Chapter 8

Literary Works

It is merely a guess on my part when I assume that Lord Gifford was induced to found the Edinburgh Lectures on Natural Religion by his great countryman, David Hume's *Dialogues concerning Natural Religion*. Sherrington, interpreting the founder's intentions, quoted Lord Bacon's famous definition: that 'spark of knowledge of God which may be had by the light of nature and the consideration of created things: and thus can be fairly held to be divine in respect of its object and natural in respect of its source of information'. From these lectures Revealed Religion was banned. The founder's wish was that the subject should be treated as if it were astronomy or chemistry. Sherrington responded to this commission much as did the great painters of the Renaissance to the orders of their patrons. The formal limitations of the theme, so far from checking the flow of inspiration, became a challenge for him to muster all his resources of knowledge and intuition in order to express his ideas on spiritual values, life, and the image of the world as created by modern biological science.

Sherrington with his poetic instinct was never far from a pantheistic identification of himself with Nature. In a lecture on Goethe (1942) he had written congenially: 'A cry of consent to be one with Nature! That thought is comfortable to him—more than comfortable, it is welcome. The thought that whether alive or lifeless he is inescapably and for ever a part of Nature—one with her. This, it would seem, is what sustains him. He draws from it his salve for existence, his balsam wherewith he would heal death itself.' While Sherrington saw but little to admire in Goethe's scientific contributions, he identified himself

with the 'Nature-intoxicated' poet (his expression) who wrote the unforgettable lines:

Ihr glucklichen Augen
Was je ihr gesehn,
Es sei wie es wolle,
Es war doch so schön.

Faust, II

Man on his Nature is a work by a scientist who became 'Nature-intoxicated' in a new dimension. His inspiration is the image of the world that modern science is creating, and he believes we can understand Nature in terms which are satisfying to ourselves quite apart from whatever restrictions epistemology may impose upon our modes of thinking. This leads him on to a natural religion of values based on science. By comparison a philosopher of Bertrand Russell's format finds science useful and also pleasing as an intellectual exercise, but when the values to which we revert for our spiritual comfort are concerned he is stirred to an emotional pitch of a far higher order by the aesthetic sensations accepted by all and sundry: 'When I come to die I shall not feel that I have lived in vain. I have seen the earth turn red at evening, the dew sparkling in the morning, and the snow shining under a frosty sun. I have smelt rain after drought, and have heard the stormy Atlantic beat upon the granite shores of Cornwall. Science may bestow these and other joys upon more people than could otherwise enjoy them. If so, its power will be wisely used. But when it takes out of life the moments to which life owes its value, science will not deserve admiration, however cleverly and however elaborately it may lead man along the road to despair. The sphere of values lies outside science, except in so far as science consists in the pursuit of knowledge' (Russell: *The Scientific Outlook*).

The sense of wonder, so fundamental with Sherrington, is the key to his poetic transcription of biological facts. Whenever he is deeply engaged by his theme, he is also carried away by a sense of wonder. This makes him take up his brush and start painting. On his palette he mixes naked facts, experimental results, poignant questions, and starts filling his canvas with scenes from the frontiers of biological knowledge. The task excites him. Those sections of *Man on his Nature* are written

with abandon, at times almost feverishly. The words come tumbling over each other. Sentences are split into pointed statements. Vivid imagery splashes colour across the pages; thus, for instance:

The eye-ball is a little camera. Its smallness is part of its perfection. A spheroid camera. There are not many anatomical organs where exact shape counts for so much as with the eye. Light which will enter the eye will traverse a lens placed in the right position there. *Will* traverse; all this making of the eye which will see in the light is carried out in the dark. It is a preparing in darkness for use in light. The lens required is biconvex and to be shaped truly enough to focus its pencil of light at the particular distance of the sheet of photosensitive cells at the back, the retina. . . . The light-sensitive screen at the back is the key-structure. It registers a continually changing picture. It receives, takes, and records a moving picture life-long without change of 'plate', through every waking day. It signals its shifting exposures to the brain. . . . And the whole structure with its prescience and all its efficiency, is produced by and out of specks of granular slime arranging themselves as of their own accord in sheets and layers, and acting seemingly on an agreed plan. . . .

. . . The little hollow bladder of the embryo-brain, narrowing itself at two points so as to be triple, thrusts from its foremost chamber to either side a hollow bud. This bud pushes towards the overlying skin. That skin, as though it knew and sympathized, then dips down forming a cuplike hollow to meet the hollow brain stalk growing outward. They meet. The round end of the hollow brain-bud dimples inward and becomes a cup. Concurrently, the ingrowth from the skin nips itself free from its original skin. It rounds itself into a hollow ball, lying in the mouth of the brain-cup. Of this stalked cup, the optic cup, the stalk becomes in a few weeks a cable of a million nerve-fibres connecting the nerve cells within the eyeball itself with the brain. . . . The human eye has about 137 million separate 'seeing' elements spread out in the sheet of the retina. The number of nerve-lines leading from them to the brain gradually condenses down to little over a million. Each of these has in the brain we must think to find its right nerve-exchanges. . . .

. . . As wonders, these things have grown stale through familiarity. The making of this eye out of self-actuated specks, which draw together and multiply and move as if obsessed with one desire, namely, to make the eye ball. In a few weeks they have done so. Then, their madness over, they sit down and rest satisfied to be life long what they have made themselves and, so to say, wait for death. . . .

. . . But the chief wonder of all we have not touched on yet. Wonder of wonders, though familiar even to boredom. So much with us that we forget it all our time. The eye sends, as we saw, into a cell-and-fibre forest of the brain throughout the waking day continual rhythmic streams of tiny, individually evanescent, electrical potentials. This throbbing streaming crowd of electrified shifting points in the spongework of the brain bears no obvious semblance in space-pattern, and even in temporal relation resembles but a little remotely the tiny two-dimensional upside-down picture of the outside world which the eye-ball paints on the beginnings of its nerve-fibres to the brain. But that little picture sets up an electrical storm. And that electrical storm so set up is one which affects a whole population of brain-cells. . . .

Such 'Nature-intoxicated' and, at times, dramatic scenes abound in the descriptive sections of *Man on his Nature*. They are written by an octogenarian and, possibly, age coupled to vitality has been a real advantage because during his life Sherrington had seen scientific knowledge expand to become the powerful structure the young now may take for granted. He had participated in the process of expansion and knew it from the inside, not only as a bystander. Age must have been a special privilege when, as in the example chosen, the leading facts were based on optical magnification, the great era of histology, which Sherrington had seen rise to its climax at the turn of the century. In his youth the microscope was still the leading invention in the world of biological science and it had guided his own thinking when he forced a way through to functional analysis. The light it had thrown on genetic evolution was to him a living experience and not one become stale through familiarity. To Sherrington in his old age it must have been sheer pleasure to lean back for a last sweeping glance over the full panorama of biological science and tell the young what had happened. What indomitable strength of mind—at his age! His almost boyish delight is catching. It echoes a vitality reminiscent of the works of the eighteenth-century naturalists. It is Linnaean in its enthusiasm, in its colourful language, Linnaean also in its background of dormant religiosity (though there is nothing left of the vindictive God of the Old Testament whom Linnaeus revered as an Alter ego to the inspired Artificer, gracious, benevolent and deeply concerned about beauty, order and fitness in the biological world).

For all that, Sherrington may not have been in the least familiar with the writings of the great botanist. Actually he wove into the general pattern of his book reflections on Jean Fernel (1485–1557), a sixteenth-century physician and savant, to whom he also devoted a separate study (*The Endeavour of Jean Fernel*, 1946). This took him to the Paris of the French Renaissance at the time of Francis I. In England Henry VIII was on the throne, in Germany Charles V. When Henri II succeeded to the throne in France (1547), the Protestant movement in Germany under Luther and Melanchton was well under way. Charles V abdicated in 1556; when Fernel died in 1557 he was physician to Henri II. Fernel had been educated at Ignatius Loyola's college, St Barbe, in the *Quartier Latin*.

The Endeavour of Jean Fernel is a scholarly book for specialists in the history of medicine, erudite and critical. It displayed detailed knowledge about the Latin Quarter of the years 1500–60. Once at a dinner party in Paris, sitting next to the late Professor Louis Lapicque of the Sorbonne, I took the liberty of asking him how accurate it was. 'I am the right person to answer this question,' he replied, 'because I live in the house where Jean Fernel lived [or was it a neighbouring house?] and have always been very interested in the history of the *Quartier Latin*. And I would like to testify that Sherrington's knowledge of this region and time is if anything better than my own.' Of Lapicque's knowledge of the history of his university I had been informed in advance by my host, Professor A. Mounier of the Sorbonne.

What concerns us here is simply the place of Jean Fernel in Sherrington's personal sphere of interests. What did he see in the man who created the words 'physiology' and 'pathology' and who wrote the first textbook of physiology (1542) some hundred years before Harvey made physiology an experimental science and Descartes defined the reflex? The work was an outlet, partly at least, for his love of Paris and the French language, both shared with his wife. Though so much of Sherrington's Continental education had been in the German language and in his youth German science dominated the scene, he deeply admired French civilization and, when he had to spend all his days in a chair in the nursing home at Eastbourne, he still enjoyed reading French novels. On his ninetieth birthday

he started an animated discussion with me on *Madame Bovary* which he had recently re-read.

Sherrington's interest in Jean Fernel would have been greatly stimulated by the fact that this man wrote a book akin to *Man on his Nature*—in Latin dialogue to be sure, but at Ipswich school Sherrington, as an exercise, had turned Keats' 'Sonnets on Visiting the Tomb of Burns' into Latin elegiacs. With Fernel he shared a common interest and found in the dialogue *De Abditis Rerum* a statement of his own problems of mind and matter. The author had had the strength to shake himself free from astrology and supernatural causes of disease and reached a view of physiology (in which Fernel included body and soul), that with all its deficiencies was independent and also penetrating enough to make Fernel's book one that was read by intellectuals for a hundred years—until the experimental era began.

Fernel, like Sherrington, belonged to the few who grow more modern with age, and four years before his death he declared that the 'whole book of healing was nothing other than a copy of the code of inviolable laws observable in Nature'. What is Man, he asked in the *Dialogue*, and what is Nature? Briefly put, his reply was that Nature is God's principle working upon matter but Man has powers beyond those of matter, something celestial emerging as 'form' which the Creator sends forth 'as by the breathing of a breath'; not form in the Aristotelian sense but something spiritual, assumed to enter the embryo on the fortieth day after conception!

Another motive for introducing Jean Fernel into *Man on his Nature* was to provide contrast with our times. 'We have to look for a time and scene sufficiently akin to our own for us to share the viewpoints, and then to lay the science along with its religious implications conformably beside our own. Fernel's acceptance of man as within Nature is of significance to us here,' Sherrington said. On asking, why, the reply would seem to be that Fernel felt so urgently that 'Natural Religion and his religion of faith must harmonize'. Across time and space Sherrington felt a bond of sympathy with his aim and the urge behind it.

It is not out of place to consider whether Sherrington acted wisely in providing contrast by introducing Jean Fernel into

Man on his Nature. This complicated the design of the book and the reader, with less background than the author, may sometimes feel the strain of focusing and re-focusing across a gap of four hundred years, a long distance for contrast. To counterbalance this criticism it should be admitted that his musings on Jean Fernel really add a specific flavour to the book, truly Sherringtonian in its intricate artistry. This partly derives from the ever-present mind-matter problem, partly from the opportunity Sherrington thus had of taking his readers back to the embryonic stage of biology before letting them witness parturition and the roaring crescendo of growth in the present time. 'Ah, you know,' Sherrington would have replied to my criticism, 'every one is an artist in his own right' (this being an actual remark of his).

It is, of course, easy to understand Sherrington's desire for contrast with some previous stage of biological knowledge. The obvious can be interesting in perspective and, if one imagines oneself faced with the author's task of writing a *Man on his Nature*, then surely one would also feel the need for a platform to return to every now and then before making a fresh effort in a new direction. From the author's point of view moments of rest would be more precious than the reader's need for contrast.

The panoramic part of the book begins to gather momentum with the third chapter dealing with a presentation of 'Life in little', the results of optic magnification. Coming from the pre-microscopic era, 'Fernel seeing man, his type of inseparable unity of the "life principle" disrupted into billions of microscopic lives, may well ask to be shown, not only that these component unit-lives are demonstrable as "lives", but that this mass-life of the body and its organs is built up from them. He would learn that the study of physiology now commonly proceeds on that assumption and never finds it fail. . . . If a definition has to exclude as well as to include, it must lean on a logical boundary of what it defines: the term life has no such boundary from lifeless.'

This standpoint means giving a leading rôle to 'evolution', a concept which, after Darwin, Wallace, and Mendel, and up to the present time, has been of such overwhelming importance in general biology that no other generalization in this field can rival its hegemony. In the example quoted above, Sherrington

described ontogenetic evolution in one specific case. He returns to evolutional problems in many contexts and clearly defines his viewpoint: 'the key of the problem is not psychical. Chemistry holds the key.' Today we have seen this attitude justified in the work of Crick, Wilkins, and Watson on the genetic code of information as laid down in the nucleic acids rewarded with the Nobel prize in medicine (1962). Sherrington, being concerned throughout his book just as much with mind as with matter, boldly faces one of his leading questions: is mind a product of evolution? This question is so essential because it stands at the entrance to a group of problems concerning mind and matter all of which engage him to the very core of his being, and much depends upon how the first one of them is answered. He has no hesitation on that point. The story of evolution tells us that living things are busy becoming something other than what they are all the time and mind is no exception. It is part of the tide of change. It seems to have arisen in connection with the motor act, when motor integration progressed and became evolved. It had survival value and the biological advantage it conferred on the concrete individual was improvement of control of the motor act. 'What the mind is concerned with is not the act but the aim.' This is another way of defining 'control'.

Sherrington's attitude is an evolutionary monism or pantheism since no line is drawn between life and lifeless, and in life's history of two thousand million years, mind, soul, psyche—these terms are not separated—are regarded as having emerged in the general development of cell aggregates into bodies with brains. In his own words: 'The appearance of a recognizable mind in the soma would then be not a creation *de novo* but a development of mind from unrecognizable into recognizable. It is at this point therefore that on these admissions we become committed to dualism. But while accepting this duality (of energy and mind) we remember that Nature in instance after instance dealing with this duality treats it as a unity.' Hence Sherrington's dualism is a purely pragmatic acceptance of energy and mind as phenomena of two categories. 'Pragmatic judgement here, as often, ranges itself beside Nature's practice. Pragmatic judgement accepts ourselves as compounds of energy and mind.'

Sherrington is not unaware of the epistemological problems

involved because of mind being our only channel of information, but he does not want to discuss this question which has been amply expounded by the philosophers from Leibnitz, Berkeley, and Hume onwards. It can hardly be out of ignorance that on the whole he ignores philosophers. He wants to be, as he says, 'the man in the street'. He examines the situation and finds that natural science is consistent in its application of the energy concept, including its application to living material. 'The mental is not examinable as a form of energy.' It lies outside natural science, and of the relation between thoughts and the brain we only know of gross correlations in time and space. Countless experiences provide us with a general localization of the mind to the brain, but then mind has no lower limit accessible to definition. It comes from nothing and returns to nothing. To apply common-sense dualism alongside theoretical unity 'may be taken either as sanity or superficiality or perhaps both'. His examination of the scientific as distinct from philosophical evidence has led him to this final standpoint: 'the duality is there; and combination is there, but the footing on which the combination rests . . . is for our enquiry still to seek. . . . Where our knowledge halts our description will resort to metaphor. Long will man's fancy deal with the tie between body and mind by metaphor and often half forget a while that metaphor it is. Regarding this problem will a day come when metaphors can be dispensed with?'

Sherrington's attitude should not be confused with the dualism of theology nor be cited as an example of revealed insight. He emphasizes that 'the mind by its own unaided vision looking at our world does not find that world resolve into First Cause and the things which That has created and maintains. It finds, so far as I can exercise "its" vision, that our world resolves itself into energy and mind.' Sherrington praises Newton's essential modernity in that he accepted what he declared he could not account for.' Our parable,' he says, 'would preach acceptance of energy and mind as a working biological unity although we cannot describe the how of that unity.'

One further consequence of Sherrington's evolutionary attitude to all these problems is the anthropomorphic concept that the human mind is the limit which life has reached in complexity and perfection.

If, as is sometimes said, history is the tracing of past purposes, here is a history which might, while telling of past purpose, whisper to us of future purpose. It would seem so to whisper to us that we have been Earth's purpose. We must not let that flatter us too far. It adds 'not as an end but as a means to a further end'. Moreover our reflexion adds that history read backwards will whisper the same answer to each of its products which shall make that enquiry of it.

The religiosity that pervades *Man on his Nature* has sometimes been held to be a biologist's justification of the truth of Revealed Religion, the reason being Sherrington's defence of dualism. This is sheer wishful thinking, because Sherrington himself has made every possible effort to explain the pragmatical nature of his concepts. His is a Natural Religion and if a name for describing his standpoint be wanted, it is 'Evolutionary Pantheism'. Mind and energy are two concepts, formulated by mind. We arrive at them from a study of evolution in which they go together as a unity and it is impossible for us to know where in the series mind ends or begins. For all we know, mind may be an attribute of matter. What we recognize is merely the final product of evolution.

When on the other hand the mind-concept is so applied as to insert into the human individual an immortal soul, . . . a trespass is committed. . . . As an assertion on the plane of Natural Knowledge it is an irrational blow at the solidarity of the individual; it seems aimed against that very harmony which unites the concepts [energy and mind] as sister-concepts. . . . Together they make up the sum total for us; they are all we have. We called them disparate and incommensurable. Are they then absolutely apart? . . . They have this in common . . . they are both concepts; they both of them are parts of knowledge of one mind. They are thus therefore distinguished, but are not sundered. Nature in evolving us makes them two parts of the knowledge of one mind and that one mind our own. We are the tie between them. Perhaps we exist for that.

Sherrington's evolutionary pantheism, though leaving God and the Immortal Soul to Revealed Religion (its evidence 'rests on grounds we do not enter upon here', he says), nevertheless encounters all the ethical problems that belong to the sphere of mind, not excluding the rôle of evil. No revealed Lucifer is necessary to expose Nature's malevolence. Cruelty is inherent in

the design, if we look upon it from our own standpoint. Life is not a sacred thing, nature is non-moral, not immoral. We know this well. But what has happened when at a certain stage of development Nature has evolved minds with concepts which by a common term are known as 'values', such as 'sacred', 'evil', 'immoral'? 'Whence has he [Man] got them? Inventions of his own? Conventions? How far can he trust them? Can *a priori* principles suffice to base them?' Sherrington replies: 'They are under test. They are in the making, even more than is the rest that he is.' He cannot answer the questions raised but seems to believe that awareness of the sense of pain is at the root of it. 'Human life has among its privileges that of pre-eminence of pain.' Thus he makes suffering the evolutionary basis of the distinction between good and evil. We carry in our inheritance a social and a predatory streak. Whither does evolution lead us? Whatever the answer, it is certain that 'the ascendancy of *homo praedatorius* would spell ruin to man'.

Sherrington thus thinks of values as products of evolution that have come to stay. The great revealed religions have played a leading rôle in developing this aspect of mind. They have moved and organized communities by their emotional appeal. What about Natural Religion? Sherrington replies:

[It] has convictions; it must therefore have emotion. Its convictions entertain 'values' and the 'values' constrain emotion. We saw that one of its 'values' is Beauty. Also it knows the sentiment of wonder. . . . And there is Truth. Natural Religion along with the great religions holds 'truth' a value. . . . Compared with a situation where the human mind beset with its perplexities had higher mind and higher personality than itself to lean on and to seek counsel from, this other situation where it has no appeal and no resort for help beyond itself, has, we may think, an element of enhanced tragedy and pathos. To set against that, it is a situation which transforms the human spirit's task almost beyond recognition, to one of loftier responsibility.

Finally, Sherrington discusses the problem of Hume's *Dialogue*, whether the pain of the world is offset by its joy. Nature, he says, has revealed to us values such as Truth, Charity, and Beauty.

Surely these are compensations to us for much. And will not this compensation grow? Charity will grow; Truth grows; and even as

Truth so Beauty. Music as her ear grows finer embraces what once were discords. The mind which began by being one thing has truly—as so often in evolution—gone on to being another thing. Even should man in the cataclysm of Nature be doomed to disappear and man's mind with it, man will have had his compensation: to have glimpsed a coherent world and himself as item in it. To have heard for a moment a harmony wherein he is a note. And to listen to a harmony is to commune with its Composer?

This statement ends with a question mark in order to indicate, I assume, where the borderland of belief lies.

Man on his Nature is Sherrington's *credo* and I have chosen to summarize it rather than examine its concepts. It shows from where he drew 'his salve for existence' and how much science meant for him; it displays his learning and breadth of knowledge and overwhelms us with his vitality, insight, and sincerity. Sherrington is entitled to be taken at his word when he refuses to call himself a philosopher and prefers to be 'the man in the street', telling passers-by what he has seen and experienced in a life devoted to experimental biology. It is true that Professor Asher of Berne, at the international meeting of neurologists (1931) mentioned in the previous chapter, harangued him as 'the philosopher of the central nervous system', but I am inclined to disagree. Sherrington's mind was that of an artist, complex, intuitive, rich, visual in the extreme, and what kept all this in balance in his career as a scientist was the empirical attitude of the great experimenter living in his work. In the same sense many famous artists have been great experimenters, highly critical of their own results and methods.

His love of poetry was genuine, a secret chamber to which he sometimes withdrew

turn the key on the lock's pin
push back the panel and pass in.

There he would revel in strange sights, seeking expressions for them with the true poet's love of words and images.

Lodging bewitched! erst there to wake
was to pawn day for folly's sake!
There, pulse athrob and sense aswoon,
light love danced naked at high noon

above her pictured self, that played
in the sheened floor and spun and swayed,
or paused the while pent passion's note
steadied the curve of her white throat,
and bliss to bliss was made aware
beneath the cloud of her loosed hair.

This is from *The Assaying of Brabantius*, his consummate poem, a day of meeting with a world of beauty and desire which, alas, he had to forsake for creation in a different field. Yet he did not feel that he had dwelt in that other world in vain. Returning to his life of experimentation and again

entering the city gate
I found the loud street passionate
with meanings new, and from men's eyes
read trulier in humbler wise,
and in fresh habit understood
the poignancy of ill and good.

Poetry gave him a wisdom and understanding of men and their ways, respect for values, and when in his old age he wrote *Man on his Nature* it was still with him as a source of inspiration on which he drew for exaltation and passion in his approach to Nature as revealed to the enquiring mind of Man.

Although Sherrington's verse sometimes grew strained with esoteric words piled up in defiance of interpretation to suit rhyme, at other times he found happy expressions for his emotions in lyrics of true beauty. They were often written in a mood of tender sadness during the First World War when his thoughts turned to the young men in the trenches, or when he recalled someone who

died that other lives might grow
that other feet than his step free
in their loved lands, as ours now go,
where his steps never more shall be

This poem begins

Now the red thorn's sunrise fire,
laburnums all sweep golden-hung,

the thrush as never could he tire
essays his thrice-anointed tongue;
above the lasher's pool the sedge
lifts, breaking the bright waters through;
green is the wear of every hedge
and skies as mavis eggs are blue.

Oxford scenery was often recalled against that same background of emptiness and tragedy:

Ay, all the hinges of the ancient gate,
keep burnished bright the goblet's silvern state
against the hour shall hail the soldiers home.
Thou, stately tower, from high that sawst them go,
and hast full many doughty scenes and fair
watched and swung bells above, shattering the air
to honour heroes, thou too waitst as though
thou standst of our poor presence scarcely ware,
catching afar the final bugles blow.

The 'stately tower' was that of Magdalen, his own college at Oxford, to which he became attached in 1913 as Waynflete Professor in his subject. *The Assaying of Brabantius* was composed at Liverpool but this city is not reflected in any of his poems. Most of them are undated but it is a fair guess that, when the main theme is love, they belong to an earlier period of his life than the War Years. Oxford spoke to him in a different way.

. . . with one voice sole, with accents many,
tongued turret and tongued stream, tracked pasture fenny,
and cloister spirit trod, and centuried tree,
and, bondsmen locked in Time's tranquillity,
thy bell-discharged hours. If wharfage any
thine 'tis where Age shall, nursing late his penny,
smile at long last to hand him Charon's fee.
And now, by me laden with singing and young laughter,
and, higher, a wide-flung casement casts afloat
pulses of waltz the which white robes sway after;
sworn Priest of Beauty, these thy shrines among,
that kneelst with old folk and that dancest with young.

This is the old man whom we met in the first chapter of this book, devoted to his memory, and to whom we now bid farewell.