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VIGNETTES FROM NATURE

Vignettes from Nature. By Grant Allen. (London: Chatto and Windus, 1881.)

CERTAINLY Mr. Grant Allen stands at the head of living writers as a popular exponent of the evolution theory. Although the subject is one which he has taken up a comparatively short time ago, he appears to have thoroughly mastered its principles, to have read and assimilated all the best works on the subject, and to have so imbued himself with its leading ideas that he is able to apply it in an intelligent and often original manner to every natural object he meets with in his daily walks or holiday rambles. To these primary qualifications he adds a great power of description, a vivid imagination, and a charming style of writing, all of which are displayed in every page of his last work. This consists of a series of short essays, which originally appeared in the *Pall Mall Gazette*, each giving a sketch of some single scene or natural object, and showing how much interest can be given to the most common things by considering them from the point of view of evolution. "Sedge and Wood-rush" furnish an opportunity for the explanation of degraded types and the large part played by "degeneration" in the origin of existing animals and plants. By the common "Red Campion and White" we are shown how, and by what means, species become differentiated; and the subject is further discussed and elucidated in the chapter on a "Bed of Nettles." After showing how the sting of the nettle has originated, and how it protects the plant by stinging the noses of herbivorous quadrupeds, he goes on to discuss the general form of the nettle in a way that is both suggestive and (I think) original.

"But the sting certainly does not exhaust the whole philosophy of the nettle. Look, for example, at the stem and leaves. The nettle has found its chance in life, its one fitting vacancy, among the ditches and waste places by roadsides or near cottages; and it has laid itself out for the circumstances in which it lives. Its near relative, the hop, is a twisting climber; its southern cousins, the fig and mulberry, are tall and spreading trees. But the nettle has made itself a niche in nature along the bare patches which diversify human cultivation; and it has adapted its stem and leaves to the station in life where it has pleased Providence to place it. Plants like the dock, the burdock, and the rhubarb, which lift their leaves straight above the ground, from large subterranean reservoirs of material, have usually big, broad, undivided leaves, that overshadow all beneath them, and push boldly out on every side to drink in the air and sunlight. On the other hand, regular hedgerow plants, like cleavers, chervil, herb-Robert, milfoil, and most ferns, which grow in the tangled shady undermath of the banks and thickets, have usually slender, blade-like, much divided leaves, all split up into long narrow pushing segments, because they cannot get sunlight and air enough to build up a single large, respectable, rounded leaf.

"The nettle is just half way between these two extremes. It does not grow out broad and solitary, like the burdock, nor does it creep under the hedges like the little much-divided wayside weeds; but it springs up erect in tall, thick, luxuriant clumps, growing close together, each stem fringed with a considerable number of moderate-sized, heart-shaped, toothed-and-pointed leaves. Such leaves have just room enough to expand, and to extract from the air all the carbon they need for their growth, without encroaching on one another's food supply (for it must always be remembered that leaves grow out of the air, not, as most people fancy, out of the ground), and so without the consequent necessity for dividing up into little separate narrow segments. Accordingly, this type of leaf is very common among all those plants which spring up beside the hedgerows in the same erect shrubby manner as the nettles. It is almost exactly imitated in the dead-nettle and the hemp-nettle, which are plants of a totally distinct family, with flowers of the sage and rosemary type; and it is more or less simulated by ten or twenty other species of like habit. This peculiarity of external resemblance, under identical circumstances, is a common and a natural one. . . . Whatever the original stock, natural selection tends always under like circumstances to produce like results."

Then we have the dicœcious green flowers described, with the curious elasticity and irritability of the stamens, which throw out the pollen dust when the wind blows the plants about, and thus ensures abundant cross-fertilisation.

In the next chapter, "Loosestrife and Pimpernel," we have an excellent discussion on the close relationship of the wood-loosestrife or yellow-pimpernel (*Lysimachia nemorum*) to the true pimpernel (*Anagallis vulgaris*), although placed by botanists in distinct genera. Such remarks as these are very important, calling attention to the fact that the technical characters of botanists, even when drawn from the structure of the fruit, may be really of recent origin, and may not be so important as more superficial resemblances usually treated as of less systematic value. In another article on "A Big Fossil Bone" a popular misconception as to the generally large size of extinct animals is very well corrected. Everywhere we seem to find in fossil forms a bigger animal of each kind than any now existing. Here we have an enormous Irish elk, there an immense extinct sloth, a gigantic armadillo, or a turtle ten times as big as the greatest living member of the tortoise group. But it is apt to be forgotten that the huge Saurians were secondary animals, while the dinotherium was tertiary, the mammoth quaternary, and the moa as well as the epyornis almost modern. It is forgotten that the age of the great reptiles was nearly over before that of the great mammals set in. It is forgotten that the glyptodon lived in South America, while the big elk lived in Ireland; and by picturing a world in which all the great extinct animals were grouped together as they see them in a geological museum, people get a distorted picture which really reverses the actual facts as to the relative size of the animals in the past and the present. For (Mr. Allen remarks)—

"As a matter of fact it seems probable that our actual fauna and flora are on the whole not only quite as big as any previous ones, but even a great deal bigger. If we take single instances, no known extinct animal was as large as some of our modern whales; if we look at the *ensemble* of our existing species, no known period comprised so many large forms as we can show at the present day in our three or four great cetaceans, our two elephants, our rhinoceroses, our bisons, our giraffe, our walrus, and our horses. These would probably form a total assemblage of larger average size than any previous epoch could produce. Similarly in almost every special class, we could apparently show larger species at the present day than any which we know to have existed in fossil forms. Our

whale is the biggest known mammal; our gigantic salamander is the biggest known amphibian; probably our sun-fish, our tunnies, our sharks, and our devil-fish, are each in their way larger than any previous fishes—one living shark actually attaining a length of forty feet. No fossil bivalve molluscs are, to my knowledge, as big as the common Mediterranean pinna, or as that giant clam, the tridacna, whose shell is so commonly used as a basin for fountains. In fact there are only two important groups, the birds and the reptiles, in which extinct species were much larger than existing ones; and in these two groups the decrease is evidently due to the later supremacy of the mammalian type."

He then goes on to show that in many lines of descent we find groups of animals which have steadily been increasing in size from the earliest epoch of their appearance to the present day, as, for example, the horses, the deer, and the elephants. Evolution generally tends towards increase of size in dominant groups; but when a group ceases to be dominant and begins to decay its bigger members die out.

Equally interesting and suggestive are the discussions on colour and the colour-sense, *à propos* of the "Veronica" and the distribution of fishes, in "The carp pond" and "The mountain tarn"; but we pass on to the chapter devoted to "The donkey's ancestors"—a charming sketch suggested by "a dear shaggy old donkey making himself perfectly happy upon a bare rocky hillside, upon four sprouting thistles, a bit of prickly carline, and three square yards of wet turf at the outcrop of a little spring." Let us, however, pass by his pedigree (the same as that of his cousin, the horse), and see what Mr. Allen has to say about his intelligence, and the reason of it.

"Donkeys are the final flower of long ages of native evolution, the natural head and crown of one great line of mammalian development. To doubt their intelligence is to impugn the whole conduct of nature, to upset the entire system of evolutionary psychology off-hand. Donkeys cannot help being clever, because they are the final survivors in the struggle for existence in one of the most specialised, most highly developed, and most dominant mammalian stocks. They do not represent mere stranded and struggling relics of older types, like the very silly kangaroos, and ant-eaters, and hedgehogs, which drag on a miserable existence behind the times in out-of-the-way holes and corners of the earth; they are one of the finest developments of one of the most successful branches of the great ungulate tribe. I feel a genuine respect for every donkey I meet, when I remember that it was the mere accidental possession of an opposable thumb that gave my ancestors a start over his in the race for the inheritance of the earth towards the very close of the tertiary period."

In reading this most entertaining and instructive volume almost every page offers some suggestive remark or apposite illustration of the principle of evolution; and it is very rarely that we meet with anything to which exception can be taken on the score of accuracy. It is perhaps doubtful whether monkeys are "intellectually in the very front rank of the animal world," notwithstanding "the opposable thumb and the highly mobile trunk, with its tactile appendage, give these creatures an exceptional chance of grasping an object all round, and so of learning its physical properties." I am myself inclined to think they are decidedly inferior to dogs, horses, and elephants. So the tracing of man's sense of colour to the fact of our pre-human ancestors having been attracted by the bright colours of the orange, blue, and crimson fruits of tropical forests appears doubtful, if not erroneous; because the colours of such fruits are no indication of their edibility for either man or monkeys, and there is no reason they should be so, since mammalia in eating the fruits would be likely to crush and destroy the vitality of the seeds. At all events many bright coloured tropical fruits are poisonous, while many that are eatable are green and unattractive. Even among our native berries children who trust to enticing colour are apt to be poisoned by bitter-sweet or deadly nightshade. Neither is there any evidence that—

"Up to the beginning of the tertiary period, large evergreens of what is now the tropical type covered the whole world as far as the very poles themselves. Greenland and Spitzbergen then supported huge forests of the same general character as those which now spread over Brazil and the Malay Archipelago."

Nor is Buffon's idea—that organic life must have begun at the Poles, because on the surface of an incandescent planet the poles would be the first part to cool down sufficiently to allow of the conditions under which alone life becomes possible—at all in accordance with the teachings of modern science, as Mr. Allen maintains it to be. For the first cooling of the surface would necessarily occur at a time when the whole of the water of the globe was in a state of vapour, and this vast aqueous atmosphere would so far prevent the heat of the sun from reaching the surface, and so equalise radiation that there need have been no cooling at the poles earlier than at the equator; and when subsequently the water was condensed and oceans were formed, these would equalise temperature over the whole surface, and render it possible for life to originate at one part as well as at another. But these are very slight blemishes in so excellent a book, which is calculated to bring home to every reader how much of interest and novelty, of intricacy, of beauty, and of wonder, is to be found in the structure or history of the humblest plants or the most familiar animals; and also, how greatly the once-decried doctrine of evolution has added to the ideal and poetic aspects of the study of nature.

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THE COMPASS

Traité Théorique et Pratique de la Régulation et de la Compensation des Compas. Par A. Collet, Lieutenant de Vaisseau, Répétiteur à l'École Polytechnique. Ouvrage publié avec l'Autorisation de M. le Ministre de la Marine. (Paris: Challamel Ainé, 1882.)

THIS new treatise on the compass contains an admirable account of the most recent work done on the subject, and a very full and practical explanation of the objects of compass compensation and the methods adopted to secure it. It is founded on the author's translation, now twelve years old, of Smith and Evans' Admiralty Manual—made for the benefit of the French marine. That epoch-making book is however still the basis or substratum of Lieut. Collet's new work.

The practical part of the English book is fully given. M. Collet has added as much elementary mathematics and physics as he thinks may be useful to such seamen