

are mere trivialities, but even such little flaws jar the ear in reading a poem. And Mr. Gosse is so true a poet, that though we doubt his ever making a true dramatist, we would have him remove in any future edition any little flaw which seems to mark crudity of conception or hastiness of execution.

THE VARIATION OF ANIMALS AND PLANTS UNDER DOMESTICATION.*

(FIRST NOTICE.)

It is almost needless to say now that the teaching of Mr. Darwin's *Origin of Species* has effected an almost complete revolution in biology, and that no book has appeared in this century which has excited so much opposition, or which has in a very few years attracted such a widely spread and numerous band of disciples. Eminent men of science who are still in an attitude of opposition to "Darwinian" views may now be numbered on the fingers of a hand, whilst the rising school of thought is almost unanimous in favour of the doctrine of evolution. Very much of the opposition which the views contained in the *Origin of Species* had to encounter, leaving out of question, of course, the class opposition which was to be expected, was due to the absence of the details of the facts upon which those views were based, an absence which was rendered necessary by the hastened publication of the book. But when the first edition of the book now under consideration came under the notice of thoughtful and unprejudiced readers, there could no longer remain any doubt in their minds that the whole doctrine of the immutability of species and genera must be abandoned, and that the new theory of the origin of all by a process of evolution must be fairly faced.

It is very rarely the case—indeed, we doubt if a parallel instance exists in the world's history—of a great teacher living to see his views generally adopted, when they have been found to be so revolutionary as have been those of Mr. Darwin. Certainly there is no other instance of a man having founded so great a doctrine as this, and being at the same time the author of the minute investigations which have completed and solidified his achievement.

The second edition of this book has appeared in seven years, and it is already in the fourth thousand, a fact more pregnant than any words can be with comfort for those who are interested in the advance of scientific education. The book itself is far from being attractive to the uninitiated; indeed, we may say that to be a reader of any of Mr. Darwin's books involves the previous possession of a considerable amount of biological knowledge, and from the reverent care with which our author details all his facts before suggesting any conclusion, his writings are far from being such as may be regarded as light reading. But for the student of science they are models of composition, for the utter absence of any straining after effect, for the almost painful elaboration of their facts, for the absence of anything approaching to an unsubstantiated conclusion; but most of all, for the absolute and uniform fairness with which Mr. Darwin treats all who may differ from him, all who have gone before him, and all who have in any way contributed facts for his use.

The new edition of the book now before us is, of course, chiefly a reproduction of the first; but numerous and very important additions have been made, and Mr. Darwin seems to have had very little occasion to withdraw or amend what he had written before. The only noteworthy instance of the latter is in the case of a statement made in the first edition concerning the reproduction of supernumerary digits. The law affecting the production of polydactylism seems to be that the more specialised limb—the anterior or arm—is more variable than the other; and that males are more prone to it than females, as might be expected as a corollary, for males are more specialised in their employments than females. Only one point seems as yet uninvestigated, and that is, which hand is more frequently affected. We should expect it to be the right, as that is more specialised than the left; and if it should prove to be so, Mr. Darwin's position would be considerably strengthened. There can be no doubt that polydactylism occurs in a more and more perfect and complete form, the nearer we get to that stage of development where vegetative repetition is the rule. This is shown by the reversion which is seen occasionally in the horse to the condition of tridactylism, which characterised the extinct hipparion, illustrations of which may be seen in the Museum of the College of Surgeons. In races of polydactylous cats, the anterior limbs are always first affected, there being often seven toes there

to six in the posterior limbs; and the males are much more frequently affected than the females. In certain districts these polydactylous cats seem likely to evict the cats with only twenty toes, and that, probably, because the extra digits serve an evident and very useful purpose. It is further very remarkable that the most specialised digit, the thumb, is that whose reduplication is most frequent in all animals. The writer has seen a white male cat which was perfectly deaf, had one eye blue and the other yellow, and had three thumbs on each anterior limb. In his first edition, Mr. Darwin mentions the case of a double-thumbed infant, where the smaller digit was twice amputated, and twice was reproduced with its nail complete. Doubt having been expressed about this case, and the evidence concerning it being incomplete, Mr. Darwin has withdrawn the conclusions he had made upon it. This withdrawal is not justified, because the facts of such reproduction are fully substantiated in surgical works. Nay, more than that, the reproduction of many digits after intra-uterine amputation of a limb is a well-established fact, so that Mr. Darwin, in his next edition, may go further than he did in his first, and say that, just as the human animal is nearer to that phase of its existence in which it resembles structures in which vegetative repetition is the rule, so attempts at such repetition are visible. If in early infantile life half of a double digit is removed, that half may be reproduced; and if in intra-uterine life a limb be amputated by processes which are thoroughly well known, attempts will be made to reproduce the elements of the amputated part. This is clearly a most telling instance of reversion.

Amongst the new matter to be found in this edition some very important facts are placed, though they were scarcely needed to strengthen Mr. Darwin's position. Thus the intimate relationship which he had already established between the various breeds of domesticated dogs and wild members of the same family, is greatly supported by the singular process of reversion which occurs in dogs which are imported into Guinea, where they are found to alter strangely, their ears growing long and stiff, like those of foxes, to the colour of which they also incline, so that in three or four years they degenerate into very ugly creatures; and in three or four broods their barking turns into a howl. Such observations as this are being multiplied on all sides, and the first step in the process of proving a common relationship between all animals may be taken as having been accomplished by Mr. Darwin, in his having shown that our domesticated animals have all been derived from feral stock.

The peculiar movements made in the air by the tumbler-pigeon have been a source of much speculation, and in a note, quoted from Mr. W. J. Moore, Mr. Darwin tells us that the pricking of the base of the brain and giving hydrocyanic acid, together with strychnine, to an ordinary pigeon, brings on convulsive movements exactly like those of a tumbler. This is far from being a satisfactory explanation, nor indeed can any be given that is perfectly sufficient. The breed of tumblers is very widely spread, yet we have no information that any artificial process has been used to produce their peculiarities. The fact seems to have escaped Mr. Darwin's notice, that epilepsy is a very frequent disease amongst all domesticated animals. Dogs, cats, horses, white mice, and birds are all known to suffer from it. In birds, as the writer has frequently seen in a jackdaw, the epileptic attacks often take the form of rotatory movements, from before backwards, with the wings outspread. The bird first throws its head backwards, and turns over several times in that direction, and then resumes its wonted condition, unless the fit is very severe, when it presents the drowsiness so characteristic of epilepsy. In birds these fits are induced by confinement, and cease at once if the animal is allowed to wander about; and in white mice they are often to be induced by exposure to strong light. Epilepsy is a disease in which the hereditary tendency is very strongly marked, and it would not be impossible to raise a breed of almost any animal in which it should predominate, and in which some special irritation would readily excite it. The "tumble" of the pigeon is apparently a mild form of epilepsy—*petit mal*—and it may have been originally induced by confinement, and continued by careful selection, though what the irritation is which excites the fits is, as yet, beyond our powers of explanation. We might quote many instances where diseased conditions were regarded as subjects for selection; indeed, the very disease we are now speaking of, epilepsy, was termed the "sacred disease" by the Greeks, and those affected by it were regarded as especially under the protection of the gods. It is possible that the special reverence in which they were held may have tended towards the transmission of their dreadful affliction. The appli-

* *The Variation of Animals and Plants under Domestication.* By Charles Darwin, M.A., F.R.S., &c. London: Murray.

cation of the principles of the Darwinian philosophy to the investigation of disease, is a field which will prove enormously productive for any one who has the patience and opportunity to take up the research.

FROM THE HEBRIDES TO THE HIMALAYAS.*

AFTER six months of roaming on the west coast of Scotland, Miss Gordon-Cumming spent upwards of a year in travelling about India, and she has combined her recollections of the whole period of her wanderings in the imposing work which is before us. An interesting book needs no apology, but it is not her only excuse for putting together in one work her impressions of regions so far apart as the Hebrides and the Himalayas, that she visited the one immediately after visiting the other. A diligent student of old faiths, old customs, fairy-tales, and folk-lore, the same interest predominated with her in the East and in the West, and the motive of her book has been to trace the resemblances between the decaying superstitions of the one and the living beliefs and existing customs of the other. There are those to whom this account of the work may not appear attractive, but it is by no means lacking in the features of interest usually found in books of travel; while in what may be called the archaeological parts will be found a mass of curious information, gathered from even a wider range than the title indicates, and so presented as to be highly entertaining. There is nothing of Dry-as-dust about Miss Gordon-Cumming's writing—it is clear, lively, and graceful; and it is but fair to her to add that she has been discreet in selecting points for description from a route the greater part of which was well beaten, and discreet, too, in dealing with the old-world matters which seem to turn the heads of most of those who meddle with them. In her archaeological excursions, indeed, modesty has kept her clear of the worst cause of indiscretion and error; she has been content not to theorise on her own account, taking the safer course—which is a sufficiently unsafe one—of following on each subject she deals with the lead of the most popular authorities. She may, perhaps, be open to the charge of having had nothing absolutely new to say either of West or East; but knowledge must somehow be popularised, and there would almost be an end of the making of books, if nothing were to be written about which has been written about already. No doubt, a careful study of the superstitions and traditional usages of the Hebrides, in which many traces of the old world are still lingering,—*e.g.*, traces of marriage by purchase, and kinship through milk,—would yield something much more valuable than the present work. But a study of that sort requires the devotion of years and special qualifications which few persons possess, and it must be admitted that if it is among the most absorbing, it is among the most thankless of undertakings. What Miss Gordon-Cumming has done was, we think, worth doing, and on the whole she has done it very well.

It is in her first volume, nominally devoted to the Hebrides, that archaeology is in the ascendant. She has cleverly depicted, both with pen and pencil, the more interesting of the Hebridean scenes she visited. She has culled judiciously from the stores of legend accumulated in those distant islands. Such history as they have had has not been overlooked by her, and in particular, she has given an excellent account of all that is known about Iona. But it is with the superstitions of the people, and the traces which remain of the religious faiths, modes of living, and burial customs of their predecessors, that she mostly occupies herself—and through these it was not difficult to connect the Hebrides, not merely with India, but with nearly every portion of the globe. Serpent-worship, suggested by the so-called serpent-mound at Oban, stone-worship and dove-worship, suggested by Iona, Druidism and sun-worship, which she assumes to be the same, and of which, besides existing monuments, numerous relics are found in the language and customs of the Highlanders, are among the topics which she discusses at some length, while those which are slightly touched upon are too numerous for us even to mention. In general, her subjects are naturally brought in, and she has been fairly successful in giving to her disquisitions something of the appearance of gossip prompted by her surroundings. In her second volume, she has given more room to the incidents and impressions of travel, and of these she has produced a very lively record. Considering that a disposition to impart knowledge is her foible—a large tree, for example, setting her off into an account of all the enormous trees that have anywhere been mentioned—she has not been very diffuse upon Indian religion; perhaps because the spectacular side of it to some extent diverted her from its history and dogmas. On the

other hand, the beliefs and customs of the Himalayan tribes start her afresh on her favourite speculations, and in one or two instances tempt her into very extensive surveys.

She found kelpies, fairies, mermen, and mermaids, to say nothing of wise men and witches, still to some extent believed in by the Hebrideans. Neithe, the goddess of waters, does not seem to be at all believed in, but she nevertheless receives throughout the Highlands a certain amount of traditional commemoration. Though the sacred wells have lost their prestige, the bushes near them are still on certain days, out of regard to ancient custom, loaded with bits of cloth, the votive offerings that used to be made by worshippers to this divinity. The hen, the goose, and the hare were forbidden animals to the Celts, and in the Highlands the prejudice against eating the hare is not yet altogether extinct. In the Western Isles, the Evil-eye is as much dreaded as it is in the South of Europe; and, indeed, throughout the north of Scotland, many a housewife, busy at her churn or other household work, will "bustle away her goods at the approach of a dubious stranger," because she knows that there are people whose presence will prevent the butter from "coming" or the bread from baking. When mischief has been done, when the cows, for example, have had their milk taken from them, a witch is consulted as a matter of course, and the people have ready answers for those who dissuade them from calling in such assistance. "One woman will tell you how, when she had no family, she consulted the old *caillach*, and soon afterwards became the joyful mother of children. Another will tell how her milk went from her, and the witch brought it back. She can bring luck, too, to the herring-boats, so that it would be rash economy to save her puckle of meal." So lately as 1871 a man brought an action in the Sheriff Court of Stornoway against a neighbour for accusing him of having by witchcraft stolen the milk from his cows. When a woman has store of milk beyond her neighbours, "Oh, she must have been drawing the tether!" they say; "meaning that early on Beltane morn (May-day) she had gone forth secretly, dragging her cow's tether through the dew grass, and muttering incantations to secure good milk." It is still widely believed throughout the Highlands that there are old women who, to serve their private ends, can take the form of a hare or of a cat, and in that form can only be shot with silver bullets; and that a way to destroy the glamour of a witch is to "score" her, drawing blood, "above the breath." The last-mentioned belief led, only the other day, to a trial for murder in England; and it must be confessed that, up to this point, there is nothing very peculiar in the Hebridean or Highland superstitions of which Miss Gordon-Cumming writes. Some of the remains of sun-worship which she notices have more of a local character. Here are one or two of her facts taken at random. "Going to church" in Gaelic is still "going to the stones," a description that carries us back to the days of the Druids; and a man in dire extremity is said to be "between two fires of Baal," in allusion to the fate of certain criminals in the days of Druidic government. The use of the fire-churn or need-fire—an apparatus for getting fire by friction—as a charm against cattle-plague, is said to have been common so late as 1830; and the custom of passing children and cattle through the fire has not been long extinct. At the great sun festivals—Beltane, Midsummer, Halloween, and the New Year, especially at the New Year—there is still, in some parts of the Highlands, "a dread of ill-luck in allowing a neighbour to take a 'kindling' off the hearth, or even a light for a pipe," which our author seems disposed to refer back to Druidic times; but giving a "kindling" from the hearth seems to have been at all times regarded as a thing not to be done indiscriminately. The *deisul*, a round made in the direction of the sun's course for luck, was anciently in use everywhere in the Hebrides, and it is still kept up in Barra. It is practised in other places by way of charm. "When the cattle are sick, any 'wise woman' consulted invariably begins her prescription by an order for three turns round the cow-bye, with other ceremonies;" and, quite recently, this was "earnestly recommended by the cow-herd to a gentleman in Ross-shire whose cows were ailing." The use of east and west in Highland speech is also ascribed by Miss Gordon-Cumming to the days of sun-worship, and at any rate it is curious. "If you ask a man into your house, you bid him come west, quite irrespective of the points of the compass. To bid him come east, however true geographically, would be gross insult, involving ill-luck. Once within the house, the host gives his guest a dram, and bids him 'put it west his throat,' implying good-will to him in the swallowing of it. A lad courting a lass is said to be 'putting it west upon her.'" And the old version of the Creed in Gaelic tells how our Lord went east into the place of the dead, and went west into heaven. The significance

* From the Hebrides to the Himalayas. By Constance F. Gordon-Cumming. 2 vols. London: Sampson Low and Co.

term 'orator,' when it is not used ironically, is reserved for one who, in relation to speaking, has genius of an order analogous to that which entitles a man to be seriously called "a poet." The term 'oratory,' though the exigencies of the language lead to its often being used as a mere synonym for 'set speaking,' is yet always inconveniently coloured with the same suggestion, either of irony or of superlative praise. The Roman term *orator*, 'pleader,' had this advantage over ours,—that it related, not to a faculty, but to a professional or official attitude. It could, therefore, be applied to any one who stood in that attitude, whether effectively or otherwise. Thus the Romans could legitimately say 'mediocris' or 'malus orator,' whereas in English the corresponding phrases are either incorrect or sarcastic. Even the Romans, however, seem to have felt that their word was unsatisfactory, and to have confessed this sense by saying 'dicere,' 'ars dicendi,' as much as possible. But the Greeks had a word which presented the man of eloquence, not like the English word, as a man of genius, nor like the Roman word, as an official person, but simply as a *speaker*,—*ῥήτωρ*. This designation was claimed by those Sicilian masters who taught men how to speak, at Athens it was given especially to the habitual speakers in the public assembly, in later times it was applied to students or theorists of rhetoric. What, then, is the fact signified by this double phenomenon,—that the Greeks had the word *rhetor*, and that they did not apply it to everybody? It is this:—That in the Greek view, a man who speaks may, without necessarily having first-rate natural gifts for eloquence, or being invested with office, yet deserve to be distinguished from his fellows by the name of 'a speaker.' It attests the conception that speaking is potentially an *art*, and that one who speaks may, in speaking, be an *artist*. This is the fundamental conception on which rests, first, the relation between ancient oratory and ancient prose; secondly, the relation between ancient and modern oratory.*

We venture to assert that this fundamental conception is no conception at all. The Professor has strung together a number of hazy statements, and nearly all of them are false. How, for instance, is it incorrect or sarcastic to say that So-and-so is an execrable orator, and that So-and-so is a miserable poet? To be incorrect and sarcastic, we should have to say that Tupper was a splendid poet, and that the Member for Peterborough was a consummate orator. Used by themselves, and with no qualifying adjectives, to express blame or praise, the words "orator" and "poet" have not much meaning. Homer was a poet, and Cicero was an orator, are propositions which might serve for the minor premiss of a syllogism, but we doubt if any one would think that either predicate was "coloured with a suggestion of superlative praise." Again, Mr. Jebb's Latin scholarship would seem to be hardly so strong as his Greek. There can be no doubt whatever that Cicero used *orator* in exactly the same sense as we do "orator." In his *Brutus* he repeatedly asserts and implies that this word connotes some degree of excellence. He apologises for mentioning, in his list of pleaders, men *qui nec habiti sunt oratores, neque fuerunt*; and says that in discussing the merits of aspirants for the prizes of eloquence at Rome, he shall make it abundantly clear *quem existimet clamatorem, quem oratorem fuisse*. Is Mr. Jebb more correct in what he says about *ῥήτωρ*? We think not. A term applicable alike to Sicilian masters, to Athenian mob-orators, and to theorists of Rhetoric, must be rather too elastic and vague to serve as a basis for the fundamental conception on which the relation between ancient and modern oratory rests. The habitual speakers in the public assembly were undoubtedly called *ῥήτορες*, and Cleon was a typical specimen of that class of men at Athens. Now, we know from Aristophanes what Cleon's rhetoric was like, and it is obvious at once that in resting his theory upon a supposed connotation of the word *ῥήτωρ*, Mr. Jebb has built upon the sand. He evidently, however, has no such misgivings himself. "Having proved his point, bedad!" in much the same way as Father Tom proved his against the Pope, the Professor goes away at score. "Ancient oratory is a fine art, an art regarded by its cultivators and by the public as analogous to sculpture, to poetry, to painting, to music, and to acting." From this, by an easy leap, we come to "Demosthenes is a sculptor, Burke a painter;" and by another easy leap, to that terrible word "Plastic," that word of fear, displeasing to the critic's ear. "That character," says the Professor—(his singing robes are on him now, let no dog bark!)—"that character which, with special modifications, belongs to every artistic creation of the Greek mind, whether this be a statue, a temple, a poem, a speech, or an individual's (!) conception of his own place in life, is usually, and rightly, called the plastic." Is it unfair to ask in what respects the conception formed by Alcibiades of his own place in life was more "plastic" than the similar conceptions formed by the First Napoleon, for instance, or even by Dr. Kenealy? But here we must leave the Professor, in a quagmire, as it seems to us, haunted by "Gorgons and Chimæras dire," by the "sculpturesque" and the "plastic," and by the "fundamental conception of the antique" and by the "standard of the picturesque." We leave him, however, battling with a body of opponents whom he dubs "the ingenious." It is not often that a man is bowled over by giants of his own creating, but judging from the opening sentences put

into the mouths of "the ingenious"—"It is a mistake. It is pedantry and sentiment"—we should say that if "the ingenious" have fair-play, it is odds against the Professor.

For ourselves, we frankly say that we have no sympathy with a "big-mouthed Bœotian" who "draws out the thread of his verbosity finer than the staple of his argument." That Mr. Jebb does so, and in doing so errs in company with many a prose Rossetti, who "feeds on honey-dew and drinks the milk of,—" Germany, is as true as it is pitiful, and proves that proficiency in Greek, like proficiency in chess or mathematics, gives no presumption that the man who possesses it will be able to think clearly in *alienâ arte*. Mr. Jebb closes the last page of his preface—a page, by the way, which of itself would go far to justify much of what we have said—with these words: *Securus judicat orbis terrarum*. Whether this quotation comes from the Fathers, or the Schoolmen, or from Lord Bacon, we have clean forgotten—perhaps from none of them—but we seem to recollect that it struck the imagination of J. H. Newman. How he and the Professor would translate it is clear enough, and their translation would accurately express the meaning of its author; but it admits of another and more scholarly version, which we especially commend to Mr. Jebb's attention. We will give it in the Hamiltonian way:—*Orbis terrarum*, "the world," *judicat*, "passes its verdict" (on such matters as these), *securus*, "without caring a dram about them."

One word, in conclusion. We regret to see that so sound a scholar as Mr. Jebb has given in his adhesion to the silly and ignorant—for it does not deserve to be called pedantic—way of spelling Greek proper names, which was introduced by Grote, because having been educated in Germany, he knew no better, and has been followed by many writers since, because, as Goethe says, there are few voices in the world and many echoes. The Germans, of course, may spell these words as they like, though why they should write "Isaacs" instead of "Isaios" is inscrutable, but we have no such liberty. The Latin element in our language is bone of its bone and flesh of its flesh. Literary chauvinism may for a while uphold this stupid innovation, but the time will come when *Alcibiades* will be restored to us, when shameful execution will be done upon *Sokrates*, and when *Epiuros*, *Proklos*, and *Isaacs* will be packed off to play at Spelling-bees with the *Plataians* and the *Korkyraians*.

THE VARIATION OF ANIMALS AND PLANTS UNDER DOMESTICATION.*

[SECOND NOTICE.]

NEARLY a hundred pages are devoted to a minute examination of the evidence upon which Mr. Darwin's conclusion is based, that all our breeds of domestic pigeons are descended from the *columba livia*, or blue-rock pigeon. We think that every reader who is capable of weighing the value of evidence must come to the conclusion that here Mr. Darwin completely establishes his case; and if it be so, those who can look at the broader question without trepidation must inevitably admit that if anything so different in details of structure as can be found in the blue-rock and fan-tail or pouter pigeons, the further extension of his conclusions is but a matter of time and perseverance. The initial difficulty in the way of considering this in its broader aspects will be removed at once, if the reader will bear in mind, that time is the most essential element of change of every kind, and that the important changes seen in pigeons have been artificially and clumsily induced by man in a comparatively very short time; whilst for the modifications of structure induced by natural selection, following those induced by purely natural circumstances, there is an extension of time which we not only cannot measure, but positively can form no conception of.

This part of Mr. Darwin's book seems almost to form a complete handbook for pigeon-fanciers, and some of the facts he has detailed are not only important, but curious. Thus he tells us that the especial characters for which each breed is valued are eminently variable, as in the Fantail, where the number and direction of the tail-feathers, the carriage of the body, and the degree of trembling are all highly variable. It is, first of all, almost unintelligible why fanciers, who, of course, are wholly unscientific in their object of selection, should select trembling as a *point*. We are ignorant of the ways of pigeons, but have little doubt that this trembling is a sexual peculiarity; and as it is variable, there can be no limit to the power of its extension by artificial selection, so that a new pigeon-breed of "Shakers" might be produced. It

* *Animals and Plants under Domestication*. By Charles Darwin, F.R.S. London: Murray.

will, no doubt, be regarded as a very humiliating fact, by a certain class of modern philosophers of both sexes, that in pigeons a "high degree of merit is rarer in the female than in the male;" and that "if a cock and hen Tumbler were of equal merit, the hen would be worth double the value of the cock."

This is all the more remarkable, and will probably be found still more applicable to man than to pigeons, as "it is found that in domesticated pigeons certain sexual differences are found to be developed and to increase with age," whilst "there is no sensible difference at any age between the two sexes in the aboriginal rock-pigeon."

Mr. Darwin carries his minute observations over fowls, ducks, geese, peacocks, canaries, gold-fish, hive-bees, and silk-moths, and makes all contribute their share of information. Of canaries he records one most curious fact, the exact relation of which is yet far from clear. It is that if two top-knotted birds are matched, the young, instead of having very fine top-knots, are generally bald, or even have a wound on their heads. He suggests that it would appear as if the top-knot were due to some morbid condition which is increased to an injurious degree when two birds in this state are paired. Of course the word "morbid," like many of its kind, is purely relative, and may mean either excess or diminution of a process. We have very little knowledge of the conditions which govern growth, but we are certain that vascular supply is an essential, and that the regulation of the same by the vaso-motor system governs the various modifications of the process. Thus the spur of the cock in its normal position has a definitely regulated blood-supply, which might be, by accident, increased or diminished so as to induce disease of the spur. But if it be placed under circumstances where its blood-supply is independent of vaso-motor control, as in John Hunter's experiments of engrafting it into the comb of the cock, its growth may be unlimited. Dr. Stirling has recently shown that this may be the case in organs which are not dislocated, as when the sympathetic is divided in the neck of a rabbit; in course of time the ear increases very much in size, and the temperature is permanently exalted. In the case of the chicks of two top-knotted canaries, the baldness and wound may be really the result of an excess of blood-supply, just as the original top-knot must arise, and it would be extremely interesting to see what the interbreeding of birds so produced would lead to.

Mr. Darwin has studied canaries so closely, that he can tell us that they differ much in disposition and character, but that is a conclusion to which we think all who keep a number of animals of any one kind will come to. Even guinea-pigs, whose character is about the most insipid of all pets, vary considerably in disposition and tastes, and the degree of variation may be noticed to increase in proportion to the intelligence of the kind of animal observed. One of the most curious and at present one of the least explicable facts established by Mr. Darwin is the tendency of reversion to a wild state, or to very altered habits, by a mixture of race. Thus, if a hen belonging to a variety which does not incubate be crossed by another variety which has equally lost, by artificial selection, the tendency to brood, the product will be inclined to sit steadily on its eggs. A sow of the domesticated Chinese variety, crossed by an Alpine boar which had become remarkably tame, had young which were remarkably wild in confinement, and would not eat swill like common English pigs. Livingstone is quoted to the effect that "it is unaccountable why half-castes are so much more cruel than the Portuguese, but such undoubtedly is the case." And it was further remarked to the same missionary by a native that "God made white men, and God made black men, but the Devil made half-castes." No explanation of this is, in the present state of our knowledge, possible; but it gives an indisputable explanation of the impossibilities of keeping up mixed races, and it must also be offered as an explanation of the barbarities which we hear of as of frequent occurrence in such borderlands as at present extend across the whole continent of America, even under xanthochroic rule, and which we can only agree with our author in considering as reversion of types to a primitive state of savagery.

Equally incomprehensible, yet equally important and interesting, is the fact that in the case of certain crosses, one variety seems to have the tendency to perpetuate its peculiarities more than the other, and to this tendency Mr. Darwin gives the term of "prepotency in transmission." This has been seen to be remarkable in the case in certain breeds of cattle, as the short-horn, and in the special instances of brood-mares and greyhounds. In certain human races this is markedly the case. Thus the children of Frenchmen or Portuguese with East-Indian and Chinese mothers have, with the exception of the pigmentary development, the European characters preponderating strongly over the

Asiatic, and are usually beautiful; whilst the half-castes of Englishmen and Germans have a tendency to show the Eastern blood rather than the Western, and are generally hideously ugly. In individual families this is also often to be remarked, and in the case of musical genius it is seen in very striking instances. Thus, of our great musical composers, the majority will be found to have had fathers who were noted musicians, but we have failed to find one instance in which the gift seems to have been transmitted from the female line. The children of Jews and Saxons seldom exhibit the Hebrew features with any prominence, especially in childhood. Peculiarities of one sex are also apt to be continued in one sex, to the complete exclusion of the other, even when these peculiarities may be of a perfectly general character. This is well seen in the case of certain diseases, as in a case quoted from Dr. Sedgwick, in which four brothers suffered almost every week from severe head-aches, from which also their father, paternal uncles, paternal grandfather, and grand-uncles all suffer, yet all the female members of the family escaped. We also know of a case where all the women of a family suffer from nettle-rash if they eat strawberries, yet the males may eat them with impunity. That marvellous tendency to variation which every animal displays in every character forms the foundation upon which the great factor of selection is brought to bear, either by natural agencies or by the conventional selection of man. Mr. Darwin's writing on this subject may be said to be his best and most important, though it is really difficult in a book like this to speak more highly of any one part than of the whole.

Of artificial selection we need say no more here, but on the process of the evolution of new characters by natural selection, a word or two may be said on a certain want of definition in the use of a term for which we are indebted to Mr. Herbert Spencer, and which has now obtained a very extended use, so much so that Mr. Darwin uses it as an equivalent for "natural selection." The term in question, "survival of the fittest," is one which is far from expressing the whole of the steps of the process of natural selection, even as far as they are known to us; and instead of having a universal application, as it has now in the mind of most writers, it seems to us that it should have one of a more restricted kind. When we use the superlative term "fittest," we obviously mean a limited number out of a multitude; and when we speak of the "survival of the fittest," we infer the destruction of the majority by reason of their want of fitness. When, on the contrary, we say that certain animals survive "by reason of their fitness," we refer to the destruction of the few and the survival of the many; and it is self-evident that these two conditions are quite different steps of the one process of evolution. To explain this by example, let us suppose that a breed of sheep is introduced into a district cut up by ditches, and that to get their food it shall be necessary for the sheep to be able to jump over these ditches. Suppose that the majority of these sheep have limbs only fourteen inches long, but that a few have a length of fifteen, sixteen, or even seventeen inches, and that these only can jump the ditches. It is evident that the majority will perish by lack of fitness, and that the minority will survive by reason of their fitness. But if the ditches are all exactly equal, and the sheep with limbs fifteen inches long are able to cross them, those with a length of limb seventeen inches will have no advantage, so that it is clear that this would not be a case of *survival of the fittest*, but one of *survival by fitness*. So again, if the sheep remained under the same condition, every year all who had limbs under the necessary length would perish, and thus the minimum limb-length would be maintained. This part of the process secures permanency of structure which has been evolved, but it in no way introduces anything new. But, on the other hand, suppose that one or two ditches were widened, so that only the seventeen-inch-legged sheep could cross, they would have a manifest advantage over all, and would have an increased chance of survival, by being the fittest. This would induce a further change of structure, and is manifestly a wholly different step. "Survival of the fittest" is, therefore, the agency by which modifications are made useful, whilst "survival by fitness" is that by which they are rendered permanent. At first sight, the distinction may seem fine, but it is really of sufficient importance to be regarded as necessary.

ARNOLD'S "GOD AND THE BIBLE."*

THIS book is as full of wit—in every sense of the word—as an egg is of meat. Nothing can surpass the "very gracious fooling" with which Mr. Arnold banters Professor Clifford and his

* *God and the Bible: a Review of the Objections to "Literature and Dogma."* By Matthew Arnold. London: Smith, Elder, and Co. 1875.