

MACLEAY SYSTEM OF ANIMATED  
NATURE.

THIS SYSTEM CONSIDERED IN CONNEXION WITH THE  
PROGRESS OF ORGANIC CREATION, AND AS INDI-  
CATING THE NATURAL STATUS OF MAN.

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It is now high time to advert to the system formed by the animated tribes, both with a view to the possible illustration of the preceding argument, and for the light which it throws upon that general system of nature which it is the more comprehensive object of this book to ascertain.

The vegetable and animal kingdoms are arranged upon a scale, starting from simply organized forms, and going on to the more complex, each of these forms being but slightly different from those next to it on both sides. The lowest and most slightly

developed forms in the two kingdoms are so closely connected, that it is impossible to say where vegetable ends and animal begins. United at what may be called their bases, they start away in different directions, but not altogether to lose sight of each other. On the contrary, they maintain a strict analogy throughout the whole of their subsequent courses, sub-kingdom for sub-kingdom, class for class; shewing a beautiful, though as yet obscure relation between the two grand forms of being, and consequently a unity in the laws which brought them both into existence. So complete does this analogy appear, even in the present imperfect state of science, that I fully expect in a few years to see the animal and vegetable kingdoms duly ranked up against each other in a system of parallels, which will admit of our assigning to each species in the former the particular shrub or tree corresponding to it in the latter, all marked by unmistakable analogies of the most interesting kind.

It is as yet but a few years since a system of subordinate analogies not less remarkable began to be speculated upon as within the range of the animal kingdom. Probably it also exists in the vegetable kingdom; but to this point no direct

attention has been given; so we are left to infer that such is the case from theoretical considerations only. We are indebted for what we know of these beautiful analogies to three naturalists—Macleay, Vigers, and Swainson, whose labours tempt us to dismiss in a great measure the artificial classifications hitherto used, and make an entirely new *conspectus of the animal kingdom*, not to speak of the corresponding reform which will be required in our systems of botany also.

The Macleay system, as it may be called in honour of its principal author, announces that, whether we take the whole animal kingdom, or any definite division of it, we shall find that we are examining a group of beings which is capable of being arranged along a series of close affinities, *in a circular form*,—that is to say, starting from any one portion of the group, when it is properly arranged, we can proceed from one to another by minute gradations, till at length, having run through the whole, we return to the point whence we set out. All natural groups of animals are, therefore, in the language of Mr. Macleay, *circular*; and the possibility of throwing any supposed group into a circular arrangement is held as a decisive test of its being a real or natural one. It is of course to

be understood that each circle is composed of a set of inferior circles: for example, a set of *tribe* circles composes an *order*; a set of *order* circles, again, forms a *class*; and so on. Of each group, the component circles are *invariably five in number*: thus, in the animal kingdom, there are five sub-kingdoms, — the *vertebrata*, *annulosa*,\* *radiata*, *acrita*,† *mollusca*. Take, again, one of these sub-kingdoms, the *vertebrata*, and we find it composed of five classes,—the *mammalia*, *reptilia*, *pisces*, *amphibia*, and *aves*, each of the other sub-kingdoms being similarly divisible. Take the *mammalia*, and it is in like manner found to be composed of five orders,—the *cheirotheria*,‡ *feræ*, *cetacea*, *glires*, *ungulata*. Even in this numerical uniformity, which goes down to the lowest ramifications of the system, there would be something very remarkable, as arguing a definite and pre-conceived arrangement; but this is only the least curious part of the Macleay theory.

We shall best understand the wonderfully com-

\* Corresponding to the *articulata* of Cuvier.

† A new sub-kingdom, made out of part of the *radiata* of Cuvier.

‡ This is a newly applied term, the reasons for which will be explained in the *sequel*.

plex system of analogies developed by that theory, if we start from the part of the kingdom in which they were first traced,—namely, the class aves, or birds. This gives for its five orders,—*incessores*, (perching birds,) *raptores*, (birds of prey,) *natatores*, (swimming birds,) *grallatores*, (waders,) *rasores*, (scrapers.) In these orders our naturalists discerned distinct organic characters, of different degrees of perfectness, the first being the most perfect with regard to the general character of the class, and therefore the best representative of that class; whence it was called the *typical* order. The second was found to be inferior, or rather to have a less perfect balance of qualities; hence it was designated the *sub-typical*. In this are comprehended the chief noxious and destructive animals of the circle to which it belongs. The other three groups were called aberrant, as exhibiting a much wider departure from the typical standard, although the last of the three is observed to make a certain recovery, and join on to the typical group, so as to complete the circle. The first of the aberrant groups (*natatores*) is remarkable for making the water the theatre of its existence, and the birds composing it are in general of comparatively large bulk. The second (*grallatores*) are

long-limbed and long-billed, that they may wade and pick up their subsistence in the shallows and marshes in which they chiefly live. The third (*rasores*) are distinguished by strong feet, for walking or running on the ground, and for scraping in it for their food ; also by wings designed to scarcely raise them off the earth ; and, farther, by a general domesticity of character and usefulness to man.

Now the most remarkable circumstance is, that these organic characters, habits, and moral properties, were found to be traceable more or less distinctly in the corresponding portions of every other group, even of those belonging to distant subdivisions of the animal kingdom, as, for instance, the insects. The *incessores* (typical order of aves) being reduced to its constituent circles or tribes, it was found that these strictly represented the five orders. In the *conirostres* are the perfections which belong to the *incessores* as an order, with the conspicuous external feature of a comparatively small notch in their bills ; in the *dentirostres*, the notch is strong and toothlike, (hence the name of the tribe) assimilating them to the *raptores* ; the *fissirostres* come into analogy with the *natatores* in the slight development of their feet and their great powers of flight ; the *tenuirostres* have the

small mouths and long soft bills of the *grallatores*. Finally, the *scansores* resemble the *rasores* in their superior intelligence and docility, and in their having strong limbs and a bill entire at the tip. This parity of qualities becomes clearer when placed in a tabular form :—

<i>Orders of Birds.</i>	<i>Characters.</i>	<i>Tribes of Incessores.</i>
Incessores -	{ Most perfect of their circle ; notch of bill small - - - }	Conirostres.
Raptores - -	Notch of bill like a tooth -	Dentirostres.
Natatores - -	{ Slightly developed feet ; strong flight - - - - }	Fissirostres.
Grallatores -	Small mouths ; long soft bills	Tenuirostres.
Rasores - -	{ Strong feet, short wings ; docile and domestic - - }	Scansores.

Some comprehensive terms are much wanted to describe these five characters, so curiously repeated throughout the whole of the animal, and probably also the vegetable kingdom. Meanwhile, Mr. Swainson calls them typical, sub-typical, natatorial, suctorial,\* and rasorial. Some of his illustrations of the principle are exceedingly interesting. He shews that the leading animal of a typical circle usually has a combination of properties concen-

\* This is preferred to *grallatorial*, as more comprehensively descriptive. There is the same need for a substitute for *rasorial*, which is only applicable to birds.

trated in itself, without any of these preponderating remarkably over others. The sub-typical circles, he says, “do not comprise the largest individuals in bulk, but always those which are the most powerfully armed, either for inflicting injury on their own class, for exciting terror, producing injury, or creating annoyance to man. Their dispositions are often sanguinary, since the forms most conspicuous among them live by rapine, and subsist on the blood of other animals. They are, in short, symbolically types of *evil*.” This symbolical character is most conspicuous about the centre of the series of gradations:—

Kingdom . . . . .	Annulosa.
Sub-kingdom . . . . .	Reptilia.
Class (Mammalia) . . . . .	Feræ.
(Aves) . . . . .	Raptores.

In the annulosa it is not distinct, although we must also remember that insects do produce enormous ravages and annoyance in many parts of the earth. In the reptilia it is more distinct, since to this class belong the ophidia, (serpents,) an order peculiarly noxious. It comes to a kind of climax in the feræ and raptores, which fulfil the function of butchers among land animals. As we descend



through tribes, families, genera, species, it becomes fainter and fainter, but never altogether vanishes. In the dentirostres, for instance, we have in a subdued form the hooked bill and predaceous character of the raptores; to this tribe belongs the family of the shrikes, so deadly to all the lesser field birds. In the genus bos, we have, in the sub-typical group, the bison, "wild, revengeful, and shewing an innate detestation of man." In equus, we have, in the same situation, the zebra, which actually shews the stripes of the tiger, and is as remarkable for its wildness as its congeners, the horse and ass, are for their docility and usefulness. To quote again from Mr. Swainson, "the singular threatening aspect which the caterpillars of the sphinx moth assume on being disturbed, is a remarkable modification of the terrific or evil nature which is impressed in one form or another, palpable or remote, upon all sub-typical groups; for this division of the lepidopterous order is precisely of this denomination. In the pre-eminent type of this order of insects, the butterflies, (papilionides,) our associations little prepare us for expecting any trace of the evil principle; but here, too, there is a sub-typical division. These," says our naturalist, "are distinguished by their caterpillars

being armed with formidable spines or prickles, which in general are possessed of some highly acrimonious or poisonous quality, capable of injuring those who touch them. *It is only,*" continues Mr. Swainson, "when extensive researches bring to light a uniformity of results, that we can venture to believe they are so universal as to deserve being ranked as primary laws. Thus, when a celebrated entomologist denounced as impure the black and lurid beetles forming the saprophagous petalocera of Mr. Macleay, a tribe living only upon putrid vegetable matter, and hiding themselves in their disgusting food, or in dark hollows of the earth, neither of these celebrated men suspected the absolute fact, elicited from our analogies of this group, that this very tribe constituted the sub-typical group of one of the primary divisions of coleopterous insects: nor had they any suspicion that, by the filthy habits and repulsive forms of these beetles, nature had intended that they should be types or emblems of hundreds of other groups, distinguished by peculiarities equally indicative of evil. On the other hand, the thalerophagous petalocera, forming the typical group of the same division, present us with all the perfections and habits belonging to their kind. These families

of beetles live only upon fresh vegetables; they are diurnal, and sport in the glare of day, pure in their food, elegant in their shapes, and beautiful in their colours.”\*

The third type, (first of the three aberrant,) called by Mr. Swainson, the *natatorial*, or aquatic, are chiefly remarkable for their bulk, the disproportionate size of the head, and the absence, or slight development of the feet. They partake of the predaceous and destructive character of the adjoining sub-typical group, and the means of their predacity are generally found in the mouth alone. In the primary division of the animal kingdom, we find the type in the radiata, not one of which lives out of water. In the vertebrata, it is in the fishes. In both of these, feet are totally wanting. Descending to the class mammalia, we have this type in the cetacea, which present a comparatively slight development of limbs. In the aves, as we have seen, the type is presented in the natatores, whose name has been adopted as an appropriate term for all the corresponding groups. An enumeration of some other examples of the natatorial type, as the cephalopoda (instanced in

\* Distribution and Classification of Animals, p. 248.

the cuttle-fish) in the mollusca; the crustacea (crabs, &c.) in the annulosa; the owls (which often duck for fish) in the raptores; the ichthyosaurus, plesiosaurus, &c., among reptilia, will serve to bring the general character, and its pervasion of the whole animal world, forcibly before the mind of the reader.

The next type is that of meanest and most imperfect organization, the lower termination of all groups, as the typical is the upper. It is called by Mr. Swainson the suctorial, from a very generally prevalent peculiarity, that of drawing sustenance by suction. The acrita, or polypes, among the sub-kingdoms; the intestina, among the annulosa; the tortoises, among the reptilia; the armadillo and scaly ant-eater, pig, mouse, jerboa, and kangaroo, among quadrupeds; the waders and tenuirostres, among birds; the coleoptera, (bug, louse, flea, &c.) among insects; the gastrobranchus, among fishes; are examples which will illustrate the special characters of this type. These are smallness, particularly in the head and mouth, febleness, and want of offensive protection, defect of organs of mastication, considerable powers of swift movement, and (often) a parasitic mode of living; while of negative qualities, there are, be-

sides, indisposition to domestication, and an unsuitableness to serve as human food.

The rasorial type comprehends most of the animals which become domesticated and useful to man, as, first, the fowls which give a name to the type, the ungulata, and more particularly the ruminantia, among quadrupeds, and the dog among the feræ. Gentleness, familiarity with man, and a peculiar approach to human intelligence, are the leading mental characteristics of animals of this type. Amongst external characters, we generally find power of limbs and feet for locomotion on land, (to which the rasorial type is confined,) abundant tail and ornaments for the head, whether in the form of tufts, crests, horns, or bony excrescences. In the animal kingdom, the mollusca are the rasorial type, which, however, only shews itself there in their soft and sluggish character, and their being very generally edible. In the ptilota, or winged insects, the hymenopterous are the rasorial type, and it is not therefore surprising to find amongst them the ants and bees, "the most social, intelligent, and in the latter case, most useful to man, of all the annulose animals."

As yet the speculations on representation are imperfect, in consequence of the novelty of the

doctrine, and the defective state of our knowledge of animated nature. It has, however, been so fully proved in the aves, and traced so clearly in other parts of the animal kingdom, and as a general feature of that part of nature, that hardly a doubt can exist of its being universally applicable. Even in the lowly forms of the acrita, (polypes,) the suctorial type of the animal kingdom, representation has been discerned, and with some remarkable results as to the history of our world. The acrita were the first forms of animal life upon earth, the starting point of that great branch of organization. Now, this sub-kingdom consists, like the rest, of five groups, (classes,) and these are respectively representations of the acrita itself, and the other four sub-kingdoms, which had not come into existence when the acrita were formed. The polypi vaginati, in the crustaceous covering of the living mass, and their more or less articulated structure, represent the *annulosa*. In the radiated forms of the rotifera, and the simple structure of the polypi rudes, we are reminded of the *radiata*. The *mollusca* are typified in the soft, mucous, sluggish intestina. And, finally, in the fleshy living mass which surrounds the bony and hollow axis of the polypi natantes, we have a sketch of the *vertebrata*.

The acrita thus appear as a prophecy of the higher events of animal development. They shew that the nobler orders of being, including man himself, were contemplated from the first, and came into existence by virtue of a law, the operation of which had commenced ages before their forms were realized.

The system of representation is therefore to be regarded as *a powerful additional proof of the hypothesis of organic progress by virtue of law*. It establishes the unity of animated nature and the definite character of its entire constitution. It enables us to see how, under the flowing robes of nature, where all looks arbitrary and accidental, there is an artificiality of the most rigid kind. The natural, we now perceive, sinks into and merges in a Higher Artificial. To adopt a comparison more apt than dignified, we may be said to be placed here as insects are in a garden of the old style. Our first unassisted view is limited, and we perceive only the irregularities of the minute surface, and single shrubs which appear arbitrarily scattered. But our view at length extending and becoming more comprehensive, we begin to see parterres balancing each other, trees, statues, and arbours placed symmetrically, and that the whole is an

assemblage of parts mutually reflective. It can scarcely be necessary to point to the inference hence arising with regard to the origination of nature in some Power, of which man's mind is a faint and humble representation. The insects of the garden, supposing them to be invested with reasoning power, and aware how artificial are their own works, might of course very reasonably conclude that, being in its totality an artificial object, the garden was the work of some maker or artificer. And so also must we conclude, when we attain a knowledge of the artificiality which is at the basis of nature, that nature is wholly the production of a Being resembling, but infinitely greater than ourselves.

Organic beings are, then, bound together in development, and in a system of both affinities and analogies. Now, it will be asked, does this agree with what we know of the geographical distribution of organic beings, and of the history of organic progress as delineated by geology? Let us first advert to the geographical question.

Plants, as is well known, require various kinds of soil, forms of geographical surface, climate, and other conditions, for their existence. And it is everywhere found that, however isolated a parti-



cular spot may be with regard to these conditions,—as a mountain top in a torrid country, the marsh round a salt spring far inland, or an island placed far apart in the ocean,—appropriate plants have there taken up their abode. But the torrid zone divides the two temperate regions from each other by the space of more than forty-six degrees, and the torrid and temperate zones together form a much broader line of division between the two arctic regions. The Atlantic and Pacific Oceans, and the Persian Gulf, also divide the various portions of continent in the torrid and temperate zones from each other. Australia is also divided by a broad sea from the continent of Asia. Thus there are various portions of the earth separated from each other in such a way as to preclude anything like a general communication of the seeds of their respective plants towards each other. Hence arises an interesting question—Are the plants of the various isolated regions which enjoy a parity of climate and other conditions, identical or the reverse? The answer is—that in such regions the vegetation bears a general resemblance, but the *species* are nearly all different, and there is even, in a considerable measure, a diversity of families.

The general facts have been thus stated: in the arctic and antarctic regions, and in those parts of lower latitudes, which, from their elevation, possess the same cold climate, there is always a similar or analogous vegetation, but few species are common to the various situations. In like manner, the intertropical vegetation of Asia, Africa, and America, are specifically different, though generally similar. The southern region of America is equally diverse from that of Africa, a country similar in climate, but separated by a vast extent of ocean. The vegetation of Australia, another region similarly placed in respect of climate, is even more peculiar. These facts are the more remarkable when we discover that, in most instances, the plants of one region have thriven when transplanted to another of parallel climate. This would shew that parity of conditions does not lead to a parity of productions so exact as to include identity of species, or even genera. Besides the various isolated regions here enumerated, there are some others indicated by naturalists as exhibiting a vegetation equally peculiar. Some of these are isolated by mountains, or the interposition of sandy wastes. For example, the temperate region of the elder continent is divided about the centre of

Asia, and the east of that line is different from the west. So also is the same region divided in North America by the Rocky Mountains. Abyssinia and Nubia constitute another distinct botanical region. De Candolle enumerates in all twenty well-marked portions of the earth's surface which are peculiar with respect to vegetation; a number which would be greatly increased if remote islands and isolated mountain ranges were to be included.

When we come to the zoology, we find precisely similar results, excepting that man (with, perhaps, some of the less conspicuous forms of being) is universal, and that several tribes, as the bear and dog, appear to have passed by the land connexion from the arctic regions of the eastern to those of the western hemisphere. "With these exceptions," says Dr. Prichard, "and without any others, as far as zoological researches have yet gone, it may be asserted that no individual species are common to distant regions. In parallel climates, analogous species replace each other; sometimes, but not frequently, the same genus is found in two separate continents; but the species which are natives of one region are not identical with corresponding races indigenous in the opposite hemisphere.

“ A similar result arises when we compare the three great intertropical regions, as well as the extreme spaces of the three great continents, which advance into the temperate climates of the southern hemisphere.

“ Thus, the tribes of simiæ, (monkeys,) of the dog and cat kinds, of pachyderms, including elephants, tapirs, rhinoceroses, hogs, of bats, of saurian and ophidian reptiles, as well of birds and other terrene animals, are all different in the three great continents. In the lower departments of the mammiferous family, we find that the bruta, or edendata, (sloths, armadillos, &c.,) of Africa, are differently organized from those of America, and these again from the tribes found in the Malayan archipelago and Terra Australis.”\*

It does not appear that the diversity between the similar regions of Africa, Asia, and America, is occasioned in all instances by any disqualification of these countries to support precisely the same genera or species. The ox, horse, goat, &c., of the elder continent have thriven and extended themselves in the new, and many of the indigenous tribes of America would no doubt flourish in corresponding climates in Europe, Asia, and Africa.

\* Researches, 4th edition, i. 95.

It has, however, been remarked by naturalists unacquainted with the Macleay system, that the larger and more powerful animals of their respective orders belong to the elder continent, and that thus the animals of America, unlike the features of inanimate nature, appear to be upon a small scale. The swiftest and most agile animals, and a large proportion of those most useful to man, are also natives of the elder continent. On the other hand, the bulk of the edentata, a group remarkable for defects and meanness of organization, are American. The zoology of America may be said, upon the whole, to recede from that of Asia, "and perhaps in a greater degree," adds Dr. Prichard, "from that of Africa." A much greater recession is, however, observed in both the botany and zoology of Australia.

There "we do not find, in the great masses of vegetation, either the majesty of the virgin forests of America, or the variety and elegance of those of Asia, or the delicacy and freshness of the woods of our temperate countries of Europe. The vegetation is generally gloomy and sad; it has the aspect of our evergreens or heaths; the plants are for the most part woody; the leaves of nearly all the plants are linear, lanceolated, small, coria-

ceous, and spinescent. The grasses, which elsewhere are generally soft and flexible, participate in the stiffness of the other vegetables. The greater part of the plants of New Holland belong to new genera; and those included in the genera already known are of new species. The natural families which prevail are those of the heaths, the proteæ, compositæ, leguminosæ, and myrthoideæ; . the larger trees all belong to the last family.”\*

The prevalent animals of Australia are not less peculiar. It is well known that none above the marsupialia, or pouched animals, are native to it. The most conspicuous are these marsupials, which exist in great varieties here, though unknown in the elder continent, and only found in a few mean forms in America. Next to them are the monotremata, which are entirely peculiar to this portion of the earth. Now these are animals at the bottom of the mammiferous class, adjoining to that of birds, of whose character and organization the monotremata largely partake, the ornithorynchus presenting the bill and feet of a duck, producing its young in eggs, and having, like birds, a clavicle between the two shoulders. The birds of Australia vary in structure and plumage, but all have some singu-

\* Prichard.

larity about them—the swan, for instance, is black. The country abounds in reptiles, and the prevalent fishes are of the early kinds, having a cartilaginous structure.

Altogether, the plants and animals of this minor continent convey the impression of an early system of things, such as might be displayed in other parts of the earth about the time of the oolite. In connexion with this circumstance, it is a fact of some importance, that the geognostic character of Australia, its vast arid plains, its little diversified surface and consequent paucity of streams, and the very slight development of volcanic rock on its surface, seem to indicate a system of physical conditions, such as we may suppose to have existed elsewhere in the oolitic era: perhaps we see the chalk formation preparing there in the vast coral beds fronting the coast. Australia thus appears as a portion of the earth which has, from some unknown causes, been belated in its physical and organic development. And certainly the greater part of its surface is not fitted to be an advantageous place of residence for beings above the marsupialia, and judging from analogy, it may yet be subjected to a series of changes in the highest degree incon-

venient to any human beings who may have settled upon it.

The general conclusions regarding the geography of organic nature, may be thus stated. (1.) There are numerous distinct foci of organic production throughout the earth. (2.) These have everywhere advanced in accordance with the local conditions of climate &c., as far as at least the class and order are concerned, a diversity taking place in the lower gradations. No physical or geographical reason appearing for this diversity, we are led to infer that, (3,) it is the result of minute and inappreciable causes giving the law of organic development a particular direction in the lower subdivisions of the two kingdoms. (4.) Development has not gone on to equal results in the various continents, being most advanced in the eastern continent, next in the western, and least in Australia, this inequality being perhaps the result of the comparative antiquity of the various regions, geologically and geographically.

It must at the same time be admitted that the line of organic development has nowhere required for its advance the whole of the families comprehended in the two kingdoms, seeing that some of



these are confined to one continent, and some to another, without a conceivable possibility of one having been connected with the other in the way of ancestry. The two great families of quadrumana, cebidæ and simiadæ, are a noted instance, the one being exclusively American, while the other belongs entirely to the old world. There are many other cases in which the full circular group can only be completed by taking subdivisions from various continents. This would seem to imply that, while the entire system is so remarkable for its unity, it has nevertheless been produced in lines geographically detached, these lines perhaps consisting of particular typical groups placed in an independent succession, or of two or more of these groups. And for this idea there is, even in the present imperfect state of our knowledge of animated nature, some countenance in ascertained facts, the birds of Australia, for example, being chiefly of the suctorial type, while it may be presumed that the observation as to the predominance of the useful animals in the Old World, is not much different from saying that the rasorial type is there peculiarly abundant. It does not appear that the idea of independent lines, consisting of particular types, or sets of types, is

necessarily inconsistent with the general hypothesis, as nothing yet ascertained of the Macleay system forbids their having an independent set of affinities. On this subject, however, there is as yet much obscurity, and it must be left to future inquirers to clear it up.

We must now call to mind that the geographical distribution of plants and animals was very different in the geological ages from what it is now. Down to a time not long antecedent to man, the same vegetation overspread every clime, and a similar uniformity marked the zoology. This is conceived by M. Brogniart, with great plausibility, to have been the result of a uniformity of climate, produced by the as yet unexhausted effect of the internal heat of the earth upon its surface; whereas climate has since depended chiefly on external sources of heat, as modified by the various meteorological influences. However the early uniform climate was produced, certain it is that, from about the close of the geological epoch, plants and animals have been dispersed over the globe with a regard to their particular characters, and specimens of both are found so isolated in particular situations, as utterly to exclude the idea that they came thither from any common centre. It may be

asked,—Considering that, in the geological epoch, species are not limited to particular regions, and that since the close of that epoch, they are very peculiarly limited, are we to presume the present organisms of the world to have been created *ab initio* after that time? To this it may be answered,—Not necessarily, as it so happens that animals begin to be much varied, or to appear in a considerable variety of species, towards the close of the geological history. It may have been that the multitudes of locally peculiar species only came into being after the uniform climate had passed away. It may have only been when a varied climate arose, that the originally few species branched off into the present extensive variety.

A question of a very interesting kind will now probably arise in the reader's mind—*What place or status is assigned to man in the new natural system?* Before going into this inquiry, it is necessary to advert to several particulars of the natural system not yet noticed.

It is necessary, in particular, to ascertain the grades which exist in the classification of animals. In the line of the aves, Mr. Swainson finds these to be nine, the species *pica*, for example, being thus indicated:—

Kingdom . . . . .	Animalia.
Sub-kingdom . . . . .	Vertebrata.
Class . . . . .	Aves.
Order . . . . .	Incessores.
Tribe . . . . .	Conirostres.
Family . . . . .	Corvidæ.
Sub-family . . . . .	Corvinæ.
Genus . . . . .	Corvus.
Sub-genus, or species . . . . .	Pica.

This brings us down to species, the subdivision where intermarriage or breeding is usually considered as natural to animals, and where a resemblance of offspring to parents is generally persevered in. The dog, for instance, is a species, because all dogs can breed together, and the progeny partakes of the appearances of the parents. The human race is held as a species, primarily for the same reasons. Species, however, is liable to another subdivision, which naturalists call variety; and variety appears to be subject to exactly the same system of *representation* which have been traced in species and higher denominations. In canis, for instance, the bull-dog and mastiff represent the ferocious sub-typical group; the water-dog is natatorial; we see the speed and length of muzzle of the suctorial group in the greyhound; and the bushy tail and gentle and serviceable character of the rasorial in the shepherd's dog and

spaniel. Even the striped and spotted skin of the tiger and panther is reproduced in the more ferocious kind of dogs—an indication of a fundamental connexion between physical and mental qualities which we have also seen in the zebra, and which is likewise displayed in the predominance of a yellow colour in the vultures and owls in common with the lion and his congeners.

It is by no means clearly made out that this system of nine gradations over and above that of variety applies in all departments of nature. On the contrary, even Mr. Swainson gives series in which several of them are omitted. It may be that, in some departments of nature, variation from the class or order has gone down into fewer shades than in others; or it may be, that many of the variations have not survived till our era, or have not been as yet detected by naturalists; in either of which cases there may be a necessity for shortening the series by the omission of one or two grades, as for instance *tribe* or *sub-family*. This, however, is much to be regretted, as it introduces an irregularity into the natural system, and consequently throws a difficulty and doubt in the way of our investigating it. With these preliminary

remarks, I shall proceed to inquire what is the natural status of man.

That man's place is to be looked for in the class mammalia and sub-kingdom vertebrata admits of no doubt, from his possessing both the characters on which these divisions are founded. When we descend, however, below the *class*, we find no settled views on the subject amongst naturalists. Mr. Swainson, who alone has given a review of the animal kingdom on the Macleay system, unfortunately writes on this subject in a manner which excites a suspicion as to his judgment. His arrangement of the first or typical order of the mammalia is therefore to be received with great hesitation. It is as follows:—

Typical	. Quadrumana	Pre-eminently organized for grasping.
Sub-typical	Feræ . .	Claws retractile; carnivorous.
Natatorial	Cetacea . .	Pre-eminently aquatic; feet very short.
Suctorial	. Glires . .	Muzzle lengthened and pointed.
Rasorial	. Ungulata .	Crests and other processes on the head.

He then takes the quadrumana, and places it in the following arrangement:—

Typical	. . Simiadæ . .	(Monkeys of Old World.)
Sub-typical	. . Cebidæ . .	(Monkeys of New World.)
Natatorial	. . Unknown.	
Suctorial	. . Vespertilionidæ	(Bats.)
Rasorial	. . Lemuridæ .	(Lemurs.)

He considers the simiadæ as a complete circle, and argues thence that there is no room in the range of the animal kingdom for man. Man, he says, is not a constituent part of any circle, for, if he were, there ought to be other animals on each hand having affinity to him, whereas there are none, the resemblance of the oranges being one of mere analogy. Mr. Swainson therefore considers our race as standing apart, and forming a link between the unintelligent order of beings and the angels! And this in spite of the glaring fact that, in our teeth, hands, and other features grounded on by naturalists as characteristic, we do not differ more from the simiadæ than the bats do from the lemurs—in spite also of that resemblance of analogy to the oranges which he himself admits, and which, at the least, must be held to imply a certain relation. He also overlooks that, though there may be no room for man in the circle of the simiadæ, (this, indeed, is quite true,) there may be in the order, where he actually leaves a place entirely blank, or only to be filled up, as he suggests, by mermen!\* Another argument in his arrange-

\* Mr. Swainson's arguments about the entireness of the circle simiadæ are only too rigid, for fossil geology has since added new genera to this group and the cebidæ, and there may be still farther additions.

ment is, that it leaves the grades of classification very much abridged, there being at the most seven instead of nine. But serious argument on a theory so preposterous may be considered as nearly thrown away. I shall therefore at once proceed to suggest a new arrangement of this portion of the animal kingdom, in which man is allowed the place to which he is zoologically entitled.

I propose that the typical order of the mammalia should be designated cheirotheria, from the sole character which is universal amongst them, their possessing hands, and with a regard to that pre-eminent qualification for grasping which has been ascribed to them—an analogy to the perching habit of the typical order of birds, which is worthy of particular notice. The tribes of the cheirotheria I arrange as follows:—

Typical . . . . .	Bimana.
Sub-typical . . . . .	Simiadæ.
Natatorial . . . . .	Vespertilionidæ.
Suctorial . . . . .	Lemuridæ.
Rasorial . . . . .	Cebidæ.

Here man is put into the typical place, as the genuine head, not only of this order, but of the whole animal world. The double affinity which is requisite is obtained, for here he has the simiadæ



on one hand, and the cebidæ on the other. The five tribes of the order are completed, the vesperilionidæ being shifted (provisionally) into the natatorial place, for which their appropriateness is so far evidenced by the aquatic habits of several of the tribe, and the lemuridæ into the suctorial, to which their length of muzzle and remarkable saltatory power are highly suitable. At the same time, the simiadæ are degraded from the typical place, to which they have no sort of pretension, and placed where their mean and mischievous character seem to require; the cebidæ again being assigned that situation which their comparatively inoffensive dispositions, their arboreal habits, and their extraordinary development of the tail, (which with them is like a fifth hand,) render so proper.

The zoological status thus assigned to the human race is precisely what might be expected. In order to understand its full value, it is necessary to observe how the various type peculiarities operate in fixing the character of the animals ranked in them. It is easy to conceive that they must be, in some instances, much mixed up with each other, and consequently obscured. If an animal, for example, is the suctorial member of a circle of species, forming the natatorial type of genera, forming a

family or sub-family which in its turn is ratorial, its qualities must evidently be greatly mingled and ill to define. But, on the other hand, if we take the rapacious or sub-typical group of birds, and look in it for the tribe which is again the rapacious or sub-typical group of its order, we may expect to find the qualities of that group exalted or intensified, and accordingly made the more conspicuous. Such is really the case with the vultures, in the rapacious birds, a family remarkable above all of their order for their carnivorous and foul habits. So, also, if we take the typical group of the birds, the incessores or perchers, and look in it for its typical group, the conirostres, and seek there again for the typical family of that group, the corvidæ, we may expect to find a very marked superiority in organization and character. Such is really the case. "The crow," says Mr. Swainson, "unites in itself a greater number of properties than are to be found individually in any other genus of birds; as if in fact it had taken from all the other orders a portion of their peculiar qualities, for the purpose of exhibiting in what manner they could be combined. From the rapacious birds this "type of types," as the crow has been justly called, takes the power of soaring

in the air, and of seizing upon living birds, like the hawks, while its habit of devouring putrid substances, and picking out the eyes of young animals, is borrowed from the vultures. From the scansorial or climbing order it takes the faculty of picking the ground, and discovering its food when hidden from the eye, while the parrot family gives it the taste for vegetable food, and furnishes it with great cunning, sagacity, and powers of imitation, even to counterfeiting the human voice. Next come the order of waders, who impart their quota to the perfection of the crow by giving it great powers of flight, and perfect facility in walking, such being among the chief attributes of the suctorial order. Lastly, the aquatic birds contribute their portion, by giving this terrestrial bird the power of feeding not only on fish, which are their peculiar food, but actually of occasionally catching it.\* In this wonderful manner do we find the crow partially invested with the united properties of all other birds, while in its own order, that of the incessores or perchers, it stands the pre-eminent type. We cannot also fail to regard it as a remarkable proof of the superior organization and character of the corvidæ, that they are adapted

\* See Wilson's American Ornithology; article, *Fishing Crow*.

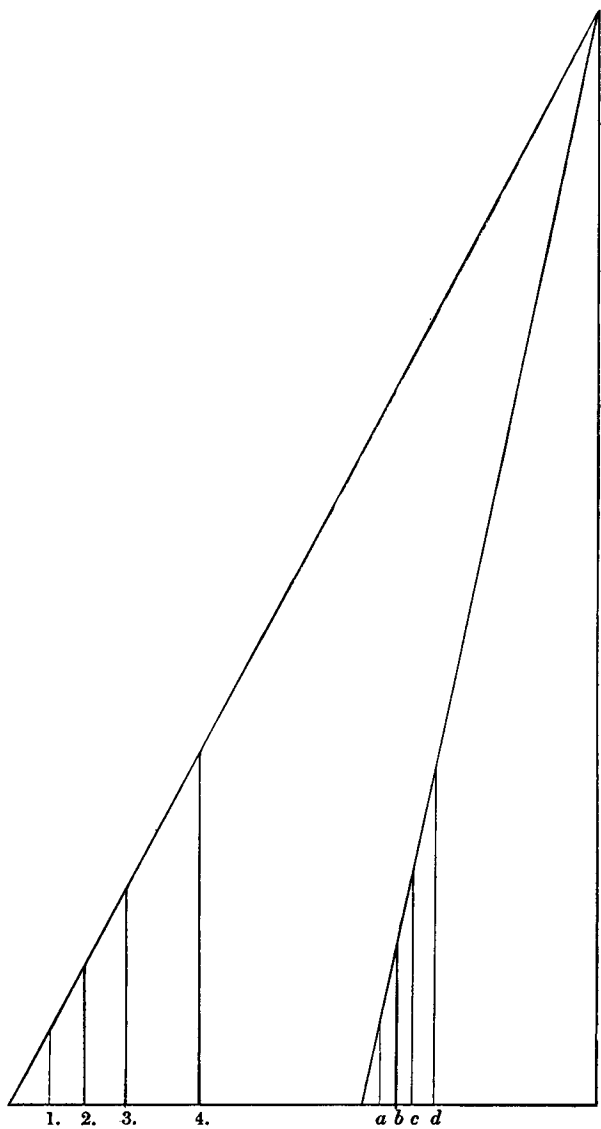
for all climates, and accordingly found all over the world.

Mr. Swainson's description of the zoological status of the crow, written without the least design of throwing any light upon that of man, evidently does so in a remarkable degree. It prepares us to expect in the place among the mammalia, corresponding to that of the corvidæ in the aves, a being or set of beings possessing a remarkable concentration of qualities from all the other groups of their order, but in general character as far above the corvidæ as a typical group is above an aberrant one, the mammalia above the aves. Can any of the simiadæ pretend to such a place, narrowly and imperfectly endowed as these creatures are—a mean reflection apparently of something higher? Assuredly not, and in this consideration alone Mr. Swainson's arrangement must fall to the ground. To fill worthily so lofty a station in the animated families man alone is competent. In him only is to be found that concentration of qualities from all the other groups of his order which has been described as marking the corvidæ. That grasping power, which has been selected as the leading physical quality of his order, is nowhere so beautifully or so powerfully developed as in his hand.

The intelligence and teachableness of the simiadæ rise to a climax in his pre-eminent mental nature. His sub-analogy to the feræ is marked by his canine teeth, and the universality of his rapacity, for where is the department of animated nature which he does not without scruple sacrifice to his convenience? With sanguinary, he has also gentle and domesticable dispositions, thus reflecting the characters of the ungulata, (the rasorial type of the class,) to which we perhaps see a further analogy in the use which he makes of the surface of the earth as a source of food. To the aquatic type his love of maritime adventure very readily assimilates him; and how far the suctorial is represented in his nature it is hardly necessary to say. As the corvidæ, too, are found in every part of the earth—almost the only one of the inferior animals which has been acknowledged as universal—so do we find man. He thrives in all climates, and with regard to style of living, can adapt himself to an infinitely greater diversity of circumstances than any other animated creature.

Man, then, considered zoologically, and without regard to the distinct character assigned to him by theology, simply takes his place as the type of all types of the animal kingdom, the true and unmis-

takable head of animated nature upon this earth. It will readily occur that some more particular investigations into the ranks of types might throw additional light on man's status, and perhaps his nature; and such light we may hope to obtain when the philosophy of zoology shall have been studied as it deserves. Perhaps some such diagram as the one given on the next page will be found to be an approximation to the expression of the merely natural or secular grade of man in comparison with other animals.



Here the upright lines, 1, 2, 3, 4, 5, may represent the comparative height and grade of organization of both the five sub-kingdoms, and the five classes of each of these ; 5 being the vertebrata in the one case, and the mammalia in the other. The difference between the height of the line 1 and the line 5 gives an idea of the difference of being the head type of the aves, (*corvidæ*,) and the head type of the mammalia, (*bimana*;) *a. b. c. d. 5*, again, represent the five groups of the first order of the mammalia; *a*, being the organic structure of the highest simia, and 5, that of man. A set of tangent lines of this kind may yet prove one of the most satisfactory means of ascertaining the height and breadth of the psychology of our species.

It may be asked,—Is the existing human race the only species designed to occupy the grade to which it is here referred? Such a question evidently ought not to be answered rashly; and I shall therefore confine myself to the admission that, judging by analogy, we might expect to see several varieties of the being, homo. There is no other family approaching to this in importance, which presents but one species. The *corvidæ*, our parallel in aves, consist of several distinct genera and sub-genera. It is startling to find such



an appearance of imperfection in the circle to which man belongs, and the ideas which rise in consequence are not less startling. Is our race but the initial of the grand crowning type? Are there yet to be species superior to us in organization, purer in feeling, more powerful in device and act, and who shall take a rule over us! There is in this nothing improbable on other grounds. The present race, rude and impulsive as it is, is perhaps the best adapted to the present state of things in the world; but the external world goes through slow and gradual changes, which may leave it in time a much serener field of existence. There may then be occasion for a nobler type of humanity, which shall complete the zoological circle on this planet, and realize some of the dreams of the purest spirits of the present race.