *—thus laying the foundation of subcutaneous surgery.

Even in abdominal surgery, which we justly regard as a peculiar triumph of modern times, and as depending on the recent improvements in the treatment of wounds, the vigour of Hunter's mind, and the originality of his practice, enabled him to point out the path, which it was not given to him, or the men of his day, to follow. Speaking of cases of suppurative peritonitis he says, "How far in such cases it might appear desirable to make an opening into the abdomen and throw in warm water repeatedly to wash away the matter I will not at present determine." † And in treating of gunshot wounds of the abdomen, where viscera are bruised beyond repair, but not opened, he speaks with a wise mixture of caution and hopefulness, pointing out how often adhesive peritonitis precludes fatal extravasation.‡

The little tract on 'Inflammation of the Internal Coats of Veins' forms the basis on which all the elaborate pathological and surgical inquiry is founded which has done so much, not only to give

* Ottley's 'Life,' vol. i, p. 34.
† Works, vol. iii, p. 404.
‡ 'On Gunshot Wounds,' chap. ii, § 3.

us a knowledge of phlebitis and pyæmia, but, what is much more important, to anticipate their causes and prevent them. It seems strange that so suggestive and so practical a tract did not gain more attention from Hunter's contemporaries, and equally strange that symptoms so marked as those of pyæmia were not recognised by so acute an observer as Hunter himself.

But the great service which Hunter rendered to surgery was, no doubt, through its connection with pathology, and on pathology he laboured, not only more abundantly than all his contemporaries, but in quite a different spirit, and with far higher aims, because he regarded disease as a part of nature.* This character is impressed peculiarly on the great treatise on the 'Blood, Inflammation, and Gunshot Wounds,' the merit of which (and I think no words can well exaggerate its merits) consists less in its theory of inflammation than in its method, by which all the principles of disease and treatment are sought to be deduced from the laws of nature in the whole animated creation.† Yet how admirable is Hunter's theory of inflammation when we reflect on the state of pathology in his time,‡ and on the

* Abernethy well said of him, "He discovered a vital principle in physiology active in producing correct pathology. I may well call him the first and great physionosologist."—('Hunterian Oration,' 1819.)

† "He effected more by the questions that he set than by the answers that he worked out."—(Sir W. Savory, 'Hunterian Oration,' p. 10.)

‡ "If any one," says Paget, "would see what progress Hunter

imperfection of the instruments with which he worked! * how very near the more complete investigations of this age of microscopy! how luminous as an introduction to universal pathology !†

If, then, we allow that Hunter's work as a philosopher, and as the founder of the museum, surpassed in value his work as a surgeon, we must also admit that as a practical surgeon he was of the first rank, and that as "The Founder of Scientific Surgery" (the title justly inscribed on his monument in the Abbey,‡ he rendered a greater service to our art

gained for scientific surgery let him compare his writings on inflammation with those of Bromfield."—'Hunterian Oration,' note L.

* Hunter did all he could with the microscopical instruments with which he was acquainted, but that did not lead him far into the science of histology, and, as Mr. Marshall ('Hunterian Oration,' p. 15) has well said, he "had so large a field of observation in the obvious conformation of the organs of animals open to his reach by the aid of scalpel, scissors, and forceps, assisted occasionally by magnifying powers, that he could well afford to disregard the less trustworthy information afforded by the imperfect microscopes of his day." How imperfect they were will best appear from the perusal of Hunter's note to that section (chap. i, § 4) of the 'Treatise on the Blood,' &c., which treats of the red globules.—(Vol. iii, p. 60.)

† "As regards the complex phenomena of inflammation, which Hunter had so long and so carefully thought out, it may be said in a word that the modern microscope, whilst adding so much to his knowledge, would elucidate and confirm almost all his sagacious conceptions. Those important agents in the inflammatory process, the white corpuscles, although perhaps not altogether unknown, were not sufficiently distinguished in Hunter's time. The existence of these being granted, their amœbiform properties, their emigration through the softened walls of the small vessels, their further action on the tissues, their presence in lymph, and their identity with pus-corpuscles would fill up the details in the Hunterian sketch."—(Marshall, 'Hunterian Oration,' p. 35.)

‡ Hunter's claim to this title was asserted in the first Hunterian Oration ever delivered, that by Sir E. Home in 1814. "From the

than it has ever been in any other man's power to render. It is, however, difficult to fix Hunter's exact place in surgery, for his claims depend as much on what he suggested and originated as on what he actually accomplished. "It may be said that nearly all the advances that have been made in surgery since the time of John Hunter may be found foreshadowed, or suggested, or actually adopted in his writings, experiments, and practice."*

I must now speak as well as I can in the time at my disposal of Hunter's writings on natural philosophy. These are contained in the fourth volume of Palmer's edition, as edited by Sir R. Owen. I need not enumerate them. They are of the most varied nature, and one at least of them ought to be classed among the surgical. I mean the tract 'On the Recovery of Drowned Persons,' which has the great merit, so common in Hunter's writings, of seizing the essential truth of the matter, which in this instance is that "in recovering persons drowned, the principal effect depends upon air being thrown into the lungs."

Most of these papers have been collected and published by their author in a book entitled 'Animal Œconomy.' Many persons regard this work as the most valuable of Hunter's writings, and the one

time of Hunter our profession has no longer been confined within the narrow limits of a practical art; assisted by his labours it has acquired a new character, has assumed a more elevated form, and has expanded itself to a science."

* Power, 'Hunterian Oration,' p. 4.

most characteristic of its author. The latter praise it deserves, for Hunter seems to me to have been most at his ease when investigating scientific subjects, detailing experiments, describing structures, and reasoning on their uses; but his great treatise on the Blood and Inflammation surely exceeds in value any, or indeed all, of his other writings. The topics treated of in 'Animal Œconomy' are of the most varied nature; *human physiology*, as in the descent of the testis, the function of the vesiculæ seminales, the structure of the gravid uterus and placenta; *general physiology*, as in the lectures on muscular motion, on absorption by veins, on digestion and post-mortem digestion, the production of heat in vegetables and animals,* &c.; *anatomy*, as in the exquisite description of the nerves which supply the organs of smelling, on the air-cells in birds, on the growth of bones, and numerous descriptions of various animals; *zoology*, as in the charming papers on whales† and on bees;

* Animal heat was a subject which Hunter studied with especial zeal, and on which he threw great light at a time when "it was generally taught that the body obtained its heat from the blood, which again derived it from the heart, or, as one asserted, from the septum ventriculorum, whilst others derived it from a process of fermentation, and others from the meeting of bile with lymph."—(Power, 'Hunterian Oration.')

† The tract 'On the Structure and Œconomy of Whales,' which was originally published in vol. lxxvii of the 'Phil. Trans.' (1787), is mentioned by Abernethy with special commendation, and it is truly a performance which shows Hunter at his best as a naturalist, from the lucidity of the anatomical descriptions and the cogent demonstration of the connection of those anatomical arrangements with the habits rendered necessary by the position of a warm-

and finally *palæontology*, in the observations on the fossil bones found near Bayreuth. No one knows Hunter who has not read some of these papers, and few who have read some will stop till they have read all. But now I must try in a very few minutes to give some intelligible sketch of Hunter as a writer.

In the first place it must be allowed that Hunter was not intended for a writer at all, though no man wrote more strenuously or more constantly than he did. But what he was daily writing (and that chiefly by the pens of his faithful amanuenses Clift and Bell) was the careful description and registration of each specimen that he dissected—notes which were lost to the world through his brother-in-law's misconduct.* Hunter was confessedly a

blooded mammal inhabiting the depths of the sea. It is in this tract that Hunter tells the story, so characteristic of his profuse liberality where natural research was in question, of how he engaged a surgeon at considerable expense (£500 say his biographers) to make a voyage to Greenland in a whaler, and furnished him with all necessaries for examining and preserving the interesting parts, and with instructions for making general observations, and how all that he received for this great expense "was a piece of whale's skin with some small animals sticking on it."

Among the vivid descriptions in this tract one more poetical and picturesque than is common with Hunter gives a forcible picture of the circulation in the spermaceti whale, the blood rushing with immense velocity through an aorta of a foot in diameter under the stroke of a heart which filled a wide tub, and threw out ten to fifteen gallons of blood at a stroke. It may also be noticed that, according to Sir R. Owen, "the minute, original, and accurate account of the formation of whalebone was pirated by the editor of the second edition of Cuvier's 'Anatomie Comparée,' to eke out the imperfection of the account given by Cuvier himself."

* "It is," says Sir R. Owen, "to the zeal and industry which induced Mr. Clift to transcribe portions of the Hunterian MSS., at a

man of what is commonly called little education, *i. e.* he had not much school learning. Hardly a letter of his is preserved in which there are not gross errors in spelling, and often they are so negligently expressed as to be quite unintelligible. I shall not stay to consider whether this want of education was a good or a bad thing for him—it was a necessity. He did not choose to study when he was young, and afterwards he had other things to do. But I would say, with Le Gros Clark ('Hunterian Oration,' p. 27), "I cannot persuade myself that he did not really and deeply regret the wasted time and unemployed talents which marked his career till manhood overtook him." It would seem as if, at one time, he or his friends contemplated his entering the profession as a physician, since in 1753 his name was entered as a gentleman commoner at St. Mary's Hall, Oxford; but Hunter hated the notion of "stuffing Latin and Greek at the University," as he expressed it, and he never resided after his first term of six weeks. The result of this defective education was that he had not enough command of language to be certain of expressing his meaning. There are passages of much force and beauty in his writings, his general style has distinction and power of its own, but he is often hopelessly obscure, and sometimes when his

period when he little suspected their ultimate fate, that we owe our additional knowledge of the philosophical views which Hunter entertained of the application of anatomical facts, and of the general principles which he had deduced from them."—(Pref., p. xxxix.)

meaning is discoverable it is only after considerable puzzling. He was conscious of this himself, and writes to a friend, while the second edition of the 'Treatise on the Venereal Disease' was in preparation, "In order to render the language intelligible, I meet a committee of three gentlemen,* to whose correction every page is submitted." Whether it would have been good or bad for Hunter himself had he spent more time in school learning may be doubtful, but that it would have been a good thing for his readers if he had been able to express himself plainly no one can question.† But even though Hunter had to struggle with a literary incapacity which prevented him from making clear to others the meaning of his thoughts, and though we are justified in believing along with some of his most sincere and most ardent admirers and scholars that those thoughts were often not perfectly clear to his own mind, yet in many cases the further progress of science has cleared up dark places in Hunter's

* Babington tells us that the three were Sir G. Blane, Dr. Fordyce, and Dr. Pitcairn, to whom a Mr. Marshall was afterwards joined. He also says that their efforts did not produce much result.

† Of the many discussions of this matter, none, I think, is more lucid or more satisfactory than Sir W. Savory's in his Hunterian Oration, p. 26, "I confess that to me it seems the education, of whatever kind, must indeed be a bad one, which is not better than none at all. My conviction is that if Hunter had received a good general education in early years he would have been all the better for it. He would have lost nothing. His mental powers could have been no way impaired, but, on the contrary, enhanced. He would have recorded the results of his labours in better order, with more light and greater effect; and we should have had the advantage of a clearer revelation of his thoughts."

writings, and has shown to the world both what his theory meant and that it was based on truth. This is pointed out by Abernethy * in regard to his opinions respecting secretion, as well as by many other critics in other instances.

Hunter also is by no means always logical or consistent in his reasoning. Whether he shared the other qualities of his nation or no, he shows little trace of the fondness with which the Scotch are credited for metaphysics, yet much of his speculation is really metaphysical. Mr. Buckle, in a well-known section of his work, refers the confusion which he finds in Hunter's theoretical reasoning to a conflict in his mind between two hostile methods, viz. the deductive method, that of reasoning from general principles to particular facts, a method which, he says, is native to Scotland, and which Hunter imbibed with his earliest associations; and the inductive or Baconian method, of reasoning from particular facts to general principles, which Hunter was taught from his residence in England. "This conflict," says Mr. Buckle, "darkened his understanding." I leave this theory of Buckle's to your judgment—to my own it seems too ingenious to be quite true. But whatever may have been the remote cause, the fact that Hunter is often confused in his method is obvious and undeniable. Again he has a fixed habit of adducing as the cause of any phenomenon he is studying, not what we should

* 'Phys. Lect.,' p. 174.

regard as its cause, *i. e.* the natural action which produces it, but the teleological object which he believes the phenomenon calculated to serve.* Much fault has been found justly enough with Hunter's method for this confusion between efficient and final causes, and many have sneered at his teleological proclivities. This is an old battle-ground between rival metaphysicians.† There are

* In Abernethy's words, "His unphilosophical language imputes design to unintelligent agency."—('Phys. Lect.,' p. 79.)

† Dr. W. Ogle, in his beautiful and profoundly interesting 'Translation of Aristotle on the Parts of Animals' (Introduction, foot-note, p. ii), gives the following illustration:—"In a remarkable passage ('Phys.,' ii, 8. 4.) Aristotle thus states the materialistic view. 'Why, however, it must be asked, should we look on the operations of nature as dictated by a final cause and intended to realise some desirable end? Why may they not be merely the results of necessity, just as the rain falls of necessity, and not that the corn may grow? For the uprising of the watery vapour, its cooling when thus raised, and its fall as rain when cooled, are all matters of necessity; and though the rain makes the corn grow, it no more occurs in order to cause that growth than a shower which spoils the farmer's crop at harvest-time occurs in order to do that mischief. Now, why may not this which is true of the rain be true also of the parts of the body? Why, for instance, may not the teeth grow to be such as they are merely of necessity, and the fitness of the front ones with their sharp edge for the comminution of the food, and of the hind ones with their flat surface for its mastication, be no more than an accidental coincidence, and not the cause that has determined their development? And so with all other parts wherever there is an appearance of final causes. In short, whenever accident caused all the parts of the body to be developed spontaneously in this suitable manner, to be developed, that is, just as they would have been had design presided over the formation the resulting wholes survived; but when this was not the case they perished, and still do perish, as Empedocles insists, when speaking of certain monstrosities.'

"The explanation suggested in this passage will be found," pursues Dr. Ogle, "recurring in after ages. A similar hypothesis,

those who deny all force in the argument from design, and who remain quite unaffected by Paley's celebrated illustration of the watch. In fact it has now become almost a requisite of the highest culture to adopt and put into more elaborate phraseology Topsy's simple theory of her origin, "I 'spect I grow'd. Don't think nobody never made me." Yet somehow, in spite of science "entangling itself in overwiseness," in spite of the difficulty of assigning uses to parts which have all the appearance of survivals from disused types, and in spite of the still more startling thought that all these elaborate machines are wound up only that they may run down, most people are as firmly teleological as Hunter was, and think that these exquisite arrangements were made in order to fulfil the designs for which they are so indubitably fitted. It is a tendency which is inevitable, because it is natural, and natural, I believe, because it is true. Anyhow, Hunter is entirely teleological.* He died too

for instance, is started in Diderot's 'Letter on the Blind for the use of those who can see,' where it is put in the mouth of the blind Sanderson. The relation in which the hypothesis stands to that of Darwin may be thus expressed: the old philosopher insists on the survival of the fit, Darwin on the survival of the fittest. What a vast difference underlies the apparent similarity in the introduction of a single short syllable scarcely needs to be pointed out."

The whole of this Introduction, where it treats on necessity and teleology, will well repay the reader's perusal and best attention. The great founder of natural science, though admitting the force of the necessitarian argument to some extent, was for all practical purposes a teleologist.

* Abernethy takes the same view in his comments on Hunter's physiology (see his 'Phys. Lect.,' pp. 70, 151, 153, &c.).

soon to have read Paley's 'Natural Theology' and would have been highly unlikely to read it had he lived; but if he had read it he would have agreed heartily with its reasoning.

Hunter's philosophy is throughout entirely natural. He treats of every part of the system of nature, but about things supernatural he neither theorises nor even speaks. His works contain nothing to show whether the biographer is right or wrong who says that he had no feeling of religion. At any rate he wisely saw that the provinces of religion and natural philosophy are perfectly distinct, and that although the works of nature have furnished the wisest of men with cogent evidence of the existence of something higher, yet the operations of nature may be studied and described thoroughly without any theories of the supernatural.*

The philosophers of the present day are much exercised about heredity. To judge from what some of them say about it one would think that the old commandment had been reversed—for now, instead of visiting the sins of the fathers on the children, we immediately proceed to lay all the faults and failings of the children on their parents

* "Hunter might with the same breath have consoled the veriest materialist and the most anxious theologian, and have told both that the field of nature is common ground, in which they may dig, and dig fearlessly, together, and that it will yield according to the seed with which it is sown."—(Sir G. Humphry, 'Hunterian Oration,' p. 15.)

to the third and fourth generation. We no longer impute our sins to the conjunctions of the planets, as was the fashion in King Lear's day; "atavism" accounts for all our backslidings; but the result is the same, that "we are villains by necessity—fools by heavenly compulsion." Without going into these extravagances Hunter occupied himself deeply with heredity. "He used, in his lectures," says Abernethy,* "to record every instance that came within his own knowledge with his usual accuracy and fidelity. He recites instances of children, who had never seen their parents, resembling them not only most exactly in form, but also in manners and in peculiar and whimsical habits. He actually wearied his audience by the number of facts he recorded, and the minuteness and accuracy with which he detailed them."

A curious feature in Hunter's writings is his tendency to personification. "Nature" is with him not so much an expression for the outside world as an artificer engaged in building up or pulling down, or repairing the frame of our bodies.†

* 'Phys. Lect.,' p. 306.

† For instance, in describing the post-mortem appearances in a case of suppurative peritonitis in which he had laid open the abdominal cavity to give exit to the pus, he says, "From this view of the case we must see how Nature had guarded all the most essential parts. In the time of the adhesive stage she had covered all the intestines with a coat of coagulating lymph, so as to guard them, and this probably on two principles, one from their being canals, and therefore loth to admit penetration in that way, the other from their being more internal than the parietes of the abdomen; one side is therefore thickened for their defence, while the

Absorption, again,* he typifies as "the natural surgeon" to whom he attributes intention and a definite and even artistic mode of working; and so on, in a thousand instances.

Closely connected with this tendency to personification is the use which Hunter makes of "stimuli" and "sympathies." Looked at philosophically, perhaps these terms might be said to have little meaning—to stand merely as more or less metaphorical re-statements of the facts they are alleged to explain. Yet they serve the attentive reader well. They introduce so many pathological facts, so many practical observations, that we could ill afford to dispense with them. Stimulus is defined by Hunter† as "the immediate cause of action in an animal;" a perfect definition, yet one which might justify his hatred of definitions,‡ for it certainly does not fit into his own use of the term. Sometimes that term figures as a veil for our ignorance of the whole matter, as when he says that this or that is produced by the stimulus of necessity, or of nature. Sometimes it applies more to the mind than the body, as the stimulus of want or hunger—sometimes it seems

other is thinned for the relief of the part."—('On the Blood, &c.,' vol. iii, p. 478.)

* See the 'Treatise on the Blood, &c.,' part ii, chap. vi, §§ 7, 8, pp. 481, 482.

† 'Croonian Lectures,' p. 197.

‡ "Of all things on the face of the earth definitions are the most cursed, for if you make a definition you may bring together under it a thousand things that have not the least connexion with it."—('Principles of Surgery,' p. 217.)

to resolve itself into a mere metaphor, as the stimulus of imperfection.* The strange expression, "the stimulus of death," is due to the error of regarding the rigor mortis as a vital not a lethal change.† And yet, when he uses the term in its natural and true signification, what vivacity and picturesqueness it gives to his exposition, and how plainly it brings out the point to which his reasoning is intended to conduce!

And so with sympathies. Much that Hunter says about sympathy is metaphorical merely, much is a re-statement of facts under the guise of explanation. Yet some of the most valuable sections on general pathology are those which deal with sympathy—notably the most interesting tenth chapter of the 'Surgical Lectures,' the perusal of which I should be disposed to recommend to one who had not the time "to steep himself" in Hunter, as the best sample of Hunter's style as a writer on surgery. But, after all, with Hunter, as with every great author, "to steep yourself in him" is the only way really to appreciate him. In these days of "abstracts" and "extracts" we have but too

* He is speaking (chap. v of the 'Lectures on Surgery') of the absorption of useless parts, and he says, "When the part to be absorbed is alive it must feel its own inefficacy and admit of absorption. The vessels must have the stimulus of imperfection of this part, as if they were sensible that this part were unfit, therefore take it up."

† Green ('Hunterian Oration,' 1840, p. 84) has tried to defend Hunter's use of these terms, but to my apprehension not very successfully.

many examples of the old story of the fool who took a brick about as a sample when he wanted to sell his house.

So far I seem to have spoken rather of the weakness than the strength of Hunter's philosophical method. Yet no one can study, or ever has carefully studied, his works without seeing that John Hunter was the author of a completely new method of treating physiology and surgery—a method so strong that it launched the world on a new path in these matters, by an impulse which, far from slackening, has now, after the lapse of a century, assumed the irresistible power of a law of nature. Whence was that strength derived? Clearly from the conception which underlies all that Hunter wrote, all the aims of his great collection, all the thoughts that were for ever seething in his mind, viz. that surgery, pathology, physiology, natural history, palæontology, were but different branches—say rather different aspects—of the great science of life; life as directing organisation, life in all things, great and small, ancient and contemporary; life in health and in disease. Ideas like this are so simple that when they have become familiar we are loth to believe in a time when they were otherwise.* But no less is it true that Hunter was

* And it had been seen before Hunter's time that disease and health are only parts of the same life. Thus Holden quotes from Sydenham, "Disease, however hostile its causes may be to the human body, is nothing else than nature exerting all her strength

the first who tried to carry it out into practice, and who not only tried, but succeeded as far as any one man could succeed in his short working life of little more than forty years. This is a service to the whole human race, a revolution in thought such as it is given to only a very few men of the highest genius to originate, and in comparison with which errors in detail or failures in logical method appear as unimportant as are the minute perturbations which interfere with the perfect regularity of a planet's orbit.

But beside his great achievement, that of starting the world on a course of ever-increasing knowledge and improvement, Hunter made enormous advances by his own unassisted labour.* If you look in Buckle's great work, you will find a long list of the discoveries which are ascribed to him as original. Sir J. Paget more prudently abstains from pronouncing on Hunter's claim to each of these discoveries, for some are contested, and probably some were made about the same time by Hunter and some contemporary (as that of the air-cells in birds' bones by Hunter and Camper), and therefore, as Sir J. Paget says, "it would require a careful study of the literature of the period

in an effort to destroy morbific material in order to save the sick man."

* "Bacon, we know, has been compared to Moses on Pisgah surveying the promised land, and Newton to Joshua, who began to take possession of it. But Hunter saw the Canaan of surgery and took possession of it too."—(Savory, 'Hunterian Oration.')

to enable one to form a definite opinion on each question." Sir R. Owen speaks with similar wise caution on this subject in his preface to Hunter's 'Animal Œconomy' (p. iv), and in his notes to each paper in that work. He truly says that many of Hunter's so-called "discoveries" were so in the sense that "he doubtless did discover (the matter in question) so far as an independent and original research constitutes a claim to that honour," though similar results might, without his knowledge, have been arrived at independently. But there are many which are incontestable, and they prove that Hunter was by far the greatest physiologist of his time. Then he was much more, for his far-reaching method dealt with life, not only in the present, but in the past; and his researches in geology and palæontology carried him far along a road then untrodden, but which since his time has been opened out as one of the main avenues to a knowledge of the genesis of heaven and earth.* His

* Travers says, in his 'Hunterian Oration,' "Even of that sublime science of these our days, which connects the history of our planet with that of its extinct races, which has based their classification on the anatomical correspondence and uniformity of design manifest in the organic remains of periods remotely antecedent to the creation of man and the existing types of mortality, it is indisputable that Hunter had a prophetic vision. For proof of this I may refer not only to his rich fossil collection, including at his decease about 1050 specimens, but to his interesting posthumous paper in the 'Phil. Trans.,' 1794, on the fossil bones found in the caverns of the principality of Bayreuth. In this paper he compares these specimens with their recent analogues . . . alludes to the different climates and localities of the globe to which animals are more or less confined, or their geographical distribution, which, con-

embryological researches again, led him to the fruitful conception that "organised creation," as the latest Hunterian orator phrases it, "had been formed on a single plan or type, which may be traced through the whole animal world; and that the lower animals represent permanently the successive stages through which higher animals pass, until they have attained their full and perfect development;"* an idea which contains within it the germ of the Darwinian philosophy.†

sidered in relation to fossil remains, elucidates by implication the changes of temperature to which different parts of the earth have been subject at different periods. With more distinctness and detail he points out the evidence which fossils afford of the alterations of the conditions of the earth's surface, as dry land or submerged; and by frequent allusions to the many thousand years which must have elapsed since the earth was the theatre of these changes, he seems to have fully appreciated the necessity of an ample allowance of past time to account philosophically for the changes in question. Mr. Clift, who transcribed the MS. of this paper, informs me that it was originally, not 'many thousand years,' but 'many thousand centuries,' and he preserves the copy of the letter of the friend of Hunter (Major Rennell), who advised the change of expression in conformity with the popular notion of the world's age. This interesting paper, if candidly perused, must, I think, be considered as the dawning of that glorious daylight with which fossil anatomy, the handmaid of geology, has since overspread the summits and penetrated the depths, and thus illumined the history of the 'earth and the waters under the earth!'"

* Bryant, 'Hunterian Oration,' p. 31.

† Mr. Marshall, in his 'Hunterian Oration' (pp. 30, 31), brings out in a very interesting way the anticipations of the doctrines of Darwin which are to be found in Hunter's speculations. "Contrasting," says Mr. Marshall, "the phenomena of variation as they occur in wild and in domesticated animals, to which he obviously paid great attention, Hunter says: 'Animals living in a free and natural state are subject to few deviations from their specific character, but Nature is less uniform in its operations when

Hunter was, above all things, an experimental philosopher. He carried his zeal for experiment on

influenced by culture. Considerable variations are produced under such circumstances, of which the most frequent are changes in colour.' In a note he adds: 'From the variations produced by culture it would appear that the animal is so susceptible of impressions as to vary Nature's action, and this is even carried into propagation' (vol. iv, p. 277). Still more striking is a note in which, speaking of extreme variations as monstrous, he reflects: 'Perhaps the word monstrous is too strong or not exactly just;' and then he adds this remarkable passage: 'It certainly may be laid down as one of the principles or laws of Nature to deviate under certain circumstances. It may also be observed that it is neither necessary nor does it follow that all deviations from the original must be a falling off; it appears just the contrary; therefore we may suppose that Nature is improving her works, or at least has established the principle of improvement in the body as well as in the mind' (vol. iv, pp. 278, 279, note). Given the additional factor of the advantages bestowed upon individuals by such improvements in the 'struggle for existence,' and Hunter would have discerned the Darwinian doctrines of 'modification in descent' and 'the survival of the fittest.'"

Mr. Marshall then proceeds to show that Hunter discusses as Darwin did the question of reversion to the original type, that he alludes to the necessary adaptation of some insects to uniform and others to variable climates, and reflects on the differences of habit which must thus be brought about; that he describes those constant and associated peculiarities and changes in an animal to which Darwin applied the term "Correlation," and adds that "his paper on the peculiarities of a hen-pheasant which had acquired the plumage of a male, is full of reflections and suggestions conceived in the true Darwinian spirit." It is amusing to remember that it was just this paper which Foot thought too absurd to waste a word on—so dangerous is it to criticise what you cannot understand.

Again, Mr. Marshall remarks that, like Darwin, Hunter often drew conclusions from the most trivial facts, that he inferred the existence of bile in the maggot from the bitterness of a bad nut, that he examined the excrement of fleas and caterpillars, and speculated therefrom on their digestive powers and habits of feeding, in passages which would have rejoiced the heart of Aristophanes if Socrates had written them, and of which he would have made fun for countless generations to split their sides over. (See Arist., 'Nubes,' 142—168.)

to the field of battle;* he was experimenting all day and much of the night in his leisure at Earl's Court, in his study at home, in his visits at the hospital; † he was meditating on his experiments as he sat in his armchair or rode in his carriage; ‡ he did not spare his own body, as I have shown you, nor did he spare the bodies of his fellow creatures. But I willingly avoid any reference to "the vivisection controversy," and turn to the last of my topics.

We come now to the greatest of Hunter's works, the great museum, which was the chief occupation of his last thirty years to collect, at which he worked every day and every night, to which he sacrificed every guinea, as well as every moment that he could spare; which was intended to embody, to be the visible presentment of, the theory of the action of life in health and disease, that he had formed with such infinite labour and such indomitable perseverance. Well, indeed, does Abernethy ('Phys. Lect.,' p 27) call it "the great labour of his life—the principal record

* "To be still more certain of the nature of what these vesiculæ contain than was possible from the examination of bodies which had been dead some time I took an opportunity of opening a man immediately after his death who had been killed by a cannon-ball." —('On the Glands called Vesiculæ seminales,' vol. iv, p. 21.)

† He inferred the passage of air through animal membranes partly from some experiments performed by him when house surgeon at St. George's.—('Treatise on the Blood,' &c., vol. iii, p. 84.)

‡ I have often devised experiments by the fireside or in my carriage, and have also conceived the result; but when I tried the experiment the result was different, or I found that the experiment could not be attended with all the circumstances that were suggested."—'Observations on Bees,' vol. iv, p. 424.

of his deeds and opinions." To this chief object all the other parts of his life were subordinate. He was, as we have seen, a great surgeon, yet practice always was with him secondary to his researches. He constantly complained of the interruption to his studies caused by the necessity of earning the means for carrying them on. He was a great anatomist, but he has told us in his own simple way how good it was for him that he never devoted himself to anatomical teaching, "as the necessity I should have been under to read might have occupied me too much and prevented my forming habits or established modes of thinking."* He was a great pathologist, but pathology was, after all, only one of the departments, and that one of the smaller, of the great science of life which it was his grand aim to found; and hence the pathological specimens, though numerous and important, are but a small minority of the contents of the museum.† Again, Hunter was a great zoologist, and the bulk of his

* 'Lectures on Surgery,' p. 210. He used anatomy as anatomy ought to be used, as the handmaid of physiology. "When," says Abernethy ('Phys. Lect.,' p. 58), "he met with an animal he had never dissected he cared little by what name it was called, to what family it belonged, with what others it was associated, either by natural or artificial ties. He chiefly wished to know how its food was digested, how its blood circulated, how it respired, what were its feelings, instincts, and habits, how it secured or defended itself from injury, how the multiplication of its species was effected and insured."

† In fact, there were 1084 pathological preparations in spirit, and 625 dry preparations, out of 14,000. The preparations of fossils were, as we shall see, far more numerous (*vide* foot-note, p. 64).

preparations are in the Department of Comparative Anatomy, but comparative anatomy was used by him only to illustrate, or rather to form part of the foundation of, biology, the science of life in its widest sense and in its most extended relations, the philosophy of the whole of animated nature.* What preparation he made for this stupendous task—a task which in its perfect accomplishment is literally superhuman—may be judged of by the fact that his collection embraced some 14,000 specimens, accompanied by ten folio volumes of MS. notes, by catalogues of certain portions of the physiological department, and a description of the pathological specimens of diseases of the bones, besides an immense number of draw-

* Sir W. Savory says of the physiological part of the museum :—"Above all, it introduces us, in the happiest way, to the study of comparative physiology. It demonstrates the great law of progress from the general to the special; the law of evolution from the simple to the complex; the principle of elaboration and advancement of function by division of labour. Or, again, as Sir W. Flower puts it, it throws 'light upon one of the great biological problems, classification, which, when rightly interpreted, means nothing more or less than a statement of the order in which living beings have been evolved from one another,' I know not, indeed, whether Hunter ever formulated this idea. . . . But then hasty generalisation was no habit of his mind. . . . When his labour ceased he was working out the great idea. But by such glimpses as we thus obtain of the character of his mind and the method of his inquiry, of the way of his genius to begin the search for the truths he sought at the furthest outposts, and from thence, so to speak, to work inward and upward—I cannot regard the possession of any facts and illustrations, which he was enabled to collect, but had not time to place, as wanton or purposeless, or even merely curious. To me, it is wonderful, but withal most suggestive, that the great mind of Hunter was not only far in advance of his own age, but is hardly overtaken by this." ('Hunterian Oration,' pp. 8, 9.)

ings, chiefly by William Bell. Sir R. Owen tells us that Hunter left original records of the dissection of 315 different species of animals, and preparations of nearly 200 others, so that he had dissected animals of over 500 different species, besides his preparations in human anatomy and pathology, those which illustrate health and disease in plants,* and his geological and palæontological specimens. We may safely say that no man since the world began has ever left so splendid a monument of well-directed and skilful labour. For Hunter was no bungler and no dilettante. He was a most accomplished dissector,† and as a natural philosopher he knew, as few men have ever known, the aim, the central point of his theories, and therefore, to what end his labour should be directed, and from that he never swerved. That point was to show how life worked in all animated nature, how it had worked in times past in building up this universe, how it was affected by cosmical conditions, by injury, and by disease.

It almost makes one shudder to think how easily the great result of all this genius and labour might have perished. Had Hunter's museum been dissipated among the few anatomists and surgeons who might have chosen to purchase the more striking

* For an interesting *résumé* of Hunter's researches in the vegetable kingdom see Abernethy, 'Phys. Lect.,' pp. 62 *et seq.*

† Mr. Power says in his 'Hunterian Oration,' "The museum proves that he possessed dexterity of manipulation in perfection, and such specimens as those I now show might be pitted for delicacy of dissection against those of any other anatomist."

specimens, or, what is just as likely, been allowed to fall into decay,* I doubt whether we should at this day have known much of John Hunter, or valued him much more highly than his elder brother.

I cannot honestly join in the sneers at Pitt's reluctance to purchase this collection, or at his answer when urged to do so, "What! buy preparations! Why, I have not money enough to purchase gunpowder!" We must recollect the circumstances of that critical period in the history of Great Britain. Hunter died on October 16th, 1793, the very day of the judicial murder of Marie Antoinette. A few months earlier the violence and aggression of the French revolutionary leaders had driven them to declare war against Great Britain, and thus Pitt, sorely against his will, was forced into a war, the magnitude and duration of which became more evident as the months rolled on, and which, in fact, never came to any final conclusion till the battle of Waterloo, more than twenty years afterwards. Surely in embarking on so gigantic a struggle—a struggle not for sugar islands or naval prerogative, but for national independence and even national existence—"gunpowder" (if by that is meant the means of war) was the first requisite the Minister had to

* Hunter's will directed that the collection should first be offered to the British Government, and if declined by them to some foreign country. If not sold to any State it was to be disposed of in one lot if possible. But it is obvious that its being refused by the British Government would seriously damage its chance of sale to any public authority, while few private persons could even keep up such a collection.

provide. We must recollect also that the value of the collection was so far from obvious to statesmen that even so distinguished a naturalist and so warm a friend of Hunter as Banks thought of it as not "an object of importance to the general study of natural history, or indeed to any branch of science except that of medicine." * Had it not been for Lord Auckland's powerful advocacy there is no doubt that the transaction would have fallen through—and that advocacy was based of course on personal friendship, not on any knowledge of the treasure thus secured to the nation. How differently do we now view the Hunterian museum. It is, indeed, thanks to the liberal and wise management of it by the College, in a very different condition from that in which its great author left it. And this is one of Hunter's great glories. Rich as are the treasures of wisdom and knowledge which he himself gave to men, they are poor in comparison with the method which he initiated, and by following which his successors have endowed the world with

* Ottley's 'Life,' p. 141. So again, Abernethy says that Cuvier "declared that he knew not that there was such a collection as the Hunterian museum." It was perhaps better known to Hunter's own professional friends, for we are told by Sir R. Owen that in 1787, "when he had brought his museum to an approximate degree of perfection, he then set apart certain days in which he exhibited and explained to some chosen minds, which could respond to the conceptions of his own, his great scheme, embracing the demonstration of all the leading modifications of every organ of the animal body, and of the different stages which each organ undergoes in its development to fulfil the functions it is required to perform in the highest organisms."—(Preface, p. xxxviii.)

so much wider a biology, and so much truer and more progressive an art of medicine. So with the museum. It now contains far more than the number of preparations left by Hunter; it is arranged on a plan which he himself indicated,* and which would have rejoiced his heart—it is the most magnificent instrument for the study of nature which exists in the world, and is one of the glories of the nation and of the city which possesses it. But though the greater part of the Hunterian Museum is in one sense not the handiwork of Hunter, the whole is so in a far higher sense—for it is by merely following his initiative that men, far inferior to him in genius, have built up this grand national monument. Many of the largest departments are merely expansions or continuations of the series which Hunter began.† Thus the ethnological collection of crania, which has taken such

* "The simplicity of his object," says Abernethy ('Phys. Lect.,' p. 10), "induced an almost equal simplicity of arrangement. The facts are displayed in his museum according to the order of the vital processes."

† Holden ('Hunterian Oration,' 1881, p. 31) says as to the Hunterian Museum: "If he could enter it, after an absence from the earth of eighty-seven years, I do not know whether he would be more pleased at finding it so little altered, or at its having been so much enlarged. It is true that one section—that of stuffed birds—has disappeared altogether. It is true that some sections have been so much enlarged that he would hardly recognise them. There are 3000 specimens of skulls in the place of his 50, and his pathological specimens have been more than doubled. But in the series of comparative physiology, on which he bestowed the most pains, he would see the very materials which he gathered with his own hands to lay the broad foundations of his new science still in the same order in which he placed them; he would see his own arrangement

great proportions in our day, was commenced by Hunter when "he collected the heads of persons of different nations,* and this collection of crania was merely one step in working out the general problem of the proportion of the cranium to the face in the descending scale of animal intelligence

rigidly adhered to in every detail, and his own specimens still outnumbering the additions of a century."

It is possible that this statement (made a dozen years ago) may now require some modification. It is impossible to give an accurate account of the total number of preparations in a museum which receives daily additions, but Prof. Stewart has been so kind as to furnish me with the following summaries of the original collection of Hunter, and of the museum as it existed at the College in 1887. In comparing these two collections it should be recollected that a large number of Hunter's original specimens have by the lapse of time become spoiled, and have been replaced under the direction of the Museum Committee by other similar ones, known as "Hunterian Substitutes." It should also be added that in place of Hunter's 215 microscopical preparations (of course of a very simple character) the College museum now contains many thousands, which are not reckoned in the annexed summary; that the collection of calculi has been supplemented by the gift of 1000 preparations from one distinguished surgeon, and that the regular yearly additions to the museum may be taken at not less than 250. The pathological specimens, it will be seen, are more than quintupled.

I should also add that the Hunterian specimens (1968 in number) which are classed as "zoological," and which show only the outward forms of animals, though they still exist at Lincoln's Inn Fields, are no longer exhibited, since the present museum is strictly anatomical, and the grand zoological collection of the British Museum renders it unnecessary now to display them. This fact accounts for Mr. Holden's statement as to the stuffed birds.

I cannot account for Travers's statement, quoted on p. 53, that the collection of fossils included at Hunter's death about 1050 specimens, except by supposing that he was misinformed, and did not verify the statement given him. Table A is taken from the College Calendar, and would give the number of fossil specimens as 3709; yet this again appears erroneous, and the real numbers appeared

* Abernethy, 'Phys. Lect.,' p. 83.

—a problem which so interested Sir J. Reynolds that he introduced into Hunter's portrait that page of his portfolio where this descending series is sketched.* "That fine portrait of his countenance," says S. Cooper in his 'Hunterian Oration,' "made Lavater exclaim when he saw it, 'That man

to Prof. Stewart and myself (from the Catalogues) to be: Vertebrata 681, Invertebrata 2092, Plants 199—total 2972.

A. Summary of Hunter's preparations.

Physiological, in spirit	3745
Osteological preparations	965
Dry preparations	617
Zoological	1968
Fossils:	
Vert.	1215
Invert.	2202
Plants	292
Pathological, in spirit	1084
Dry preparations	625
Calculi	536
Malformations	218
Microscopic	215
	13,682

B. In 1887 there were in the museum the following specimens, viz.:

Physiological	7584
Pathological	5650
Comp. ost.	4278
Human ost.	3420
Invertebrata (special series)	1115
Teratological	669
Entozoa	207
Dermatology	589
Calculi	1965
Diseases of ear	856
Diseases of eye	194
	26,527

* Ibid., p. 85.

thinks for himself.'" No man certainly ever more thoroughly deserved that praise.

Well, gentlemen, I have exhausted my time and I fear your patience, yet I have given you a most imperfect sketch of my subject, and have left quite untouched one of the most interesting parts of my theme. I had hoped, following Green and his master, Coleridge, to have tried to show how Hunter's philosophy of nature may be connected with that higher philosophy which treats of man's place in nature and his relations to the great origin of nature who is "to us invisible or dimly seen in these His lowest works." But this I must leave aside.* My task will have been well accomplished, and your time not ill spent, if I have persuaded some of you not to rest content with the vague acquaintance with Hunter which is all that most possess, but to know for yourselves what manner of man he was who laid the foundation of scientific surgery and who was the founder of the school of surgery here. Still better would it be if that study should lead you to imitate him in his single love of truth, his simple and sublime disregard of worldly rewards, his determination to base all his opinions and all his practice on honest and patient observation of nature. If you do this, each one of you, far as he may be from Hunter's piercing intuition or his unwearied energy, will have earned the praise of having been a good son of St. George's and a worthy follower of John Hunter.

* See, however, the annexed Appendix.

APPENDIX.

After the delivery of the preceding address I was asked to make an attempt to complete the task which in its closing words I had excused myself from taking up, viz. to discuss the higher aspects of Hunter's philosophy, and the opinions on this subject entertained by Green and Coleridge. I could not refuse, for the subject is otherwise left incomplete, and although I have not myself the technical knowledge which a man ought to possess who aspires to follow the reasoning of such eminent metaphysicians, still they (or at least Green, if not his master) wrote for men like ourselves—students of Hunter and of nature—rather than metaphysicians; and what they professed to derive from Hunter's philosophy was intended to be intelligible to ordinary men, and to lead them towards truths of universal application. However much, then, I may myself bungle in trying to explain the higher relations of Hunter's philosophy of life, I trust I may set some more acute minds thinking on the subject, and may obtain the reader's indulgence if he cannot give me his approbation.

Let us first inquire how Hunter's theory was accepted by his own scholars. This, I think, may be seen from Chevalier's Oration (1821), of which Paget (in his own 'Hunterian Oration') says, "I think that the clearest statement of his doctrine by any of his own pupils is that by Chevalier."

Its most important parts are as follows:—"He soon felt the necessity of studying living actions in themselves. He saw that all other known powers were incompetent to account either for the

subsistence or the agencies of a living body; that a more accurate cognisance ought to be taken of that principle or power which, as he expresses it, 'preserves the body from dissolution with or without action, and is the cause of all its actions.' . . . . His eye was continually directed, undazzled by hypotheses of any description, to vital operations. This, he says, was 'always his favourite business and amusement' ('Obs. on the An. Œconomy'). . . . .

"I think it is to be regretted, when the idea Mr. Hunter has given of the principle of life is objected to as metaphysical. If we take for metaphysics that art of subtilising abstracted and gratuitous distinctions in which the schoolmen indulged, ... then nothing can less deserve to be called metaphysical than Mr. Hunter's statements. Indeed he does not seem to have possessed an excursive imagination.* . . . .

"The organisation was first completed, and life afterwards bestowed as a power or principle, by which the original individuals should be, for a time, preserved in their destined states of action; and which should ensure a succession of races of beings of like form and nature to themselves, and to be produced by them, each engendering its own kind only. . . . . It depends on no particular quantity of matter, but is as entire and unconfused in the minutest animalcule as in an elephant or whale. It is in all cases intended to constitute and to maintain individuality of kind in the mass which it occupies, and when it is rendered incompetent to this end it is always evanescent, and soon leaves the matter over which it has exercised its dominion open to the decompounding operation of surrounding agents, from which, pending that dominion, it afforded a competent protection. . . . . The attractions of cohesion, gravitation, and chemical affinity, electricity and the mechanical powers, may be distinctly recognised as taking part in its operations, but all as coadjutors only,

* "His mind was naturally formed for investigation, and that turn displayed itself on the most trivial occasions and always with mathematical exactness. What is curious, it fatigued him to be long in a mixed company which did not admit of connected conversation, more particularly during the last ten years of his life."—(Sir E. Home, 'Life of Hunter,' p. lxv.)

neither of them as the directors of the whole; either of them in excess may overpower and extinguish it, but when it is once lost not any of them can reproduce it, nor can it ever be restored, but by a special interposition of the same creative power which first ordained and allotted its existence. . . . .

"Having thus noted the peculiar agent or active principle by which the body is constructed and actuated, Mr. Hunter's attention was next directed to the material which it compounds and employs, in order to effectuate its purposes; which purposes, he observes, are reducible to two heads, the support of the matter of the body and the support of its different actions. He therefore carefully examined the component parts of the blood, its material and vital properties . . . . and the reciprocal influences of the circulation, digestion, and respiration upon each other. . . . He watched its movements from the *punctum saliens* in the incubated egg to its various meanderings and influxes through the complicated intertextures and communications of arteries and veins, sinuses and cells in the sanguiferous system of perfect animals. . . . Then he investigated the construction, reciprocal adaptations, and distributions of the different parts of the vascular, absorbent, and nervous systems and their functional connections with each other. And, having laid this broad and substantial foundation for the consideration of his subject, he proceeded to an experimental examination of inflammation, its various kinds, degrees, and circumstances as the disordered action of these living vessels, the carriers and distributors of this living blood . . . . the changes it produces in parts of every structure and every function . . . . and the nature of the effusions, secretions, and deposits arising from it; the concomitant and subsequent action of the absorbent vessels, and the states of the nervous system under these varied circumstances; and from the whole he deduced those principles respecting its treatment which this extended survey of facts and the known properties of remedies would indicate and justify. These principles he put to the best possible test by an application of them to the management of gun-shot wounds, in which every order of parts in the body comes occasionally under exposure and review in all the varie-

ties, progressions, and terminations of inflammation. He then felt himself authorised to apply the same principles, and the line of conduct suggested by them, to inflammation as it occurs in adjunction to other injuries and diseases and operations. . . . . He entered largely into the subject of irritability, both natural and morbid, pointing out the distinction between this property and power. He noted the different sympathies and orders of parts, and their respective shares in the functions of health and in the transmission of disease. . . . .

"His observation of the unputrescent state of eggs in the advanced stages of successful incubation first led him to discriminate betwixt life, as a power, and organisation, as the mere mechanism by which it operates."—(Chevalier, 'Hunterian Oration,' 1821.)

Hunter's work, then, was interpreted by one of his scholars as an attempt to exhibit life, or "the living principle" as he called it, in action. Life, as he justly and profoundly says, is not only not the same thing as organisation, but it is independent of and prior to organisation, which indeed must be sustained and repaired by it. Its existence is ordained and allotted by creative power. But Hunter was too cautious a philosopher to attempt the impossible task of constructing a theory of life. "Life," he says,* "is a property we do not understand; we can only see the necessary steps leading to it." His aim was not to theorise about the essential nature of life, but to exhibit life in action, and to theorise about its processes so far as he had facts on which to build theory; for Hunter, though the most speculative of men, always tried to base his speculations on observation. It is true that sometimes his vivid intuition would anticipate the conclusions which ought to have been matter of induction, and that Babington† had some reason for saying that sometimes at least "he sought to arrive at the general laws of nature at once by conjecture, rather than by a close and detailed study of her inferior operations, to ascend step by step, through a slow and gradual induction, to those laws which govern her general procedure." The criticism is just if applied to portions, and those I think exceptional por-

* 'The Blood,' p. 117.

† Preface to 'Hunter on Venereal Disease,' Works, ii, 129.

tions of his work; it may be applicable to the treatise on the Venereal disease, and possibly Babington meant it only to be so taken. If he meant to speak of Hunter's work as a whole it is unjust.* No man ever tried more earnestly to ascend, step by step, through a slow and gradual induction, to his general conclusions—and if he did not entirely succeed it was, at any rate, partly the result of necessity—one man's life was too short; partly again, no doubt, it was due to want of early training in philosophy or metaphysics, so that his method of reasoning is often glaringly defective†—and doubtless he often anticipated

* Abernethy says ('Phys. Lect.,' p. 19): "At an early period he conceived those notions of life which were confirmed by his future inquiries and experiments. He began his observations on the incubated egg in the year 1755, which must either have suggested or corroborated all his opinions with regard to the cause of the vital phenomena. He perceived that, however different in form and faculty, every creature was nevertheless allied to himself, because it was a living being; and therefore he became solicitous to inquire how the vital processes were carried on in all the varieties of animal and even of vegetable existence. . . . Whether truth be discovered by that penetrating foresight which is characteristic of genius, or ascertained by the more laborious methods of experiment and induction, still, when it is once found, each succeeding observation serves but to convince us of its nature and reality. No one could be more scrupulous in admitting propositions to be proved than Mr. Hunter; yet he was convinced that his opinions respecting life were true, by a course of patient and persevering meditation on all its phenomena."

† I can conceive no more inappropriate praise than Abernethy's in his 'Hunterian Oration.' "In his reasonings I can perceive no inference deduced from insufficient or irrevelant premises." Le Gros Clark says ('Hunterian Oration,' p. 21): "In speaking of accuracy as characterising all that Hunter *did*, I mean that he was scrupulously accurate in his facts drawn from actual observation; but we find in his writings examples of a form of inaccuracy that is probably due in a measure to defective training, but is also evidence of an amount of self-reliance which induced him to treat sometimes with unmerited indifference the opinions and researches of others." Mr. Clark adduces, as an instance, that passage in the first chapter of his 'Lectures on the Principles of Surgery' in which he is arguing that life is not the same as either chemical action or

conclusions or assumed them as self evident—but these latter were the exceptions, not the rule. It was just these very "inferior operations" of nature which he spent long years in investigating. I may refer to Sir J. Paget's * account of the way in which he studied the development of the young bird within the egg, night and day, hour by hour, for parts of fifteen years. "Surely," says Paget, "one might suppose this was the great work of his life. Yet it seems to have been rather a casual by-the-way pursuit." "In his experiments on bees, he says, he killed several hives and examined every single bee, to assure himself that no male was left after the fertilisation of the queen bee had been effected. Now the number of labourers in a hive amounts to at least 4,000, so that he must have examined twelve or fifteen thousand bees one by one, to determine this point alone." † So in his experiments on such a minute matter as the motions of the leaves of sensitive plants we read: ‡ "To have the greatest part of the day before me I began my experiments at eight in the morning, while the leaves were in full expansion, and I continued them till four in the afternoon, as longer than this would not have been just, for they begin to collapse of themselves between five and six o'clock." And he brought the same thoroughness into all his work. Read the 'Treatise on the Blood' and see how carefully he builds up his theory of the life of the blood from the minutest observation of its structure and of its behaviour in life and death, in health

fermentation, and so far there can be no doubt he is right. "No chemist on earth," as he truly says, "can make out of the earth a piece of sugar, but a vegetable can do it." But from this perfectly correct premise he goes on to exclude fermentation (which he defines very inaccurately) and chemical action from the operations of life. This, no doubt, is a gross inaccuracy, in excuse for which, however, we must recollect, as Cæsar Hawkins says ('Hunterian Oration,' p. 11), that Hunter was here combating the extravagances of the chemical and mechanical physiology of the day. But this and most of the errors we meet with in his theories are in speculative matters. Had he followed them into practice he would have found that they led him wrong, and would have abandoned them.

* Paget, 'Hunterian Oration,' p. 11.

† Power, 'Hunterian Oration,' p. 28.

‡ 'Croonian Lecture on Muscular Motion,' iv, 205.

and disease.* Take the surgical lectures and see how he introduces the subject of surgery with a profound study of the properties not only of animated but of unanimated nature. And it is thus that he made not surgery only but the whole medical art scientific, and rescued it out of the hands of the ordinary practical men, who would have left it for ever a mere empirical and traditionary calling. It was just on account of

*Much has been said and written about Hunter's theory of the blood having life; some appear even to think that the opinion is an original one of Hunter. But whether Hunter knew or did not know what had been written before (and he certainly does not refer to it), everyone now knows that Harvey asserts the doctrine of the living principle of the blood as plainly as Hunter himself, and professes to be only following Aristotle (see the passages quoted in Palmer's edition, vol. iii, footnote, p. 105), while the doctrine in its popular form that the blood is the life of the body is as old as the book of Genesis. Harvey, however, did not pursue his researches further. "Hunter, on the contrary," says Sir R. Owen (Owen's preface, p. xii), "carries a series of calm and philosophical investigations on the vital properties of the blood to an extent which has never been surpassed; he examines it under every condition, both in the vessels and out of the vessels, during circulation and at rest, in health and in disease. He aims to establish the period in its formation at which it manifests the vital properties; and he fully details the changes which it undergoes, and the phenomena which supervene in the rest of the organism when these properties are lost. Lastly he tells us how the blood, by means of its vital properties, assists in the restoration of parts when injured or diseased."

But though not new the doctrine was of the greatest importance to Hunter's theory of life. "That the blood has life," he says, ('Treatise on the Blood,' &c., part 1, chapter 1, § 6), is an opinion I have started for above thirty years, and have taught it for nearly twenty of that time in my lectures." And it seems certain that the general opinion in that day attributed life only to what they called "the solids" (regardless of the fact that in living beings the most solid-looking parts are in great measure composed of fluid), while Hunter saw clearly that life was altogether independent of, and anterior to, organisation, and that the living principle would enable the yolk and white of incubated eggs, which could not even be regarded as definitely organised, to resist putrefaction (see the section above quoted. Also Abernethy's 'Phys. Lect.,' p. 239).

this laborious study of nature that surgery in Hunter's hands touches on so many branches of natural philosophy, or perhaps I should not say "surgery" but "physic"—the great healing art, of which surgery is but one branch. Travers says: * "When I claim him as the father of modern surgery I am far from meaning to imply that our brethren the physicians have no part or lot in him. . . . 'Pardon me,' says one of the most enlightened of their body, Dr. Latham, 'if I hold that Hunter was only nominally a surgeon—he belonged to no isolated district of our profession.'" This is, no doubt, true, for though, happily for surgery, Hunter's practice was confined to that one branch, his principles were laid deep in nature, and were therefore peculiarly adapted to serve as the foundation of that noble art which, by a happy and exceptional use of language, we English, alone of civilised nations, call "physic."

I do not know that we can state the case better than Green has done. "Invaluable as his researches were, and most happy as their effects have been in the especial improvement and increased light, power, and courage of surgery, may we not rather say that he achieved the more important service of bringing the whole art of healing into an immediate connection with the sciences which have nature for their object, by exhibiting its requisite foundation on an enlightened physiology." †

One of the most philosophic minds which have ever applied themselves to the study of our profession was that of Joseph Henry Green, the friend and disciple of Coleridge. He has pointed out‡ that the Hunterian Museum may be looked on in an even higher light than as a guide to the study of the works of nature: that the splendid demonstration which it furnishes of the stages of evolution, or, as Green puts it, "that every organic whole, from the polype up to man, indicates a higher and more effective principle of unity," and the striking witness which it bears "that every organic whole is the result of an antecedent principle or power" lead to the almost irresistible conclusion that "nature must not only feel, she must know, her own being; that is, mind must be superadded to life." And he

* 'Hunterian Oration,' 1838.

† Green, 'Hunterian Oration,' 1840, p. 44.

‡ 'Hunterian Oration,' 1840, pp. 37 *et seq.*

points out how plainly John Hunter's labours appear to have tended to this goal, viz. to show us that the object of the history of nature is to serve "as a preface and portion of the history of man, and the knowledge of nature as a branch of self knowledge, and the outwardly realised history of our own consciousness and conscious being" so that "every part of the creation derives its intelligibility from the final purpose revealed in earth's noblest creature—as aspiring heavenward—Man."

In another place* Green says: "Take any outward fact or phenomenon of sensible experience—say an organised being—we note its form and changes; but we ask inevitably what has produced this complex being, and what preserves it, ever the same amid its changing phases? The only answer is, somewhat beyond the power of our cognisance by the senses, and we infer a somewhat deeper and beyond the surface—call it life, spirit, law." And he goes on to argue that the support for this conclusion is derived from our own self consciousness, from the fact that "within ourselves we become cognisant of a causative, an originative, of a somewhat deeper and beyond that which is the object of our thoughts;—it is the subject, the Will."

Thus the Hunterian doctrine of life as the cause of organisation leads up in Green's hands to the conception of man as a self-conscious and voluntary agent, and "the same principles, derived from the facts of his consciousness, enable him in the same manner to contemplate the causes and laws which are operative in outward nature, and lead him to the prime cause of the moral order and unity of the universe" (p. 55).

It was his insight into this meaning lying hid in Hunter's work which powerfully attracted Coleridge towards a character so utterly unlike his own as Hunter's was.† Speaking of Blumenbach's term "Bildungstrieb" or "nisus formativus," he says that it is the equivalent of the "life" or "living principle" of John Hunter, "the profoundest, I had almost said the only, physiological philosopher of the latter half of the preceding century. For in what other sense can we understand either his assertion that this principle or agent is independent of organisation which yet it animates, sustains, and repairs, or the purport

* "Mental Dynamics," 'Hunterian Oration,' 1847, p. 53.

† See 'The Friend,' sect. ii, Essay ix.

of that magnificent commentary on his system—the Hunterian Museum. The Hunterian idea of a life or vital principle independent of the organisation, yet in each organ working instinctively towards its preservation . . . is a genuine philosophic idea. . . .

"Is not the progressive enlargement, the boldness without temerity of chirurgical views and chirurgical practice since Hunter's time to the present day, attributable in almost every instance to his substitution of what may perhaps be called experimental dynamics for the mechanical notions or the less injurious traditional empiricism of his predecessors."

And besides these two eminent writers, we may be sure that as all reverent and sincere study of nature has always connected itself with the origin of nature, so Hunter's philosophy has stimulated many of his hearers and readers in their search after truths higher than those which can be reached by the scalpel and the microscope. But the question remains how far these inferences from Hunter's philosophy are justified by what he himself has written.

Now, it must be at once admitted that in Hunter's own hands the investigation of nature was directed to natural phenomena only. He speaks of "mind" and "will," but never speculates on their origin, and what he has left as to their nature is not very easy to understand. He teaches plainly enough that life is a principle superadded to matter, of the exact nature of which principle we know nothing, but which gives to matter its power of organisation, of resistance to disintegration, of motion, and of self-reproduction,* and the degree in which this vital principle is contained in any part, or in other words, the force which the part exercises to resist disintegration, is called by him the

* See vol. iii, pp. 115—117; also footnote, pp. 120 *et seq.* Chap. iv of the 'Surgical Lectures,' vol. i, pp. 241—246, may be referred to as a very plain exposition of Hunter's teaching as to the difference between organisation and life, and the independence of the former and its priority in time, though life is prior in causation. Life is compounded with every part of the animal machine, and gives to every part its inherent power of preserving itself and performing its own actions. These actions when not regarding the separate parts merely "are of whole parts, as the stomach, heart, organs of respiration, organs of sensation, mind, and will."

"power" of that part.* All this is plain enough; but it is not so easy to make out what is meant by the "materia vitæ diffusa,"† since at one part he seems to believe that this is the same matter diffused through the body which is accumulated and rendered visible in the brain and nervous system. And yet this cannot be his real meaning, for he goes on to show that the principle of life is independent of the nervous tissue, since there are living creatures which have no nerves, and the experiments on eggs prove that life acts in the absence of all organisation. In other passages he speaks of "the inflamed materia vitæ" and again of the "different systems of materia vitæ"‡ in different parts. Not less difficult is it to fix the exact sense in which he uses the terms "mind" and "will." "The brain," he says, "is a mass of this matter (sc. materia vitæ) not diffused through anything for the purpose of that thing, but constituting an organ in itself, the actions of which are for other purposes, viz. receiving by means of the nerves the vast variety of actions in the diffused materia vitæ which arise from impression and habit, combining these, and distinguishing from what part they come. The whole of these actions form the mind, and, according to the result, react so as to impress more or less of the materia vitæ of the body in return, producing in such parts consequent actions. The brain then depends upon the body for its impression, which is sensation, and the consequent action is that of the mind; and the body depends upon the consequence of this intelligence, or effect of this mind, called the will, to impress it to action; but such § are not spent upon itself, but are for other purposes, and are called voluntary."

In another place || he treats the same question thus: "Reason,

* Vol. iii, p. 8.

† This was an expression "with which his friends furnished him," says Abernethy. He would have done better had he used his own language.

‡ Vol. iii, pp. 334, 335.

§ The editor here supplies the words "sensation and action." Something has evidently dropped out of the text; but I think it must have been the word "actions" only, for sensation could not be called "voluntary."

|| Vol. i, p. 259.

by influencing the will, becomes the cause of the voluntary actions; and by this connection all these principles" (that is, the passive impressions received by the brain from the body, the passions of the mind excited by such sensations, and the bodily actions originated by the brain) "can affect one another. Now the brain appears to be capable of two modes of action, and out of these arises every property of the brain. We may call the actions of the brain, mind: objects shall affect our senses so as form a peculiar state of mind; this, I call mental impression. Again, the mind can reason and exercise volition respecting objects. The former is involuntary, and belongs to brutes, the latter is voluntary. For instance, I am challenged to fight a duel, volition and reason determine me to go to it; but, when at the place my joints tremble, my stomach turns sicks; this is the effect of mental impression, or feelings of the mind. The two operations are very different; and, in general, the feelings of the mind, if strong, will prevent all reasoning."

In this passage we have a clear distinction between the "mental impressions," which brutes also have, and the "reason and volition" which are peculiar to man. Reason and volition, then, cannot be functions of the body, since the body is nearly or quite as perfect in the brute as in man.

In the section also of the 'Lectures on Surgery' (p. 359—361) which treats of "the effects of mind on diseases," we have the independence of the mind strongly asserted and illustrated by striking examples. Yet, we cannot but admit that several of the expressions quoted above would, if they stood alone, countenance the merely materialistic view that what we call mind and will are only phenomena produced somehow or other by molecular changes in the matter of the brain. This, however, seems to me quite inconsistent with the result of Hunter's teaching, looked at as a whole. That teaching dwells strongly on the intrinsic difference between matter and life, and between the properties of unorganised matter (dynamical, chemical, electrical, and other forces) and the vital actions produced in such matter when life has been added to it. And hardly less strongly does it bring out the essential difference between the corporeal actions which are produced by the various stimuli and sympathies, of which Hunter is never tired of speaking, and those mental and voli-

tional actions which, as he shows so clearly, can suspend or even reverse the natural actions of the body. Though Hunter, therefore, never speaks (in fact, I believe deliberately avoids speaking) of any supernatural agency, his whole teaching appears utterly inconsistent with materialism. That doctrine, as Dr. Lionel Beale has recently remarked,* "may be traced to the primary belief in the assumption that the living and non-living are one, backed by ingenious speculations, invented for the purpose of convincing people that the facts of life, as well as those of nature, living and non-living, have been explained by physics and chemistry." No theory could be more formally in opposition than this to the teaching of the man who wrote: "No chemist on earth can make out of the earth a piece of sugar, but a vegetable can do it." So far, then, it seems to me that Green and Coleridge are right in claiming John Hunter's teaching as supporting their view that life is a supernatural endowment.

Another point in which they seem to me correct is in the praise which they bestow on Hunter's philosophy as one of ideas and not merely of forces, that is to say, as teaching that behind the forces by which the visible actions are produced is a purpose directing those forces to a foreseen end.† We have got lately to

* 'Lancet,' Oct. 7th, 1893, p. 865.

† The whole of Green's Oration, 1840, entitled 'Vital Dynamics,' is occupied with this contention. The following passage may be quoted: "In the world do we not see everywhere evidences of a unity, which the component parts are so far from explaining that they necessarily presuppose the unity as the cause and condition of their existing at all? Every whole of parts, be it the minutest crystal, a plant, an animal, the globe which sustains us, the solar system of which it is a part, or the universe itself, in the infinitude of which that system is less than a mote, every whole of parts demands for its intelligibility a cause or principle of each union, a power and unity antecedent in the order of efficiency, and remaining present as the sustaining and conservative energy; it implies a legislative act, predetermining the result, compelling implicit obedience, and excluding all contingency. . . . Reflect on the exquisite harmony of all surrounding things and the coherence of all to the κόσμος, to the order and beauty of the world! How else could a whole, a system of manifold agencies, result in sequence invari-

tolerate at any rate, if not to embrace, a theory which, starting from the general acceptance of the doctrines of evolution, wishes to persuade us that everything has come to be as it is by a sort of blind necessity. The hypothesis is a very old one. It excited the ridicule of Aristophanes,* and inspired the beautiful poem of Lucretius. But it has received new life from the ultra-Darwinians who do not seem to see that if evolution has really produced such brilliant results from such obscure beginnings, it furnishes still stronger evidence of a purpose lying behind a process which involves such continuous and wonderful progress from the imperfect towards perfection. If Paley was right in saying that the traces of design which were revealed to the discoverer of the watch would be much strengthened if the watch contained mechanism which enabled it to produce another watch like itself, surely he would be entitled to argue that the presumption would be raised near to certainty if the original machine contained the germ and potency of machines rising in endless complexity and constantly adapting themselves to ever new uses.

Now Hunter's works are full of the strongest possible statements of teleological views, so full as to dispense entirely with any necessity for quotation. He goes even so far as to speak of the body as "conscious of the use" of various processes, and defends his language, "because I have not a word for expressing the cause of those actions which take place in the body as if it was conscious that such and such things were going to take place. There are actions of the body which come the nearest to consciousness of the mind of anything I can conceive, and, therefore, I make use of this word."† And as to evolution, I have shown in the text (p. 54) how near he came to the conception at any rate of its leading idea, and how plainly he taught that "we may suppose that nature is improving her works, or at least has established the principle of improvement in the body

able, in connection necessary, in order permanent, in co-operation harmonious, in government immutable, unless by a will manifested in acts causative and intelligential, predetermining the final purpose, and providing the means to the ultimate aim, already contemplated in the antecedent unity of the legislative act?" (p. 18.)

* Δῖνος βασιλεύει τὸν Δί' ἐξεληλακώς, Nub., 1471.

† Vol. i, p. 236.

as well as in the mind."* Does not this exactly correspond to Green's language, quoted on p. 73, "Nature must not only feel —she must know—her own being; that is, mind must be superadded to life"?

I hold then that Green and Coleridge were perfectly justified in their interpretation of Hunter's philosophy as abounding everywhere in the assertion of a supernatural order and plan (just as I hold that they were perfectly justified in their interpretation of nature itself in the same sense); and as showing that this plan culminates in the production of the only creature known to us as possessing reason and voluntary control over his own actions. Not that I would venture to assert, in opposition to so many eminent thinkers, that these doctrines can be absolutely proved by the study of nature merely. But Hunter's view of nature appears to me as strongly opposed to what is called determinism as it is possible to conceive.

I do not wish to put this view of the matter in the least degree more strongly than is warranted by a perusal of Hunter's writings, and I have stated explicitly in the text (p. 47) that there is nothing in Hunter's writings to show what views he himself held on this world-old controversy, if any. It seems to me that he either abstained altogether from thinking about such things, or that he was too much wrapped up in his study of nature to have time to put his views into definite shape, or possibly that he was conscious that he did not shine in the treatment of such subjects. This, however, does not in any way affect the question what the logical inference is from the adoption of his views about life. To that question I see only one answer. Any student of nature is of course at liberty to uphold the necessitarian doctrine, which indeed so many eminent students do uphold; and, of course, a student of Hunter may also uphold it; but he can only do so logically by repudiating everything which his master has said on the subject.

* Vol. iv, footnote, p. 278.

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