THE PLACE AND STATUS OF NATURE IN THE ENSEMBLE OF SURGICAL TEACHING*

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'Thou, Nature, art my goddess: to thy law my services are bound'. This, as some of you will remember, appeared in the students' journal, *Nyanga*, some years before my retirement, under the caption 'The Classics at the Faculty of Medicine'—S--nt. Of course, it was a first-class leg-pull and a parody on my marked and frequently expressed partiality for Nature and the outstanding assistance we continually get from her study. Obviously I shall have to straighten it out in due course.

My thesis is an endeavour to throw some light on this deep-seated, almost overwhelming respect for Nature as she is presented to us in all her facets, a respect amounting almost to reverence and awe, that has always been present with me during my thinking life. It has continually increased with experience and the passage of time. I need hardly say that this respect arose from the growing realization of what we can learn from her.

Further, since this is a personal view, which, I have to acknowledge, is not universally held, I must predicate that it is my convinced belief. After all, 'What we believe is, for us is', and it doesn't matter whether that belief is based on logic or not, on confirmed fact or circumstantial evidence. Whether the belief is *justified* or not, and to what extent, is in great measure a personal matter, but a firm belief, to the believer, becomes a fact. Manifestly, I can only touch on the fringes of the subject in an address like this, and I shall have to concentrate especially on those particular features which most directly apply to us surgeons.

I find, whenever I am asked to give an address to my old student family, that, in spite of the fear of repetition, the influence of surgery and its teaching, my two chief loves, is always in the offing, and present as an undercurrent; so I am sure you are not surprised at the title, covering what I have to say to you. It reminds me rather of a recurring decimal.

Teaching, in whatever sphere it functions, is naturally bound up with education and, judging from the almost world-wide students' riots these days, associated with it, education is very much to the fore. There seems to be much controversy about it, but, put simply according to the meaning of the word, it is a 'leading out', ostensibly from the darkness of ignorance into the light of knowledge and understanding; and this, I take it, by whatever means are available. The essence of it is accepted; the means of achieving it, on the other hand, like all techniques, are varied and negotiable.

One might reasonably anticipate—and common sense supports this—that the choice of those means would be best left to those with maturity of thought and experience, although one must acknowledge that from time to time a Mozart does appear, but he is an extremely *rara avis*. After all, one cannot escape the realization that adolescence—which, in us, structurally does not end before the age of 25 years, and functionally is prolonged considerably beyond this—corresponds to the period when a fruit is ripening and is not yet ready or fit for eating; and don't forget my aphorisms that 'Childhood does not necessarily end with the union of the epiphyses', and 'None so stupid as he who can but won't learn'. Consultation and discipline are the watchwords, not management.

What, then, do we understand by Nature?

What I believe is this: Nature is a creation, and she is not her own creator. I have repeatedly quoted Voltaire's remark, which I fully endorse, 'If a clock proves the existence of a clock-maker, and the world does not prove the existence of a supreme architect, then I consent to be called a fool'. I had previously, in error, accredited Akhnaton as being the first man to acknowledge 'the power behind Nature'. He certainly was the first recorded Egyptian to do so, but I find that Abraham antedated him in this respect by 1,000 years, designating *that* power 'the One God, the Spiritual Creator of the Universe'.

The word Nature, as its derivation indicates, would appear to imply and include both the process of being born and the accomplished fact, and it covers the whole of the universe, with the world a very tiny part of it, though, for us, our world usually represents what we are thinking of when we speak of Nature, and I shall keep to this restricted view of it.

Nature, then, for our immediate purpose, comprises the material world and everything in it, living and non-living, including ourselves.

In general terms, Nature as a creation, an objective production—one might say the materialization of the non-material, 'the supreme example of a concept realized'—must be under the control of her Creator and be subject to whatever laws were instituted for her governance. Incidentally, we, as part of the inclusive set-up, must necessarily be similarly subjected. Consequently we must appreciate that Nature is not, *per se*, a conceptive and organizing power, not the director but the directed, with only that freedom and latitude permitted by her Creator. In other words, the working of Nature is subject to the power behind her, the power that conceived and produced her. In fact, she is the servant and not the master. Let us look at some of the implications of this.

First, a word as to the Creator, which can never be anything but visionary. It is not possible to define the infinite, and superlatives are equally inadequate, but, so far as I am concerned, commonsense interpretation pictures the Creator as a Personality, as this is the highest state we can think of and formulate. In our limited way, we, as yet imperfectly evolved humans, consider man the highest product of this Supreme Creation, and, consequently, the Creator of such the Supreme Personality, who is beyond any description or limitation. We cannot escape from the realization that to such unlimited power nothing is impossible. I shall have occasion to refer again to this. Meanwhile, let me say that Nature as a creation, a

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materialized concept, is a finite entity, as contrasted with the infinity of the Creator, and, in consequence, she is there for our complete investigation and comprehension, however difficult that may be and however long it may take.

In common parlance we speak of the laws of Nature, but what we really mean is the laws governing her. In my opinion these laws were an essential part of the original conception of Nature and were, therefore, already fixed before ever the Creation took place. They represent basic or first principles, they are absolute, without exception, completely unassailable and unalterable, and, what is more, Nature never breaks them herself, and we break them at our peril, paying the penalty incurred. Nature herself is just, not sympathetic. Mercy is above and outside Nature's organization.

The unique element in this amazing Creation, which for us transcends all others, is the presence of life, with all that this entails, and it is this in which we are particularly interested, since our whole career is occupied with it and its vagaries.

We might well ask, 'What is life?' A simple question, but the answer is by no means as simple!

Let me say at once that no-one knows its real nature and the best we can do is to describe those attributes and appurtenances that we find associated with it. My old friend, Wood-Jones, has some quite clear and pertinent remarks:

'Life is something that is *sui generis*, in a class of its own. It is an elusive quality, inherent in those things that are living. We are powerless to create it, unable to re-create it, and, once obliterated, it is for us gone forever. It is a quality added to and not inherent in matter itself. Knowing the chemistry and physics of living tissues does not mean we understand their nature. We all know that movement, reproduction, assimilation and growth, as carried out by living beings, are processes utterly different from those seen in the inorganic world. *The distinction of living matter is its power of self-maintenance, which is manifested in activities that are characteristically directive.*'

This last is about the best brief description I have come across. I regard life as a gift of the Creator and its production definitely beyond our power of attainment.

Biologically speaking, living matter includes both the vegetable and animal kingdoms, but we are especially interested in the latter and, as surgeons, particularly in man, the highest of the vertebrates. However, we cannot ignore entirely the rest of the group, nor indeed the invertebrates, in order to complete our orientation.

In the animal kingdom, to carry out the process of self-maintenance in all its aspects, the Creator has endowed it with a variety of directive agencies which have their individual and specific duties to perform.

These directive agencies are essentially the same throughout the whole series of animals, from the lowest to the highest, but, with the appearance of intelligence as brain development proceeds, some modification is seen as *partial* individual influence appearing progressively.

Especially in the lower animals we see these agencies acting maximally and we call them instincts. All sorts of remarks and descriptions (definitions) of them are offered, but in great measure these seem rather to cloud than to clear the atmosphere; e.g. 'Instincts are now regarded as the experience of the Race, as opposed to the Individual'. It is not easy to follow what this is intended to mean, and I leave what it does mean to you. It certainly is a good example of what has been called the specious verbalism in modern science—it looks well, but isn't all it looks. Wood-Jones, again, gives quite a clear expression of his opinion: 'Instincts are an inborn pattern of behaviour (I prefer function) consisting of a series of actions requiring no learning or experience for their accomplishment. In the normal life-cycle of any organism, it is true to say that the instincts with which it is endowed are developed *directively* towards the ends that they serve—they are developed for the normal satisfaction of normal needs.'

To me, the instincts are certainly inborn, a gift of the Creator, essential for the maintenance of life, and covering all the necessities involved. They act entirely under the compulsive directive power which controls them, to the complete exclusion of the individual's interference.

This directive power seems to me to be the king-pin of life, and it represents to me the delegation of a function or duty as part and parcel of life and its maintenance, guaranteeing success, a sort of decentralization, with allocated power, acting as a kind of automation, but still under central if remote control.

I should like to emphasize that the instincts, which appear to control overwhelmingly the life of the lower animals, and the lower the more so, still persist in the higher ones, and even in man; as I have often emphasized, they still control, quite outside man's efforts, those absolute essentials of life, such as respiration, blood circulation, digestion and assimilation, and so on. But we also see, in man particularly, with the development of intelligence and the function of the brain that quite a lot of voluntary directive power has developed which can aid that which is inborn. In other words, the instincts act involuntarily, compelled by their directing power, while the limited acquired modification of directive power is under voluntary control.

I should say that the instincts function through the nervous system or its equivalent, as even in the amoeba, with no definite structural nervous system, its reactions appear in the nature of reflex ones, while in the higher animals the instincts are definitely triggered off into action by their particular stimuli, e.g. hunger for eating, thirst for drinking, etc.—there is for each a definite specific afferent impulse with its resulting effective efferent one.

Relevant to this, it appears to me that, while we speak ordinarily of the 5 senses, we don't emphasize sufficiently the numerous others which go to make up the complete system of registration of our environment, e.g. the hunger and thirst mentioned above, fear, anxiety, worry, temperature, pain, and the more subtle sensitivity to atmosphere, seen so markedly in animals but also in us, and, I might add, conscience, which one may call moral and spiritual sensitivity.

I sometimes think of instinct as the precursor of thought or as the Creator's substitute for thought in those animals where, so far as we know, thought is not yet

developed, and a mental picture, amusing in its way, would sometimes present itself, with the lower animals represented as marionettes, functioning through the pulling of strings by outside agencies, indeed, by the instincts under control of their directive power, which brooks no interference.

In this connection, I like the sentiment expressed by Wordsworth: 'It is my faith that every flower that blows enjoys the air it breathes'; and also Wood-Jones's remark, 'Who knows? Perhaps there can be no life, animal or vegetable, unaccompanied by consciousness.'

The gift of life, with its endowment of instincts, brings out very forcibly the wonderful organization we see in Nature, where it is seen at its best, in fact to perfection. It has been called the first law of heaven and the eye of action. In fact, we may say that Nature is organized for automatic control (automation) but the central remote control is never far away.

Organization here represents the orderly regulation and continuity of those functions demanded for the maintenance of life, which are a *sine qua non*, and which cannot be interrupted without disaster. In ordinary life, organization consists of the orderly regulation of our planning, carrying with it both the saving of time and the increase of efficiency and productivity, and so automatically increased production of whatever sort is involved. *It is the hallmark of ability in action*. Looked at from the opposite angle, its importance and superiority can be judged when we note the chaos and muddle that accompany disorganization. Organization is the antithesis and arch-enemy of chance, that child of ignorance and incompetence, and it is certainly the best guarantee against unforeseen mishaps. Organization and chance are mutually repellant, whereas disorganization and chance could well be bedfellows. I have always liked my modified version of the Mayo Clinic slogan, 'Early to bed, early to rise, work like hell and organize'. (I substituted organize for advertise, which I disapproved of, with apologies to the clinic.) At best, man's organization falls far short of the perfection seen in Nature, and it constitutes one further reflection of man's still incomplete development, as well as another first-class reason for looking to Nature for guidance. Could there possibly be such organization without an organizer? For me, definitely *no*.

Acknowledging Nature comprehensively as a perfect set up, the question has often been put forward, 'Why?' Has it a purpose or aim? The reason for the question is not far to seek—it reminds one so much of the child's persistent enquiry in search of truth, to fill the blanks of ignorance, and it is of course the same.

There have been many speculations as to the answer, as, I take it, we don't really know, but my own conviction is that it was conceived by the Creator deliberately with the purpose of giving us humans a comprehensive creation (with ourselves in the midst of it) complete in every detail, with all the wherefores and therefores, so that we could have endless opportunity for investigating and elucidating all her secrets, and thus increasing indefinitely our knowledge and understanding of the Creator Himself. Indeed, He cannot but be, in His Infinity, impossible to appreciate and define fully, though progressive improvement in our conception of Him can result. I say Nature's secrets specifically, as they entail increasing work for their unravelling and correct interpretation. Our general slogan could well be *Per ardua ad omnia* (the stars are not inclusive enough).

As for ourselves, the Creator has not only given us a front seat in the stalls, but has put us on the stage, and equipped us for this task by endowing us with endless potential, which it is our privilege and duty to cultivate and fructify. The potential covers all our functional activities—indeed we might well say that potential is function in prospect, the prospect involving its culture and development, i.e. exercise or use, leading to increasing efficiency in preparation. Function remains potential till it is put into action, and we may add that work is simply the activation of function, or, if you like, function in action.

You notice that one always comes back to my old friend, work, which I have lauded on many occasions and which is a *sine qua non* in a successful and happy life. Never forget that learning is the greatest reward of work, and one of its best features is that 'it makes a man fit company for himself' (E. Young). It is an unequalled help in retirement.

This mention of function brings up again the directive nature of the compulsive power behind the instincts. I refer to the question of adaptation, so prominent and important in the sphere of survival; in fact, I have often remarked that adaptability is the crux of survival. What it implies is capability of adjustment of the individual to changes in environment. While minor changes may be readily and easily met by some modification of behaviour, major ones often demand structural alterations as well and it is just here where the directive power takes control and is essential. Wood-Jones, in his *Trends of Life*, has given the clearest and most convincing advocacy of the principle that structural change follows the demand of function, a resuscitation of pre-Darwinian views, to the minimizing of the prominence of Darwinism, and the putting of it in its proper place, a much lowlier one than is popularly assigned to it. I wholeheartedly support this. However, this we may have occasion to discuss more fully another time, but I would like to say that man's intellectual development has introduced a remarkable modification in adaptation, in that he is not infrequently capable of making his own environment when that offered does not suit him.

In our approach to Nature, with a view to finding out all we can about her, and to our subsequent interpretation of what we find out, it appears to me that we follow closely the programme of the Augurs of antiquity whose task it was to predict, usually, the success or failure of worldly projects. Incidentally, the word Augur means basically 'to chatter about birds'—feathered, of course.

Their first step was the *contemplation* (seeing and observing) of the flights of birds, entrails of sacrifices, etc. Interestingly, it was this institution which gave rise to the word contemplate. The *Templum* was the demarcated open space set aside for the observation of the auspices, this latter word meaning 'seeing birds', and later it was applied to whatever shelter the Augurs installed for themselves, and so our 'temple' was evolved.

Following the observation of the auspices, which included the registration of what was seen, they proceeded to *meditation* of them, which involved their assessment and interpretation. The word 'meditation' in *its* derivation is interesting also and implies, basically, measuring in a repetitive or intensive way, quite a different thing from contemplation and a sequel to it.

Finally, *judgement* was arrived at following the meditation, and the Augury announced, for better or worse.

Our programme of approach is exactly similar, but it is applied with the specific purpose of contemplating, meditating, interpreting and judging those features relating, mainly, to life and man in their various relationships. Facts which appear or are uncovered are of course only the introduction, but with meditation we are able to understand and assess them, and so are led to their correct interpretation, which completes the picture.

I suppose we would now call our approach scientific, but that word simply implies 'getting knowledge' and so alters nothing. It is the old story, 'A rose, by any other name, would smell as sweet'. In our attempts to ferret out the truth of all that is present in Nature, the chief instrument in our armamentarium is intelligence, the product of brain function, its equivalent of a secretion in other organs. It is well named, as it means 'choosing between', and therefore includes the power of analysis and criticism with resulting judgement. It is the agent directed to and functioning in the correlation of all incoming afferent stimuli and their organization for efferent purposes or use. In fact, the brain and intelligence of man are so prominent a feature in the highest development of the evolutionary scheme, that it almost looks as though it had been specifically produced for the purpose of the search after truth. Indeed, this is my belief.

In getting down to the core of our subject, the part played by Nature in teaching and, for us, especially in the teaching of surgery, it is essential to keep in mind what I have already tried to impress on you, that Nature is a creation, a *fait accompli,* and not her own Creator, and that, furthermore, we are a small but inseparable part of her and so established right in the centre of her activities. In addition, her make-up is such that she is a storehouse of all the materials we could conceivably desire for teaching purposes. She is the passive, not the active, provider of those materials, indeed the storekeeper, the active provider being her Creator.

As I have frequently repeated, no doubt *ad nauseam,* teaching is carried out by precept and example. Precept is teaching by dictate, injunction, or discourse on doctrine or principle in the abstract as apart from concrete examples. Teaching by example, on the other hand, is by the demonstration of concrete subjects or specimens, alive or dead. These are frequently combined, the one serving to introduce the other.

In assigning to Nature her proper place in the teaching ensemble, she is obviously the acme of all teaching examples, but what of the other half, the precept aspect? I sometimes think, and really believe, that inspiration is the Creator's method of teaching by precept; in other words, that inspiration *is* the precept of the Creator, and the precursor and antecedent of the speech which we ourselves employ, our relatively lowly but indispensable substitute. I am afraid that, for most of us, the difficulty must be whether we are capable of judging what is an inspiration and when it is offered.

In surgical teaching the teacher is usually present in the flesh in both methods, whether discoursing or demonstrating or both. In the absence of the teacher there is no positive transference of knowledge from him to the student. In the case of inanimate subjects, pathological specimens in bottles, etc., the student must elucidate the problem himself; he has nothing but the specimen to go on. In the case of animate subjects, living individuals, on the other hand, e.g. clinical patients, considerable assistance may be obtained from the patient, thanks to the power of speech.

In the case of Nature, the Teacher must necessarily be the Creator, but He is not present in the flesh, and so the student has no expectation of a gratuitous offering of information, but he must apply himself to finding out what he wants to know, and here again some assistance may be obtained in the case of living subjects. As opposed to our usual relation between teacher and student, where the teacher gives all he knows and the student receives everything, we can truthfully say that Nature does not take the student by the hand and give him knowledge gratuitously, but he has to take her by the hand and ask for it; indeed, he has usually to extract it from her by hard work. Of course, the student of Nature ultimately becomes the teacher, at all events in our sphere of action, and so you will recognize how apt and wise Chaucer was when he remarked of the teacher: 'First he wrought and then he taught'.

In surgical teaching, then, with the teacher usually present, there is always, under those circumstances, a positive transference of knowledge from the teacher to the student, and, when he uses the provisions of Nature as his examples, he acts in a way as a deputy, a substitute, or a replacement.

In actuality, therefore, all our teaching material comes from Nature, even our clinical cases equally so, and consequently, when we speak of Nature as a teacher, it is entirely in a negative sense and we give her recognition for what she is, 'a wonderful storehouse, packed with every sort of example and specimen, the perfect complete teaching example'. In the storehouse, however, we have that most important section, the biological individuals, endowed with life, actively pursuing the functions associated with life, and, in their decentralized and delegated positions, acting freely under apparently remote surveillance.

Now I feel you can better understand my attitude towards the leg-pull, in that it is not Nature which is my goddess and to whose laws my services are bound, but it is the Creator who is the God, and to Whose laws my services are bound. Obviously, of course, so far as we are concerned, we are made aware of the Creator through Nature, His creation, and the more we can get to know and understand what is there for us to find out, the closer and better will be our picture and relationship.

Primitive man worshipped Nature—he deified both those agencies which he judged benefited him and those he considered did him harm. He worshipped them both in fear, the former in case they failed to appear, the latter in case they did appear. He had not yet realized the power behind Nature, but, so far as he was concerned, he protected himself both ways.

Turning now to some consideration as to how we are influenced by a study of Nature and how overwhelming and comprehensive that influence can be, let me offer briefly two examples of her activities: (1) a partial résumé from the introductory chapter of *An Introduction to Surgery*, which I wrote in 1935, on the basis of the principles of surgery, and (2) a reference to the natural cures of gallstones and gallbladder disease. These will be as brief as possible, as you are already completely familiar with them.

The state of health of the body is the result of the action of environmental influences or agents, external or internal, upon the individual. The environment which allows the vital processes of the organism to be carried out as nearly to perfection as possible must be taken as the normal. The optimum, in conception, is perfection and is ideal, but in Nature this perfection is never quite reached, because of the numerous environmental influences that are always present. However, the greater the efficiency with which the body activities can be performed, the better will be the health of the individual.

As the optimum cannot be improved, any cause or agent leading to variation from the normal (optimum) environment must be harmful to the health of the individual. Such harmful agents are spoken of as irritants, and they include everything imaginable, from mechanical, thermal, chemical and electrical agents, and X-rays, etc. to microbes of all types.

Let us consider, in a general way, what are the activities of these irritants in Nature—which, as I have already stated, is for us the human body, in the restricted realm of surgery—and what Nature does as a result. Let me say at once that, basically, the results are always the same, whatever the irritant may be, viz., destructive. They comprise the effects, what the irritant actually does in the way of damage, how Nature reacts to both the irritant itself and to its destructive effects, and what possible complications can occur.

The principles of treatment, as carried out by us, automatically arise from meditating on the above programme and they are simply and comprehensively:

1. Remove the irritant, the causal agent;
2. Counteract the effects;
3. Assist the natural reaction; and
4. Prevent complications, or deal with them if they have already occurred.

The second example is the natural cures of gallstones and gallbladder disease, i.e. where Nature acts alone, without outside help. The demonstration is wonderfully complete and it includes every conceivable means of curing both the stones and the gallbladder disease, and serves as a magnificent example for teaching purposes.

You might well ask, 'What do we get out of all this in teaching and practice?' and I would reply that, as a comprehensive picture, we see what Nature herself does, and we also see what we can do by following her. One must keep in mind that before the days of surgery, natural cures in the more serious conditions were all that could be looked for, and even in my early career, when there was a much greater reluctance to face surgery, we still met a wonderful display of them.

We find, then, in fact, that we actually follow Nature's lead, we mimic her in all her efforts, and there is practically nothing we do that she has not already done, by those directive delegated powers we have referred to. Indeed, that reaction to irritants, as seen in Nature, when ingested and thoroughly assimilated, is for us the supreme source of guidance in our approach to surgery.

I think that these examples offer a fair sample of what happens in Nature, what a wonderful machine she is, so perfectly planned and organized, a machine which carries in itself not only everything for normal running, but also the remedies and replacements necessary for the correction of any sort of breakdown, whether extrinsic or intrinsic.

I have offered these two examples, as sufficiently typical of what the power behind Nature is capable of, exhibited in the activities we meet everywhere in Nature, and which continuously show us the light and guide us in our own efforts.

Our old adage, *Vis medicatrix et conservatrix Naturae*, is apt to be commonly misinterpreted. The power so extolled is not in Nature *per se*, but is the directive agent behind her, and so she is not the active initiating power at all, but is substituting in a delegated position and carrying out innate instructions.

I am reminded of Leonardo's dictum: 'To devise is the work of the master, to execute the work of the servant'. It seems to me very apt and describes the position, as I see it, briefly but excellently.

I should like to add a few observations which would appear to be relevant to what has gone before.

We sometimes speak of the Book of Nature—it has a wonderfully attractive external cover, full of suggestion, with an impelling invitation to look inside and explore. Once inside, its potentialities are unlimited and it is never disappointing, indeed quite the reverse. It is not divided into named chapters, its paragraphs have no distinctive headings and, perhaps most difficult of all, it has no index. In other words, while it is an encyclopaedia of knowledge, the individual items require looking for, and this may be no easy task; but, on the other hand, search is always most rewarding, as everything is there that one could possibly hope to find, with the cost of discovery simply the amount of labour one puts into it. The difficulties that are encountered may frustrate a casual enquirer, but they will only serve to stimulate the efforts of the serious searcher after truth.

Nature, as an example for teaching purposes, in view of the marvellously wide scope of her offerings, could well be described by the motto, *omnia omnibus*, everything for all. Sir Thomas Browne (*Religio Medici*) was a great lover of Nature and made many telling observations, e.g. 'What

reason may not go to school to the wisdom of Bees, Ants and Spiders? What wise hand teacheth them to do what Reason cannot teach us? All knowledge worth possessing is the understanding of the happenings of Nature.'

The wonderful appreciation and esteem which arise from a close study of Nature, and the deep sense of humility that results from it, are no doubt responsible for the development of what we are apt to call 'Nature's gentlemen', and no better example will be met than the true gardener, a very special type. One of his striking features is what we call 'green fingers', and I have often felt that 'surgical fingers' are a close parallel; indeed, they are really the same things in different environments. They both deal with living tissues, vegetable or animal. They both imply maximum gentleness in manipulation, with minimal damage, and so determine a successful outcome. You will remember Moynihan's remark to his students, 'Caress the tissues'—it applies to both. My own version was to 'treat the tissues as if the patient was not under an anaesthetic at all and felt everything'. They both include, in addition to the best of technical efficiency, the best in sympathetic feeling and understanding; in other words, my old quoted motto, *Fortiter in re, suaviter in modo* (Strong in action, gentle in manner), applies 100%.

There are other similarities between the gardener and the teacher. They both select their seed—we, essentially 'principles'; sow them; supervise their early development, doing everything to encourage and guide growth, and weeding out unwanted and pernicious irregularities; and, finally, give self-control later, for better or worse, a programme that could be applied with advantage in some of our present international troubles.

They both serve their respective beneficiaries but neither is their slave, their service being open-hearted and voluntary and savouring of a devotional character. The servant and the slave are both intimately concerned with service, but there is a world of difference. Service is one of the greater objects and pleasures of life, but is a voluntary contribution and especially so when it is activated by devotion and respect. It is the result of benevolent extroversion, whereas slavery is compulsory service and is frequently entirely against all inclination. It brings to mind the thought, 'When inclination becomes compulsion, a man becomes a slave'; it has a general application, but it struck me when thinking over alcohol and drug addiction—true and pathetic! We are not meant to be slaves.

Talking of gardeners and gardening, I like the allegory of the Garden of Eden, which, I take it, is a typical representative of unsoiled Nature as seen in the world, and as conceived by the Creator, perfect in its set-up in every way, till man himself broke up the harmony by his ignorant interference and infringement of the rules and laws. I feel that we all still have a potential Garden of Eden, which has not changed, but we ourselves consistently ruin it by our behaviour. Incidentally, I was entertained recently to find a reference to it which bears on this point. It is by the poet Cowper, 'Domestic happiness, the only bliss of Paradise that has survived the fall'; and you all know how even this is so frequently ditched. Our innate, inherent shortcomings, as yet imperfectly corrected, are essentially responsible for our failure to attain paradise on earth, and our prospects are not improved by the worldly realization that the man who has nothing to lose has everything to gain, which has a lot to do with the failure of socialism and communism as we see them in practice. Usually as soon as a man has anything to conserve, he becomes a conservative, and the intensity of his convictions is apt to parallel the value he puts on his possessions.

Let me finish up with two observations.

The first is that I feel that Nature is infinitely more wonderful than I have been able to describe, and that she holds unlimited treasure, in the main buried, though not out of reach, but there for everyone to explore and, perhaps, to find. At the same time the prize is only likely to go to the persistent, indefatigable and really serious worker. I am reminded of Longfellow's allegorical poem 'Excelsior', apposite if ideal, which made a great impression on me in my youth and which tells of a dedicated and determined though unsuccessful attempt at achievement, where the sole reward was to be the achievement itself—in other words a charming picture of aspiration in which unhappily sacrifice as opposed to attainment resulted. The credit for the attempt, however, remained full and complete.

The second is a quotation from Sir Thomas Browne in the *Religio Medici*, in which he speaks of his role as teacher: 'I instruct no man as an exercise of my knowledge, or with an intent to nourish and keep it alive in my own head, rather than to beget and propagate it in his (the student's) but one thought dejects me, that my acquired parts must perish with myself, nor can be legacied among my honoured friends'. I disagree with his closing thought, which I find much too pessimistic, as, having passed on his learning, he has sown the seeds for their further continuous propagation. So far as I am concerned, I know that what seeds I may have sown have not been placed in barren ground, and the gardeners leave nothing to be desired.