

LIFE AND ITS SCIENCE

I



TO some readers, as certainly to some of our brethren in science, it may seem a strange thing that we biologists should make much ado about the Seasons, and yet stranger that, forsaking our specialist societies with their Proceedings and Transactions, their Microscopical Journals and the rest, we should be seeking to range ourselves in pages like these along with the painter-exponents, the poet-observers, of the changing year. Nor can we wonder if these look at such self-invited allies somewhat askance.

In the poet and the artist, with their thirst for actual, their dream of possible beauty, such keen interest in the Seasons is familiar and intelligible enough; so, also, albeit in widely differing ways, in the farmer and the gardener, in the sportsman and the mariner, in all who, outside the life of cities, have elected to do rather than to know or feel. As for Science, one remembers the astronomer and the geographer once explaining to us the Seasons in some dimly remembered lecture with their globes; but where should the biologist come in—the reveller in cacophonous terminology, the man of lenses and scalpels, the reducer of things to their elements of deadness? What can he tell us of the seasons, what (beyond the time of getting this or that specimen) have they to say to him?

For is not the popular picture of the botanist, for instance, that of a mild yet somewhat mischievous creature, whose chief interest is in picking flowers to pieces, like the sparrow among the crocuses? His remaining occupation is supposed to be that of gentle exercise on holiday afternoons; when, as a kind of sober academic nursemaid, he has to march out with him upon his rounds the unwilling neophytes of medicine, each fitly

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equipped, in place of outgrown satchel (so prophetic is nature) with a small tin coffin upon his back.

His skill these measure by the frequency with which he stops like a truffle-hunter's pig,—say rather like a new, a vegetarian breed of pointer. See him loudly ejaculating in the most unmistakably canine Latin as he grubs up the unlucky specimen, as he coffins it with a snap, what the student (as his manner is) swiftly scribbles down and forgets, as the one thing needful to know, its technical 'name'—really of course its index letter or reference mark in that great nature-catalogue, which so few consult at all.

Similarly, is not the zoologist a kind of mad huntsman who slays and grallocks the meanest vermin for his game; or a child who pricks beetles and hoards shells and boxes butterflies into lines and battalions; or a pedant who 'pins faith on a basipterygoid process'? And is not the physiologist the man who gives electric shocks to frogs, and analyses their waste products? These appreciations are of course grotesque, but like all caricatures, they have one side of truth, and that the obvious one. The fact is that the Biologist has a familiar, a 'Doppelgänger,' his necessary and hence masterful, often tyrannous and usurping slave, whose name is Necrologist; and now-a-days most people know only him. The dead and the abnormal, being dissonant, are more striking than the living and the normal which are harmonious; and thus the doings of the necrological Mr. Hyde attract more attention than those of the biological Dr. Jekyll. Collection and dissection have their place, their necessary and ample place, but they are not all, they are not first. The study of life—the sum of living functions, and of their resultants—in temperament, in sex, in variety, in species—is again beginning to claim, and will again recover, precedence in thought and in education over that post-mortem analysis of organs and tissues and cells which has for the present usurped its place. And as teachers of biology our serious desire and daily work is towards a

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distant revolution, which our pupils' pupils will accomplish, though we may never see. When this comes, those learned anatomical compendia, these text-books of 'Biology' falsely so called, which now dominate every School of Science in the world, shall be rewritten line by line, and from cover to cover. We shall have done with beginning with the analysis of dead structure; Physiology will precede Anatomy, and Bionomics will precede both. Physiology, too, despite popular and too authoritative manuals, Huxley's and the rest, sets out not by creaking a skeleton, by unpacking the digesting or the circulating organs, not even by observing the sensory or by experimenting upon the instinctive life. Not even with the marvel of the developing egg, nor with the mystery of seed-bearing in the flower, does the naturalist begin; but with the opening bud, with wandering deep into forest and high upon hill; in seeing, in feeling, with hunter and with savage, with husbandman and gypsy, with poet and with child, the verdant surge of Spring foaming from every branchlet, bursting from every sod, breaking here on naked rock-face, there on rugged tree-bole till even these are green with its clinging spray. Day after day he shall drift on the Sea of Life as it deepens in verdure over plain, as it eddies and ripples in blossom up the valleys; he shall keep unslaying watch upon the myriad creatures that teem upon its surface and crowd within its depths, till they show him the eager ways of their hunger, the fury and the terror of their struggle, the dim or joyous stirrings of their love. He shall listen to the Sounds of Life, the hum of insect and the coo of dove, the lilt of pairing mavis, the shivering child-cry of the lambs, till he too must lift up his voice with lover and with poet, with the greeting-song of the returned Proserpina, with the answering chant of Easter—Life is arisen! Life is arisen indeed! All this, quite seriously and definitely, is what we biologists want to teach him who would learn with us—say rather what we want him to see and hear, to live and feel for himself. Only to him, we say, who has lived and felt with Life throughout the

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Seasons, till memories of Nature throned the labyrinths of brain and tingle the meshes of the blood, has there been any 'adequate preparation in Elementary Biology' at all. Only him would we admit into our winter-palace of museum, its crypt of laboratory; only him initiate into the perilous mystery, the alluring mastery, of analysis; only to him who can approach in contemplation no less reverent, in questioning no less vital than that of ancient sacrifice and augury, shall the corpse be opened, the skull laid bare, the magic glass be given, the secret of decay be told.

For among the initiates of Necrology, he and he only, and hardly even he, who has first gathered flowers with Proserpine in her native valleys may ever return to a fuller Spring with her in the open world again. For the rest, their home is in the shades; for where the love and the wonder and the imagination of Life are dead, there remains only unceasing labour in the charnel-house and ossuary, here to disintegrate or there to embalm, with only, at best reward, the amassing of some mouldering treasure, the leaving for the bibliographer some fragment-record, the winning of some small mummy-garland upon a tomb.

But for him who has truly been in the greenwoods, who has met and kissed their faërie queen, the wealth of the museum palace still lies open; its very crypts are free. Yet with the Spring her messengers come for him as for the Rhymer of old; her white hart and hind, unseen of other eyes, pace up the unlovely street; and he too must follow them back to their home, home to his love.

II

As the simplest greetings of 'good morning' and 'good day' remind us, some sympathy with Nature, some interest in our fellows, are instinctive and universal. No one but is so far a Nature-lover and a Season-observer; Spring with her buds and lambs and lovers, Autumn amid her fruits and sheaves, Summer

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in her green, and Winter with her holly, are all themes as unfailling as human life. Even the best-worn rhymes of dove and love, of youth and truth, will be fresh song-notes for adolescent sweethearts till rhyming and sweethearting end. And even the hardest day's labour closes sweetly, which can pause at the home-coming and bathe its weariness in the evening sky.

That the child posy-gathering is a naturalist, the child drawing out of his own head an artist, the child singing and making-believe a poet, are all obvious enough. Obvious, too, are becoming the general lines and conditions of these developments up to those children of larger growth whose impressions have been more richly gathered, more vitally assimilated, more fully organised, till they appear not as mere crude attempts in the child, mere fading memories in the adult, but in fresh life and new form which we call 'original'—discovery, picture, or poem. And were this the season, we might study the far stranger (albeit more common) marvels of human failure. For what is that shortcoming of beauty, common in the human species above all others? how comes that blunting of sense and stunting of soul which befall us? How shall we unriddle the degeneration which the bio-pessimist has shown as well-nigh overspreading Nature, the senescence which he has proved to begin at birth?

But from the strange abnormalities we group as ugliness, from that subtlest arrest of evolution which we once thought as well as called the Commonplace, let us return, as befits beginners, to the simple and the natural, the normal and the organic. That is, to the growth in activity and variety of sensory and psychic life, the growth of original and productive power, in discoverer, painter, and poet. Scant outline is indeed alone possible in these limits, yet every one has this latent in his own mind. The most inarticulate rustic knows and watches his fields from day to day; yet here is the stuff of biology. Simple satisfaction in fresh landscape, notice of at least some aspects of human face and form can hardly die wholly out of any mind; yet this is the

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stuff of painting. So in the prosaic description of place or person or event one detects the touch and tinge of literature, alike in thought and style.

As poetic intensity and poetic interpretation may be true at many deepening levels, so it is with the work of the painter; so too with the scientific study of Nature. And here, too, the extremes of thinker and child meet in the same mind. In twenty years of microscopic teaching, for instance, the writer has been rewarded by no such simple and joyous outburst of juvenile delight in any mortal as he once silently provoked by pushing his microscope, as with twirling *Spirillum* and dancing Monads, under the eye of Darwin. 'Come here, come here; look! look here! look at this! they're all moving! they're all MOVING!' cried the veteran voyager, his deep eyes sparkling, his grey face bright with excitement; the aged leader of the century's science again a child who 'sees the wheels go round.'

The naturalist, as compared with his artist and poet comrades, is generally neither so much of a babe nor so much of a man as they; but primarily a boy or bird-nester, a hoarder of property in the old comprehensive schoolboy fashion, before the example of degenerate adults who specialise upon metal counters and paper securities had reduced his collecting to postage-stamps. Yet the naturalist, too, attains manhood upon the plane of intellect; and if his museum of accumulated wealth be not too much for him, he may gain new strength by systematising and organising it. Thus on the more abstract and philosophic side develops the systematist and thinker like Linnæus, on the more concrete and artistic the encyclopedist and stylist like Buffon. Each too in his way, in his world-museum and garden of life, is an Adam naming and describing the creatures.

From these great treasure-houses and libraries of the science the naturalist, too, may go out into the world not only to search and discover and collect, but to labour also. His level of action is primarily of a humbler and more fundamental sort than that

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of his artist comrades. Fishery and rustic labour are to his hand, he learns to dredge and to sow; forests, too, he may plant and tend. By-and-by, in ordered park and garden great, he even attains to artistic expression, and this upon a scale vaster than that of cities; he transforms Nature, shaping herself and not her mere image. Then strengthened and supplied in mind no less than in body he returns to his science with fresh questions and problems and perplexities, yet richer in resources, more fertile in devices for solving them. From the slight modification of certain forms of life by domestication and culture, from the breeding and selecting with farmer and fancier, he gains fresh light upon the problem of evolution; Darwin's, of course, being the familiar, the classic case, but not the only or the final one. But again riddles multiply, and even those that seemed solved a few years ago appear anew from fresh sides and in slightly altered forms. Again he must observe and ponder, again also return to practice; and beyond the comparatively limited range of domesticated animals and plants he needs wider and more thorough observations. In course of these he must rear under known conditions in laboratory and garden, in field and farmyard, all manner of living things, low and high, wild and tame, useful and malignant—and pass, in fact, the life of his whole zoological and botanic garden under fresh and keener review. This is what we begin to speak of as Experimental Evolution. It is Comparative Agriculture, Hygiene, Medicine; and all these with widening range. Before long it will have its institutes as well as they. The poet is but a simple poet who does not see that this is no dead science, but a very Alchemy, a higher Alchemy than that of metals—the Alchemy of Life—and that the search for the Elixir Vitae is indeed again begun.

Already at each stage of its progress the study of man has thrown light upon that of lower creatures; conversely their study upon our view of men. The interaction of these kindred lines of thought is even now entering a new and fuller

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phase, and a higher series of scientific institutes, those of the Experimental Evolution of Man, are thus logically necessary. These indeed are already to hand: asylum and hospital, prison, workhouse and school, orphanage and university (to name only the more obvious groups), are not far to seek. Each, too, has been changing its purpose and ideal within the past century, from the initial ones which were practically little more than of social rubbish-heaps into which society could more or less mercifully shoot its senile, diseased, or troublesome members, or of lumber-heaps for its immature and weak ones. First, common humanity showed us the festering of these social sores, opening the way for medicine, as this for hygiene; now psychology is entering upon school and asylum, even criminology forcing its way into court and prison; before long a fuller sociology and ethics will have entered all. The secrets of evolution and of dissolution of body and mind, the corresponding interpretations, economic and ethical, of evolution and dissolution for each type of human society, are thus being laid bare. And here we may note in passing the scientific (necrological) justification of much of our contemporary decadent literature.

But the night of pessimism has passed its darkest. Its social explanation and standpoint remain clear enough. The physical sciences, their associated industrial evolution, have created a disorder they are powerless to re-organise—hence progressive ruin of all kinds, individual and social, material and moral, to which church, state, and the negations of these, are all alike powerless to find remedies. But such pessimists overlook an old saying of the prophets—of Descartes before Comte, doubtless of old Greeks before these, of older Egyptians before them—that 'if the regeneration of mankind is to be accomplished, it will be through the medical sciences.'

With this regeneration defined as Experimental Evolution, the prophecy is making a fresh start towards fulfilment. In the simpler institutes which we call school, college, or the like,

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the problem is to grow good fruit from good or average seed. In those of a pathological kind (asylum, prison, hospital) beyond the obvious aim of restoration to a low or average norm of health, is arising, however, the seemingly more difficult (perhaps easier) problem, already hinted at—that of Life-Alchemy, of Redemption. For again we are dreaming of a Secret of Transmutation, that of disease into higher health, of baseness into generosity, of treason into honour, of lust into love, of stupor into lucidity, phantasmagoria into drama, mania into vision.

Beyond this there is yet another step of practice; the physician is bringing experience and method from the hospital into the service of the home; so in their way are all his brother evolutionists. And thus they begin to discern and prepare for their immediate task—to cleanse and change the face of cities, to re-organise the human hive.

For them as for their rustic fellows, the task begins with the humblest drudgery, the scavenging of dirt, the disposal of manure. Soon, however, they will grapple with the central and the supreme Art possible to mortals, the very Mystery of Masonry itself, which has its beginnings in the anxieties of calculation and the perplexities of plan, in the chaotic heaps of quarry, in the deep and toilsome labour, the uncouth massiveness of the foundations: yet steadily rises to shelter and sacredness of hearth, to gloom of tower and glory of pinnacle, to leap of arch and float of dome. With this renewal of Environment, there arises a corresponding renewal of economic and moral Function which shall yet be Industry, the renewal and development of Life as well—what shall yet be Education. And thus even painter and poet find, through what seemed to them an irrelevant science, new space for beauty and new stimulus of song. Yet even here the Three comrades have no Continuing city.

For each, for all, the faërie messengers are waiting; and they must ever return to Her from whom they came.

PATRICK GEDDES.