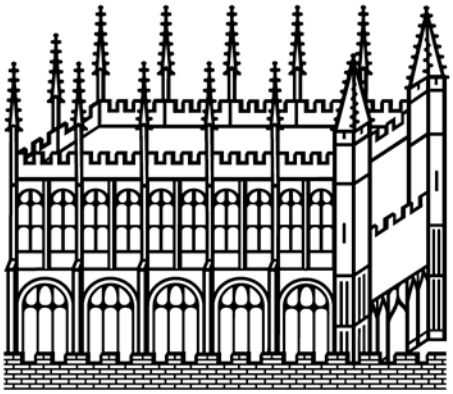

# THE HUNTERIAN ORATION

## FOR THE YEAR

## 1867.

DELIVERED IN THE THEATRE OF THE ROYAL

COLLEGE OF SURGEONS OF ENGLAND,

ON THURSDAY, FEB. 14, 1867.


BY JOHN HILTON, F.R.S.

SENIOR VICE-PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, SURGEON TO GUY'S HOSPITAL, ETC. ETC.


*PRINTED AT THE REQUEST OF THE PRESIDENT AND COUNCIL.*


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Mr. President and Gentlemen,

ONE of the signs by which the intellectual progress of nations may be measured is to be found in the just appreciation of those of their own countrymen, past and present, who have given evidence of unusual mental endowment.

It has, however, commonly happened, that a new line of thought, or the opening up of a new track of mental or philosophical inquiry, has escaped the attention, or even excited the opposition, of contemporary thinkers, possibly because their minds were preoccupied in the elaboration of ideas, antecedently suggested.

It would appear that, speaking generally, the mind of a nation is, like the mind of an individual man, unconsciously directed in one mode of thought, to the

vigorous and persistent working out of one great conception only at a time.

Were this a fitting occasion for the quotation of historic proof of my assertion, it might be abundantly adduced, from the records of the classic ages. But I would desire rather to use this opportunity to point to one of the reasons why this appreciation of philosophical knowledge should have been so prominent a feature of one age, and so utterly deficient in another.

Necessarily, the ages of strife could not nurture philosophy—"inter bella cedunt artes" furnishes the one prominent cause for the indifference to mental culture in many epochs of the world's history; but careful consideration will elicit causes other than those of the sword and battle-field for the vicissitudes in the intellectual appreciation of contemporary labour in different ages. As the educated eye, tutored by refined taste, can alone perceive the subtle beauties and delicate art displayed in a master-piece of Rubens, or appreciate the chaste poetry of the sculpture of a Canova, so the discernment of men's highest qualities, in whatever path of knowledge they may be engaged, can be appraised only by minds already attuned to the appraisement.

How rarely have the great intellectual luminaries of any age had kindred spirits to sympathize with their efforts! As a rule, their special value has been

gauged by succeeding generations rather than by their own, because the light which they had emitted, impinging upon a more matured education, revealed merits previously undiscernible.

The outburst of intellectual splendour, apparently without any direct stages of development leading up to it, that signalized the reign of Elizabeth, has scarcely a parallel in the history of this, or of any other nation of modern times; and yet what evidence do we find of just appreciation by contemporaries?

"If," wrote the late Dr. Croly, "great men are "the most evident gift of Heaven to a nation, the "reign of Elizabeth displayed a succession of the "most remarkable men of Europe in that age or in "any that has followed. The prince of poets and the "prince of philosophers, with a long train of the "minds who form the gems in the historic diadems of "kingdoms—Shakespeare and Bacon, names which "took their rank at once, the fixed stars of national "genius, which have never set, and whose lustre "has never waned—Cecil, the ablest of ministers— "Raleigh, the most gallant of adventurers—Drake, "the boldest of seamen—Hooker, the most eloquent, "rational, and manly of theologians." The stars were present, but dimly perceived by the men of their own time. The warlike temper, and the maritime spirit of the age secured the appreciation of Drake, "whose "ship matched in race the chariot of the sun;" the

ever-present love of romance and adventure excited some admiration for Raleigh; but it required the aid of a retrospect, overlooking the distance between one age and another, to light up the attributes of a Bacon or a Shakespeare; attributes which have become more and more accurately estimated to this very day, in proportion to the increased power of the intellectual medium through which they are surveyed. Whereas, in the ages of marked mental degradation, men of the highest distinction for mind have been overlooked or ignored from the incapacity of their co-existents to perceive their exaltation of thought. Thus Bacon could complain that "learned men forgotten in states, "and not living in the eyes of men, are like the "images of Cassius and Brutus in the funeral of "Junia; of which, not being represented as many "others were, Tacitus saith, 'Eo ipso præfulgebant "'quod non visebantur.'"

Our Hunter affords another marked instance of this defective estimation by contemporaries. Two succeeding generations, however, have done much to atone for the indifference of his own. It would be difficult to find another instance in which so large a meed of posthumous fame has been, as it were, literally dug up from the dry bones which he bequeathed. The minds of the professional men of his day, so far as we know, failed in measuring the extent and depth of the great truths that he had enunciated, and to

appreciate the value of those which he was elaborating. The progressive knowledge of several succeeding years appears to have been necessary to evoke the earliest public attempt to establish the true relation which his marvellous labours bore to the development of science. It was not until eighteen years after his death, that Matthew Baillie and Everard Home suggested the institution of this oration—"this lasting "mark of respect to the memory of the late Mr. John "Hunter."

I do not hesitate, Sir, to rank John Hunter with the most illustrious of our countrymen to whom I have referred—his gifts, his intuitive endowments, may have been inferior to those of a Shakespeare or a Bacon; like theirs, his talent was not wrapped in a napkin; but, put out to the usury of untiring industry, it yielded the ten talents which ever reward the "good "and faithful servant." His generation, like theirs, evinced the same dulness of perception, the same comparative indifference to questions so instinct with importance, and, to them, so apparently insoluble. They could feel no sympathy for the studies to which he devoted himself with such all-absorbing interest and such self-denying labour. True, the period of his most zealous efforts, the latter portion of the eighteenth century, was distinguished by the limited application of mental activity to the cultivation of science. The mind of the nation seemed to be di-

rected solely to the cultivation of the high statesmanship requisite to contend with the grave and startling political events occurring on the European and the American continents.

Hunter was then at work patiently and perseveringly, but alone. With a sagacious and primitive simplicity, he was reading nature's facts, as exhibited in the world of organic life, with a zeal unexampled, an industry scarcely ever surpassed; questioning her, in her own language, and slowly understanding her tardy, and oftentimes to him, obscure responses.

The contemplation of Hunter's career is a study of no ordinary interest. Born in the same neighbourhood as the great African traveller of our own day, Livingstone, one might almost be tempted to suppose that each had imbibed, from the same locality, the same indomitable perseverance, the same pure love of truth, the same simplicity of aim in the pursuit of the one object in view.

At school, Hunter, like many other great men, manifested little intellectual capacity; certainly no marked power. As late as the eighteenth year of his age he seems to have been considered an unsettled time-killer, indulging in the desultory occupations of a rural life, limited in its sphere and opportunities, until he found a fixed point, as a learner of the trade of a cabinet-maker, with his brother-in-law.

At twenty, Hunter was allured, either by the grow-

ing reputation of his brother, Dr. William Hunter, or possibly by direct invitation from him, to seek his fortune in the great Babylon—the seat of confusion. Whether he had originally any special aptitude for precise manual operations, and was thus led to the adoption of minute cabinet work; or whether he acquired that aptitude by two years of skilled labour, we know not; but it is certain that he was either endowed with or had acquired a special facility for neat and precise manipulation, inasmuch as within a fortnight of his arrival in London, he dissected a human arm so perfectly as to give "great satisfac-" tion" to his brother William.

This was the first step he took in anatomical research, and although we cannot be sure of it, we can readily conceive the intense interest which the different structures suddenly spread out by that dissection before such a mind as Hunter's, would excite. Imagination seems to have been one of the least active of his mental faculties, but the grasping of hard facts which he could handle and retain, gazing on them first in wonder, as if suddenly struck by the difference between the manipulation of the animate and the inanimate; and then resolving, with the fixedness of a determined will, to leave nothing undone which would help him to why it should be so? appears to have been his great characteristic.

From this cause, as his facts accumulated, his in-

herent energies were more and more taxed by the attempt to arrive at the explanation of them: and, with scarcely any other aid than that which his own sagacity supplied, his habit of thought rose with his difficulties, until, by the expansion of his mental grasp, he wrought out the wonderful store of knowledge which he has bequeathed to us. It is probable that he was acquainted with the works of Haller, the father of modern physiology; and he may have known something of the labours of Blumenbach, his follower, as well as of those of Buffon; but these would form his only aids in the line of thought to which Providence seems to have directed him. The writings of Linnæus may have assisted him in his classifications, but scarcely in his strictly physiological problems. Such detached portions of physiological knowledge would, however, have appeared to him as but oases in the desert, which physiology at that time must have appeared to his contemplation. These few verdant spots were to him merely witnesses of the fertility of the soil, if it could but be properly cultivated. He therefore used industry as his plough (truly "terram gravem vertit aratro") and the minute and accurate observation of facts as his fertilizer; the sparsely perceptible weeds of pre-existing hypothesis, he scarified by his strong common sense, and implanted the germs of true physiological science.

The harvest, however, was not to be fully reaped

by John Hunter, but in various degrees by his successors. The early gatherers could not distinguish the ripe from the unripe fruit, and it may be doubted whether even we, of this generation, have yet tasted the fruits of his assiduity and sagacity, ripened to perfection by the genial heat of the sun of science.

As in previous ages, the seed fell at the time on a comparatively barren soil. Like the Egyptian mummy wheat, it might have lain dormant for many years, but for the lucidity of Hunter's mind, which imparted a sheen to the minds of his immediate successors, and so quickened their perception of the truths he had expounded; truths which required only continued perseverance and energetic pursuance for their fullest development.

The intense admiration and wonder excited in his mind, by his earliest observation of anatomical facts, engendered a simple greediness to gather and garner more and more of them, until he had accumulated so many as to render it necessary that he should somehow range them into line. At first, his anxiety to arrive at the simple interpretation of each fact seems to have tethered him to the syllogistic form of inquiry; for some time his causality does not extend beyond the syllogism, but when his facts became oppressive from their number, and his first stage of causation failed him, he fell back on comparison and analogy (as many philosophers had done before) to aid him in his diffi-

culties. He then examined the corresponding and analogous or congener organs in a great variety of animals, and, remarking their resemblances and differences, endeavoured, by a process of homological correlation, to interpret the reasons for the modification of the form, mechanism, and varied position of the same organs, in the distinctive moulds of animal life; and thus, by the aid of carefully ascertainedf acts, syllogistic reasoning upon the facts when they were few; comparison and analogy when they were numerous; he laid the Baconian foundation for a broad, comprehensive, and enduring physiology.

As regards my present purpose, my own mind leads me to dwell on some of the outcome from this physiology displayed in the scientific surgery which has been directly derived from it; and I candidly admit that a re-perusal of John Hunter's works forces me to confess my amazement at the extent to which the best surgery of the present day is guided by his comprehensive teachings.

We may adopt, as a postulate, the notion that, in the institution of this oration, Hunter's trustees had an object in view, much higher than that of the mere laudation of Hunter. It may be fairly inferred that their main object was to perpetuate in our profession the mind that was in John Hunter, as well as to honour his grand contributions towards the erection of surgery into its present scientific position; to inspire

Hunter's successors with the same ardour of professional pursuit, the same unwearying industry, the same appreciation of the unalterable power of facts, which enabled him to hew out from the quarry of common observation, a solid block of scientific observation from which he carved the pedestal for the support, not only of his own philosophic surgery, but of that which has served as a basis for the contributions of the Abernethies, the Coopers, the Traverses, the Keys, the Brodies, the Greens, &c; a foundation wide enough, and sound enough not only for the eminent men of our own time to build upon, but, in our opinion, for those of generations yet unborn.

Hence it becomes a question of great pertinency to ascertain what was the "manner of mind" capable of laying a foundation, which has gathered to itself an accumulated intensity with each successive step of our professional progress, from the time of his breathing activity.

In tracing Hunter's career, as I have already observed, we find a man reaching adult life without having manifested any scholastic intellectuality, without even ordinary devotion to academic cultivation. Circumstances, deemed accidental by human judgment, attracted him to a pursuit of which he had no previous knowledge, and with which he had probably no foregoing association.

No sooner, however, does he enter his new profes-

sion, than we see how congenial it is to all his faculties; he rapidly passes over the well-beaten path of his predecessors, and sets himself, with patient zeal, to penetrate the prickly bush and wait-a-bit of the thorny jungle, through which he was destined to clear a way for his successors.

With a mind undisciplined by the logical analysis of dead languages, or the abstractions and generalizations of mathematics; untutored to the perception of anything beyond the sensuous facts of daily life, he found himself suddenly summoned to the contemplation of anatomical details, brought to light by his own uncultivated dexterity.

The surprising results which, after the lapse of nearly a century, call forth our wonder and admiration, and which we acknowledge as the straight highway to still further investigation, show what a latent force of inquisitiveness must have been suddenly brought to bear upon their interpretation.

In our inquiry into the secret workings of the mental process, by which Hunter achieved such striking results, we have no educational starting point from which to trace the step-by-step development of a great mind; but we have the strong (so expressively called) common sense, the mother wit, which appreciates all that it sees, or hears, or touches, and lays it by, as so much treasure, whose worth is at present unknown; though the mind is impressed with a secret conviction that it will grow into future value.

From this point of view it is not difficult to realize how the facts developed by his first dissection of the arm for his brother took so firm a hold of his intelligent will, and opened up to him such a new world, a form of life so much beyond his previous conception, as to have entranced and led captive a dormant higher intelligence, ever ready to be enslaved by nature's truths.

As these truths dawned upon his mind they progressively riveted one by one the links of the chain which bound him to the chariot of Truth, but he studiously challenged the integrity of every welded link, correctly recognizing that the strength of the whole chain was measured by the weakest portion of each individual part, and thus he slowly, but surely, evolved his abiding professional principles.

It is curious to scan how astutely, by what intuitive logic, Hunter worked out whatever subject he had in hand. An illustration of this may be obtained by studying how Hunter and Darwin, the two foremost pursuers of biological inquiry in their day, dealt with the same subject, viz. that of sympathy.

In the then state of knowledge, the word "sympathy" was necessarily used as a symbol to express a train of symptoms, beyond the interpretation of those who employed the term—How, to unravel the relationship of a series of phenomena, expressed in a single observed fact, was the task to be accomplished?

The synthetical and analytical methods used for this object have been very loosely applied, not only to this, but to many other branches of knowledge.

The great results which have been said to issue from one or other of these methods of investigation will, I think, be found to have been effected by their combined employment; that there has neither been a building of each separate detail to the general formula, which shall contain the whole: nor yet a dissection of the formula to prove it, by the separation from it, of each detail successively; but that, as a rule, the successful thinker has unconsciously employed both processes at different stages of his inquiry.

In investigating what was called sympathy, Hunter and Darwin both alike noted the objective phenomena occurring under disorder and disease, but each appears to have been guided by a different mind in handling and endeavouring to interpret the facts presented to him. The two men start out from the same perceptible data; the flushing of the face associated with indigestion; the pain at the termination of the urethra associated with stone in the bladder; the pain at the pit of the stomach associated with gall stone; the pain in the shoulder in hepatic disease.

Darwin, the highly educated and scholastic physician, plunges at once into the pool of hypothesis; that great receptacle for all difficulties; thus cutting the Gordian knot, and satisfying himself with a plus and minus sensorial power.

He says, in effect, that if a decayed tooth produce hemi-crania, the pain in the tooth itself ceases on the occurrence of the hemi-crania; that at first, stone in the bladder gives rise to pain at the neck of the bladder, but as soon as pain is manifested at the extremity of the urethra, that at the neck of the bladder ceases; and so with regard to the pain at the pit of the stomach associated with gall stones. His published explanation runs thus:—"The pain of the primary "part of these associated trains of motion was owing "to too great stimulus, and was consequently caused "by too great action of the pained parts. This "greater action than natural of the primary part of "these associated motions, by employing or expend-"ing the sensorial power of irritation, belonging to "the whole associated train of motions, occasioned "torpor, and consequent pain in the secondary part "of the associated train, which was possessed of "greater sensibility than the primary part of it."

This hypothesis would imply that when a stone in the bladder had wearied out the natural sensibility of the neck of the bladder, and the neck of the bladder was no longer able to express its resentment by pain, then, and not till then, the extremity of the urethra took up the expression; and so with regard to the other examples of sympathy already cited.

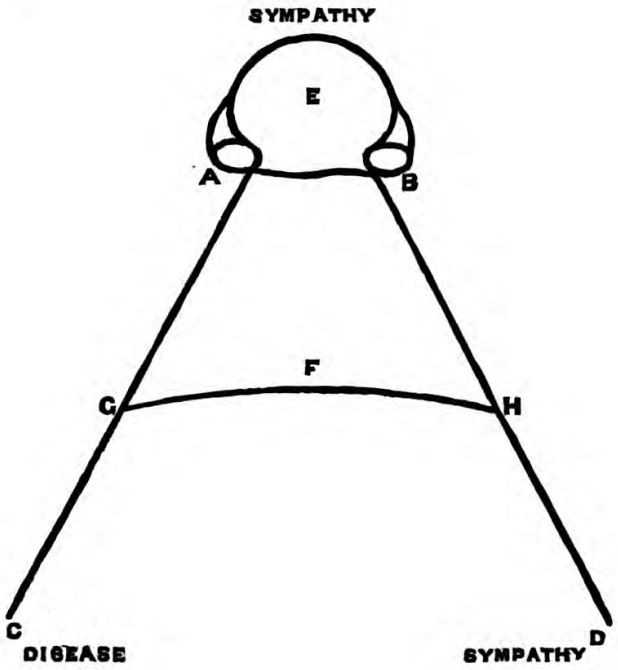
Hunter, on the other hand, has no recourse to hypothesis. He instinctively appeals to consequence

and connection of facts in order to furnish a guide to the explanation of these so-called sympathies; and thus endeavours to establish a theory as distinguished from an hypothesis.

After careful research into the sympathies of vegetable life; the diligent dissection of some of the most important nerves to their minute distribution; a sifting examination into similar and dissimilar sympathies; into the difference of sympathies in the sympathizer, arising from difference in the mode of impression, and the sympathies of the body arising from affections of the mind, and of mind with the living principle; *he* avails himself of the same tangible, or rather perceptible, facts for illustration, viz. the sensation of pain in the shoulder from disease in the liver; pain in the glans penis from disease or irritation within the bladder or kidneys, &c. These phenomena, however, he attributes mainly to delusion of the mind, and with what result? His writings show how nearly his researches and his cogitations on them led him up to the very verge of the discovery of what we now recognize as the more advanced anatomy and physiology of the cerebro-spinal nervous system.

The mental peturbation, engendered by his contention with an idea which he had partially seized, but of which he could obtain no fixed hold, is curiously exemplified by this diagram, and in the terms employed by him for its explanation. "To account,"

says Hunter, "for this delusion in sensation in our-
"selves may be difficult, but we may conceive it to be
"in this way. We may suppose that when the seat of
"sensation in the brain only takes on part of the
"action of sensation in the brain, it may be in this
"way:"*




This is a copy of the diagram used by Hunter for the purpose of explaining his views.

"Suppose E the brain, A B two portions of the
"brain, G H two nerves, F communication between
"these two nerves, C D two different parts of the
"body."

"The nerve G is inserted into a part of the brain

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* Palmer's edition of John Hunter's Works, vol. i. p. 332.

" A—the nerve H into the other part B—F is a com-
" municating nerve between G and H—A and B are
" the two parts of the brain to which sensation from
" C and D is conducted—C is the disease, or part
" impressed. But from the connection between C and
" D, by means of the nerves G F H, B will become
" the seat of action of the nerve G, as well as of
" the nerve H, and the sensation be in part re-
" ferred to D as well as to C. For, if the nerve
" H is stimulated in consequence of these connec-
" tions to take up part of the action of the nerve
" G, and B is sensible of it as well as A is of the sen-
" sation of C, then the sensitive principle of the
" nerves A B is made sensible of both the disease of
" the part of impression, as also of the sympathizer
" D, which become the two impressions in the
" sensorium."

" If anything stimulates G, part of the action is
" communicated to H ; this goes on with the action to
" B, so that both A and B become sensible of the
" disease C. If there is disease in C, the mind is
" made sensible of it, because G always communicates
" the sense of C to A ; but if a small portion of it is
" brought over to H, and this nerve carries on the
" action to B, B becomes sensible of it also, and B re-
" fers it, not to C, but to D, because it is to that
" point that it has been accustomed to refer all its
" sensations."

Hunter says, "I do not know whether this explana-
" tion may be the true one or no, but it is one mode of
" explaining how we may feel both the disease and the
" part of sympathy." He continues, " But how is it
" in those cases where the sympathizer takes on the
" whole action, affection, or sensation?" or, as we now express the same idea, when we say that all the pain of the disease is expressed remotely from the site of the real cause or disease. "In this case we must suppose
" that not only a part, but the whole of the sensation
" passes by the communicating nerve F to B, and
" thus the disease appears to be in D only. But it is
" possible that nervous sympathy is not effected by
" the nerves communicating with one another in the
" body, but from their connections in the brain; as
" from the point B sympathizing with the point A,
" taking on the whole of its action and referring its
" sensation to D."

Cowley wrote, " Bacon like Moses."

I would act the plagiarist and read it—

" ' Hunter like Bacon,' led us forth at last:
The barren wilderness he passed;
He did on the very border stand
Of the blessed promised land,
And from the mountain's top of his exalted wit
Saw it himself, and shewed us it,
But life did never to one man allow
Time to discover worlds, and conquer too."

I adduce this diagram and Hunter's explanation of it as an example of the patience with which the honest and sedulous inquirer strives to interpret a great physiological problem, leaning stedfastly on facts, and sturdily repelling the enticements of imagination, which would allure him into the bye-paths of speculation. If he did not succeed in reaching the goal, which he set before himself, still he built up the craggy steps which rendered the higher ascent of his successors comparatively easy. This is the habit of mind, as I conceive, intended to be nurtured by our proceedings this day. A habit of mind as displayed by Hunter; sagacious in the separation of what he knew to be true, from that which only appeared to him to be conjectural. What Bacon termed the power of divorcing facts themselves from the theories attempted to be founded upon them, when he writes:—

" So, in natural history, we see there hath not been
" that choice and judgment used as ought to have been;
" as may appear in the writings of Plinius, Albertus,
" and divers of the Arabians, being fraught with
" much fabulous matter, a great part, not only untried,
" but notoriously untrue, to the great derogation of
" the credit of natural philosophy, with the grave and
" sober kind of wits—wherein the wisdom and integrity
" of Aristotle is worthy to be observed, that having
" made so diligent and exquisite a history of living
" creatures, hath mingled it sparingly with any vain

" or feigned matter; and yet, on the other side, hath " cast all prodigious narrations which he thought " worthy of recording into one book, excellently dis- " cerning that matter of manifest truth, such where- " upon observation and rule was to be built, was not " to be mingled or weakened with matter of doubtful " credit; and, yet again, that rarities, and reports " that seem incredible are not to be suppressed or " denied to the memory of man."

I shall pursue the question of sympathy because it serves to elucidate the object of my immediate aim, which is to sketch the mode and habit of thought, and the mental culture, which not only conducted Hunter to the van of his physiological contemporaries, but which have also trained, by the same discipline, the minds of succeeding triumphant cultivators of this branch of learning, and which must ever direct the successful venturer in the path of natural knowledge. In whichsoever of the varied branches of scientific inquiry Hunter was for the time engaged, we find that he could not take a single step in advance without the aid of well-ascertained facts. He seems to halt, and linger, and delay his advance to a conclusion unless he can firmly grasp every fact leading up, in due sequence, to it. Nor does he seem satisfied to take the statements of others, as reliable for his purpose in any instance where the means of absolute demonstration of the fact is within his own reach.

Here surely is a sound lesson of inductive training for all time; knowledge is not to be carelessly plucked, as the flowers of the hedge-row, by the saunterer; knowledge must be sown, tilled, assiduously tended, nay, almost subjected to the influence of the forcing-house of mathematical science, before it arrives at the development of truth.

Well-ascertained facts must now, as ever, form the safest start-point of all inquiry. Under this aspect it is noteworthy to track Hunter in his dealings with the most abstruse subject presented to his contemplation. Difficult and imperfect as are any attempts at a biological explanation of the corporeal phenomena, even with our much increased information regarding the nervous and vascular systems! what must have been Hunter's embarrassments, with the imperfect information of his day? In his time, apparently by common consent, all such difficulties were grouped under the word "sympathy," the old scape-goat of scientific men, the evasion of the acknowledgment of ignorance, the adoption of a word elastic enough to mean anything or nothing. This could satisfy neither Hunter's accurate mind, nor his love of truth; he sought for new facts, which would enable him to unravel the complicated phenomena summed up or concealed in the word "sympathy."

Very much of what we now know of sympathy he taught in the concrete. "There are," he remarked,

" two sympathetic principles in the higher animals: " viz. life and action of the nerves, which last is called " sensation and volition, thus the living principle of " one part sympathizes with the actions of life in " another part, as must be the case in all animals " which have no nerves."

He uses the term life as synonymous with living principle, while, as we do now, he confesses his entire ignorance of what is so designated; but he makes use of sensation and volition, of which we have far more definite knowledge, in order to elucidate the living principle. Relatively, we occupy much the same position that Hunter did, but our present enlarged stepping-stone affords us a more sure foothold in the uphill research, into the mysterious nature of life.

Guided by his passionately instinctive adherence to facts, Hunter first carefully noted what he assumed to be the sympathies of vegetable-life; then he passed on to the observation of the relative phenomena in the lower classes of animal life; but when he ascends to human life, he gives up all speculation with reference to the living principle, and falls back upon the observable data of health and disease.

Thus he speaks of contiguous sympathy resulting from simple contact of parts with each other, as of the abdomen with the abdominal muscles; the explanation of this manifestation, we now know, is to be found in the well-ascertained anatomical fact, that the perito-

neum, the abdominal parietes, and, to a certain extent, the intestines themselves, receive their nervous supply from the same source.

Continuous sympathy.—His example of this state is, "When the hip or the loins are affected, the sym- "pathizing pain is felt in the knee before it is felt in "the original seat." Now, the accurate knowledge of the distribution of the obturator, anterior crural and sciatic nerves to the hip and knee joints, sufficiently explains what he was driven to veil under the covering of sympathy. Nevertheless he had well observed the fact.

He often speaks of the various sympathies resulting from teething in children, not accompanied with much pain in the teeth; and says, "The action of the part is "moderate, but the action in the sympathizing parts "is very great, namely, in the voluntary muscles." Although he had dissected with original care much of the distribution of the fifth nerve, yet his lack of anatomical knowledge of the structural association of the sensitive part of the fifth nerve with the membranes of the brain, and with the grey matter of the spinal marrow, precluded his interpretation of those brain and spinal marrow symptoms which characterize the chief deviations from health during infantile dentition.

Hunter speaks of pain in the shoulder induced by inflammation of the liver, and although he affords no satisfactory explanation of it, he notes "that the

" shoulder sympathizes with the liver, but the liver " never sympathizes with the shoulder." He had not arrived at the anatomical and physiological elucidation which we have deduced from the fact that the right phrenic nerve arising from the third and fourth cervical, gives off a branch which takes its course under the inferior cava, through the fissura venosa into the porta of the liver, and finally also one or two filaments to the round ligament.

He next applies the ever-present idea of sympathy (as conducting to a biological interpretation of health and disease) to pathological observation; and is led by his clinical deductions to enunciate such axiomatic formulæ as the following:—

" Local or partial structural sympathy is found " more in the old man than in the young; whereas " universal sympathy is more in young than in old, " so that when a local disease takes place in a part " when the patient is very young, it is capable of " giving a general disposition to sympathize, by which " means symptoms become more uncertain than in " those of more advanced age, often putting on the " appearance of great variety of disease." Or again, " Constitutional diseases prevail in the youth and " growing; local diseases manifest themselves in the " middle age; constitutional again in old age."

How interesting it is here to note the Hippocratic mind, exemplified by this aphoristic style, avoiding the error so denounced by Bacon, viz. " the over-

" early and peremptory reduction of knowledge into " arts and methods, from which science commonly re- " ceives small or no augmentation; for, as young " men, when they are knit and shaped perfectly, do " seldom grow to a further stature, so knowledge, " while it is in aphorism and observations, is in " growth; but when it is comprehended in exact " methods, it may perchance be further polished, and " illustrated, and accommodated, for use and practice, " but it increaseth no more in bulk and substance." These aphorisms of Hunter are striking illustrations of the wisdom of Bacon's remark.

Had they been moulded into hypothesis or theory, they would in all probability have been buried and consigned to oblivion. Viewed, as he left them, by the light of progressive physiology and pathology, we recognize in them physiological laws and subservient pathological consequences of the very highest importance in the study of disease.

It is within the experience of every observing surgeon to have seen the greater amount, rapidity, and extent, of general or constitutional disturbance which local disease engenders in the young, as compared with the aged. In the young, the same kind of wide-spreading consequence may result from the local disturbance, no matter where it shows itself; on the whole, it is most marked when the primary mischief is in the arterial or nervous system, so that symptoms

occur quite remote from the original seat of morbid influence, and involve parts which are not upon any known law structurally or physiologically associated, nor in any way allied, except in that here alluded to by John Hunter.

He believed, and we believe, that the observed phenomena depend upon the fact, that every part of the body is simultaneously under the influence of a vital and harmonious organizing force; a force diffused through every part of the delicate intertexture; each growing relatively to the whole, and subservient to the correlative forces, which constrain the consentaneous development of each individual structure. Hence, inherited or constitutional diseases are diffused, and appear in many parts at the same time, especially during the period of growth. In the process of growth the formative force, so wonderfully exerted to determine the detailed completion of the organism, must influence all parts of the body simultaneously. If a disturbing cause be introduced into a process of such concordant activity it may be fairly expected to produce the rapid and wide-spread results which characterize infantile and juvenile disease.

This may be exemplified by reference to the familiar general derangement of the system engendered by acute inflammation of an organ in the earlier periods of life, when all the various structures composing it are being developed under the influence of an action

common to the formation of all the parts necessary to its completion.

Hunter also recognizes a period of local developmental growth in relation to sympathy with its more precise pathological accompaniment. "As the child "advances, the power of sympathy becomes partial; "there not being now in the constitution that uni- "versal consent of parts, the different organs acquire "more and more of their own independent action as "the child grows older." Let us view this observation by our more extended experience, and we shall still further recognize Hunter's gifted perception.

For example:—Our clinical experience teaches us that in children, during the active and harmonizing stage of development, inflammation in any one structure of a joint has a tendency to involve rapidly the contiguous and allied structures in the mischief; hence our doubtful prognosis of joint disease at that period of life. In mid-life, if an inflammation of the same structure should occur, its effects are more limited, from a less tendency in the contiguous tissues to be implicated, and our prognosis becomes by so much the more favourable. In advanced life, the same disease is most likely to be pathologically isolated and restricted to the seat of its aggression.

How common is the diffused character of brain disease in children as contrasted with the local well-defined disease of the same organ in more advanced

life! Not only is the disease less localized in children, but, under the direction or stimulus of growth, the course of the disease becomes more rapid.

Again, with respect to the heart and lungs. In manhood and old age the physician meets with bronchitis, pneumonia, or pleurisy, each as a separate, distinct, and undistorted disease, each running through a strict and well-defined course from beginning to end. Not so in childhood: in children the physiological consent, natural to harmonious growth, groups these separate structures subject to these diseases into a nearer unity, and their tendency is to be involved in the aggregate, or, as Hunter expresses it, "giving "a general disposition to sympathize, by which "means symptoms become more uncertain, and put "on the appearance of great variety of disease."

Experience and extended observation thus illustrate and display with precision the terse statement of Hunter, "that the different organs and parts acquire "more and more of their independent action as the "child grows older."

Hunter's definition of tetanus, as an "involuntary "contraction of the voluntary muscles, and sometimes "of the involuntary, which makes it fatal," is a very near approximation, roughly expressed, to our more precise, but still indefinite knowledge of the pathology of this disease.

He says that tetanus and other diseases, such as

St. Vitus's dance, epilepsy, catalepsy, subsultus tendinum, cramp, the shivering of ague, &c. all of which he groups under the same classification, have their cause in the nervous "system;" but he does not attempt an explanation of the phenomena of these diseases by reference to any peculiar structural association. He noted that the first symptom of tetanus was so frequently trismus, a radiating centre from which all the other voluntary muscles were gradually implicated; but he had not our knowledge of the important and continuous connection of the fifth nerve with the grey matter of the spinal chord, which seems to afford to us a more obvious explanation of these tetanic phenomena; nor did he clearly perceive the physiological involvement of the pneumogastric and the ganglionic system of nerves, implicating the lungs, the larynx, and the heart, and resulting in what he expresses as "contraction of the involuntary muscles, "which makes it fatal."

So regarding the joints, he remarked that inflamed joints were always flexed, or rather he says, that "joints when diseased naturally gèt into a middle "state between flexion and extension, or even more "bent, and as the joints are passive this must be per-"formed by the muscles, and either by their voluntary "or involuntary action. The stiffness of the joint "depends upon the involuntary contraction of the "muscles and is a consequence of the muscles sym-

" pathizing with the joint." Here we meet another proof of Hunter's scientific observation, based upon sensuous observation. He seems to have had an inkling of what we now know to be strictly in accordance with accurate anatomy; that the same nerves which supply the interior of the joint supply also the muscles that move it and the skin covering it, and thus establishing in health a natural physiological consent, and in disease a pathological sympathy between all the parts entering into its composition; the almost necessary result, therefore, of inflammation of a joint ill-tended must be the fixing of the joint in a state of flexure consequent upon the involuntary exercise of the excito-motor function through the group of nerves by which it is supplied, active even during sleep.

Did time permit, it would not be difficult to trace in Hunter's arrangement, under the head of " Sym- " pathy," a shadowy foresight of many interpretations which have rewarded the zealous labours of the earnest inquirers into the secret of nervous phenomena during the past half century.

Before quitting this part of my theme I would remark that Hunter makes no definite allusion to what we now term " collapse or nerve shock," the result of an influence exerted on the ganglionic nervous system, a subject charmingly and eloquently discussed by that distinguished surgeon the late Benjamin Travers—a

true disciple of John Hunter. The probable explanation of Hunter's omission is that he had no clear conception of a system of nerves distinct from the cerebro-spinal as exerting a special power over the circulating, the nutritive, and the secreting organs; and consequently, although he had noticed the phenomena of shock in a general way, he classed them under his generic term "Sympathy."

Even now we use the terms "collapse" and "nerve shock" without attaching to them any exact signification.

The well-devised experiments of Marshall Hall doubtless convinced surgeons that death might be the result of nerve shock and heart collapse produced by local injury inflicted on a part of the ganglionic system through the medium of the cerebro-spinal nerves, and that instances of death from violence to an important viscus, without hæmorrhage, were to be explained by the vehement sympathy of that vital nervous system, as a whole, with violent intrusion upon any of its individual parts. Hence the teaching of the present day, that injury to any important viscus is and must be accompanied by collapse, or characteristic shock; a doctrine strictly true in the main. The converse of this proposition, however, that if in a case of suspected injury there be no collapse or shock, therefore no important structural lesion has occurred

to any viscus essential to life, can scarcely be held, indeed it cannot be sustained.

In the majority of such cases it happens that, with the laceration of a viscus, in addition to the shock exerted upon the organic nervous system, escape of blood enfeebles the heart's action and assists in the production of collapse. But numerous instances might be adduced to show that a viscus may be seriously and fatally damaged without the manifestation of well marked collapse, provided there be no large loss of blood; or (and this is the point to which I wish to attract your especial attention now) no extravasation of noxious fluid or gas into a serous cavity or into the areolar tissue. So rapid may be the absorption into the blood by these structures of either the one or the other as to produce a quick inoculation and a speedy supervention of collapse or shock.

Really, Sir, the more assiduously I contemplate the contributions of Hunter to practical surgery, the more difficult do I find it to extrude from the exposition of the mind which was in him, and which should be in us, any subject on which he has written.

His philosophic doctrines and simple interpretation of Nature's contentions with difficulties, as exemplified in the "union by first intention," will ever remain a prominent foot-print in the progress of surgery. His own vigorous comprehension of this subject may well

have led to some of the irritability which he exhibited (or perhaps rather felt than exhibited) at the crude, unstudied adoption of the principles which he endeavoured to disseminate through his profession. On this subject, not only had he to contend with the bigotry of pre-conceived and ill-digested opinion, but with that haughty authority which ignorance assumes as its last escape from its difficulties. The evidence so frequently presented to him by the dying and the dead, in the form of profuse exhausting discharges, and hectic consequent on wounds, &c. constrained his full reliance on what he saw, and urged him to proselytize his profession. Like other propagandists he had to combat the errors of those who pretended to follow him. What he propounded as adapted to the treatment of healthy structures they applied to unhealthy structures. He tried to correct this error by pointing out that to attempt the "union of wounds by the first "intention" is improper and contrary to his first principles in such cases as the following.

If operations be performed, and coaptation attempted at the site of contused or lacerated wounds, —wounds having extraneous bodies within them; amputations or other operations carried through highly inflamed, swollen, erysipelatous, or otherwise unhealthy structures; in all such cases he attributes the failure to the imperfection of the interposed lymph, and consequently to the defect in its reparatory power.

The experience of eighty years' additional surgical practice furnishes us with slight evidence of any advance upon these principles of practice — principles purely original in conception, and wrought out by his own peculiar power of thought.

His work on "Venereal Disease," although, perhaps, of all his productions the one which exhibits most characteristically the weakness into which great minds sometimes fall, affords conspicuous witness to the high professional tone which existed in himself and which he endeavoured to cultivate in others. On the first publication of his work in 1786, Hunter is reported to have said,—"I am resolved that it shall "not be a bookseller's job, every subsequent edition "rendering the former useless. The truth of the "doctrines I have proved so long as to reduce them "to conviction; and, in order to render the language "intelligible, I meet a committee of three gentlemen, "to whose correction every page is submitted."

Although he fell into the weakness of supposing that gonorrhæa, chancre, and lues venerea originated from the same poison, it was an error committed in good faith, and in which he most honestly believed. His description of a genuine chancre, even now styled the Hunterian chancre, still remains true, and constitutes our type of the local disease. It is the most strictly characteristic form of syphilitic ulcer, and most surely developes secondary symptoms of some kind.

Hunter did not regard the soft venereal sores as worthy of the designation "chancrous," he did not deem mercurial treatment necessary for their cure, as he had observed that their cure could be effected by ordinary local applications and the improvement of the general health.

If appropriate to my purpose I could easily show that Hunter's views, rightly interpreted, coincide with the most recent views of syphilitic disease adopted in our day, and that his notions of the mercurial treatment, correctly conceived, hold good now as then. The details necessary to prove this are too diffuse to be dealt with in this oration: but I wish to bear testimony to the high nobility of purpose which actuated John Hunter in this as in every other matter relating to his profession. In his day he witnessed a vulgar empiricism, a pretentious superiority of knowledge of the subject, assumed for the purpose of attracting public notoriety and gratifying personal cupidity, as offensive and as wide spread, even within the pale of the profession, as that which we have to lament in our own day. He lost no opportunity of withering with the scorn which a stern uprightness alone can furnish, the monstrous quackery associated with this subject then as now. He laboured faithfully to apply to this disease the general principles of pathology he laid down, and had taught in relation to other forms of disease, under the conviction that, if true and reliable in so many other morbid conditions,

they would tend to the elucidation of this local and constitutional plague. Thus he strove, and, as I contend, successfully, to put within the reach of the inquiring surgeon a reasonable interpretation of the complex and confused phenomena presented by syphilis, creating in the minds of the well-informed public a rational confidence capable of rescuing them from the impostor or pretender.

John Hunter's description of the genuine chancre constitutes to this hour our type of the disease both local and general. The Hunterian chancre when seen is as real both in its local appearance and in its consequences as when he wrote, but it is probable that the successive transmission through three generations since that period may have exerted certain modifications in the development of the disease, comparable to those which have been so well observed in other maladies, as to raise the debate whether the type of the disease has changed or whether the improved treatment has modified the original disease.

It may be that time, treatment, and extended transmission have toned down the virulence of the poison, affording an explanation of the well-ascertained fact, that five or ten grains of mercurial inunction, or its equivalent internal administration, now effect the same amount of good as was effected by as many drachms or ounces employed in Hunter's time, or perhaps I should say in the practice of Hunter's successors, for

the same error to which I have alluded in reference to the "first intention" seems to have been repeated in this instance. An imperfect conception of what Hunter intended to convey, a greediness to convert a phantasm, an ill-conceived sketch of a really scientific idea, to the purposes of personal cupidity, whether of money or of notoriety, or of both, led to an extravagant use of mercury little short of that which Paracelsus himself adopted, extolling it as the elixir vitæ which would ensure a patriarchal longevity, although he himself succumbed to the great destroyer at forty-eight years of age, in what would correspond to our present designation of a workhouse.

Some trip of expression on the part of Hunter seems to have led in the minds of his successors to the rude notion that, given a case of syphilis, a certain amount of salivary secretion relative to the apparent severity of the sore was necessary to its cure, so that the quack, the patient, and the surgeon, seemed to be placed on the same platform; the spitting-pot was the arbiter of the degree to which the remedy was to be pushed.

A just interpretation of what Hunter wrote could never fairly lead to such a conclusion.

The treatment became again empirical, positive, and thoughtless—equally intelligible to the ignorant and well-informed, and so placed, for the second time, empirical quackery on the same plane with scientific physiological surgery. This reckless plan was ener-

getically pursued forty years, or longer, after Hunter's death. The recollections of many of my audience will bring to their presence the dreadful and hideous consequences resulting from the misuse of this potent and almost specific remedy for the direful effects of virtue sacrificed, morality shamed, happiness broken, health deteriorated, and life shortened.

Mr. President,

Time now constrains me to bring this, the 43rd Hunterian oration, to a conclusion.

The contrast between man's brief span of life and the endless pursuit of science was well marked in Hunter's history.

Whilst Lagrange and Laplace were extending the powerful mathematical analysis bequeathed by Newton; and Herschell by patient observation was extending Newton's great law of attraction to the furthest limits of our system, and completing the exact astronomical science of our day; whilst Black, Cavendish, Priestley, Scheele, Lavoisier, and their fellow-labourers in chemistry, were reducing all ponderable bodies to their simplest undecomposible elements; whilst Dalton was investigating the laws by which these elements were combined in numerical proportion of weight, and Hauy the geometry of their combinations—Hunter alone, unaided by sympathetic fellow-labourers, was scrutinizing the tangled maze presented by the myriads

of living forms—reducing these to order, and investigating the hidden laws governing their formation and growth. Let the "Thirteen thousand Hunterian pre-"parations," the work of his own hands, forming the rich, fruitful, energising nucleus of our Museum, bear witness how fascinated he was with his pursuit of Nature. They are the noblest monument of his well-directed, well-sustained labour. He who will carefully decipher that record will best understand that reputation which has caused succeeding generations to recognize and honour Hunter as the philosophic expositor of Natural History; the profoundest anatomist and physiologist of his day; by common consent the great scientific surgeon and pathologist of all time; eminently the most patient exemplar of the true student of Nature.

We shall fail to appreciate the full measure of Hunter's mental stature, if we do not recognize the difficulties under which he toiled.

The solitariness of his pursuits—the want of a single mind to sympathize with his large and exalted views of the grandeur of animate nature, must have had a chilling influence on his enthusiastic temperament. Worse than all this, he met opposition at every turn. He was conscious that he could not live to see the issue of all his toil. In bitterness of soul he could exclaim: "My life "is at the mercy of any scoundrel who chooses to put "me in a passion." Yet still he struggled onward—

unmoved from his purpose—with that high resolve which can only belong to great minds.

Our profession has lately been reproached in these terms, brought most prominently before the public eye: "There is probably no profession which in its "aggregate or corporate capacity excites so little the "interest of the public as that which professes to cure, "or alleviate, the ills resulting from the physical con-"stitution of man." This is but too true a picture of the indifference, of men well informed on other subjects, to our art; but it is no real reproach—it arises not from our want of attainment, but from their total inability to gauge its worth. They know nothing of the vast array of facts, of which we must carefully acquire a knowledge, and skilfully and systematically store in our memories. They know nothing of the intricate problems of life and disease, which we (each for himself) must investigate for ourselves with toilsome labour. The very formulæ of these problems are unknown, unintelligible, to all but those specially instructed.

They cannot realize that inner sense of true responsibility felt by the honest surgeon, who knows that life or death may depend not only on the well-practised dexterity of his hand, but upon the devotion of all his faculties of mind to the solution of the most intricate phenomena ever scanned by human intellect.

Popular appreciation is matter of small account,

but lack of interest in our labours by professional contemporaries is harder to bear. If they condemn, or "damn with faint praise," the honest worker, without taking pains to obtain an accurate knowledge of the value of his discoveries, this is still harder. Hunter had to endure all this, and right manfully he bore it all. The conviction that, let the world say what it would, no dogmatism, no vague denial, no sneer, could make any impression on proven facts; above all, his conscious love of truth, for truth's own sake, called out in Hunter the high-minded indifference of the philosopher to the petty assaults of ignorance.

This, Sir, I conceive is "the mind that should be "in us." We should not strive for the brittle fame of the meteor, dazzling only for a short time to be extinguished for ever. Rather should we seek, by the unveiling of truth, the enduring steady light of the fixed star, whose brilliancy time does not pale; a fame which, after the lapse of more than sixty years, evoked a national recognition of John Hunter's great merits, and earned for his remains a hallowed resting-place amongst the wisest, noblest, best of Britain's worthiest sons; there they rest in "honour with the "honoured."

> "They, so sepulchred, in such pomp do lie
> That kings, for such a tomb, would wish to die."

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