LITERARY NOTICES.

DARWIN'S ANIMALS AND PLANTS.* When Charles Darwin, the naturalist, set out on his voyage of observation in her Majesty's ship *Beagle*, to traverse the Pacific, he found himself surrounded by new forms of birds, reptiles, and plants, existing nowhere else in the world,—yet nearly all stamped with an American character,—in mind was awakened to new and more extensive but broader than the Pacific Ocean itself; but in those days he could scarcely have dreamed of the region in which he has now ranging. Certainly, even in those days, he did not contemplate that book on *The Origin of Species*,† which made such a sensation in 1859; but it is equally clear that, even since he promulgated his startling doctrines, after manning to follow it up with facts in evidence, the facts themselves have grown upon his hands, and in like manner, the confirmation has accumulated in the origin of species, to that subject of pangenesis, to which most of our contemporaries, we observe, give the go-bye in their notices. Some critics have culminated the charge that Darwin is now ranging, attempting to investigate a problem, which in their estimation, would cast doubt upon the Sacred Text; and others, on the contrary, have pronounced it absurd in itself. The sneerers have not taken the pains to follow the inquirer in his very curious researches; and those who deprecate his studies on religious grounds have not considered that the true motive of their alarm, are scarcely loyal to their own faith, since it is impossible that two truths can be incompatible. Darwin's theory be confirmed, could, we are convinced, be made to stand more in harmony with the spirit of the received doctrine than hasty judges imagine; but we must not forget the service rendered to true science and truth by those who investigate probable suggestions, even when their labour results in pronouncing a negative on some attractive hypothesis. And we remember that in the case of Darwin, there is no question that our author's energetic and systematic survey of phenomena in the living creation, and more strongly still his variation, as it is termed, of domestic management, possesses considerable interest for many practical purposes, by throwing light on what we may call the natural laws in agriculture, or cattle breeding, horse breeding, and so forth. By this time, the public generally understand, in his main idea,—that the several species into which animals are like kind are considered to have originated in the altered conditions, to which the original type has been subjected. The race of various forms a very signal example. Whatever may be the origin of certain wild varieties, it is settled beyond question, that all the domestic forms, without exception, are descended from the Colomba livia. The pigeon has undergone remarkable plasticity of organisation, with the most extraordinary results ensuing from altered conditions of life. In certain creatures, disuse has reduced some parts of the body, as in the case of the duck, which not needing the wings required by the wild families, exhibit a very serious decline in the size, strength, and aptitude of that organ for flight. It is observed that, in the case of the hare, the reverse is the fact, another variety at the same time. Again, when several breeds have once been formed, it has been found by long-continued experiments that whatever that the make of the animal can be subjected to the great modification, even to the extent of producing new breeds. Mr. Darwin gives wood-cuts, pourtraying several specimens of what would be familiar to our breeders, all presenting the most extraordinary changes and contrasts, such as the English Carrier, with its very large lid and contracted tail, and the English Fantail, with its very minature beak and peacock-like appendage, or the African Owl, with its still smaller beak and staring eyes; or the Spanish Fowl, with its long legs and feathered feet, its compressed head and enormously distended breast, as another specimen of the same kind. It is remarkable that these several varieties of one breed,—for they are no more,—are as unlike the original Rock Pigeon, as they are unlike each other, and that there are many animals counted as distinct species of some one genus, such as the tiger, the panther, the lion, and other species of the genus *Felis*, present the most striking forms in colour, shape, and every characteristic, than these well-known deviations in the pigeon family. Exactly the same variations take place within the limits of the horse-family, which is known to have descended from well ascertained stock, and in this instance we have every obvious example of the manner in which altered conditions of life act upon the constitution, strength, and outward form.

Mr. D. Forbes, who has had excellent opportunities of comparison in the mines of Spain with those of South America, informs me that the horses of Peru, which have lived under nearly the same conditions as their progenitors of Andalusia, remain unaltered, whilst the Spanish horses and the Puna horses are materially modified. There can be no doubt that horses become greatly reduced in size and altered in appearance by living on mountains and islands; and differ materially in size and appearance, their native ponies; and there were, or still are, on some of the islands of the Grecian Archipelago, ponies like those of the Shetland Islands, which are known to have originated through exposure to unfavourable conditions. The Shetland ponies are the lofty region of the Cordillera, are, as I hear from Mr. D. Forbes, average little creatures, very unlike their Spanish progenitors. In Corsica and the Balearic Islands, the offspring of the horses imported in 1764 have been so much deteriorated in size and strength that they are mistaken for asses. The horse can withstand intense cold, for wild troops have been found in Siberia, and in 1817, and abortionally the horse must have inhabited countries formerly covered with snow, for its long retains the habit of stamping it away for the cattle reaching their food. The wild tarpans in the East have this habit; and, as I am informed by Admiral Sullivan, it was also observed with the wild horses which run on the Falkland Islands; now this is the more remarkable, and perish when the ground is long covered. To the southern parts of South America descended from those introduced by the Spanish conquerors, but they have also run wild, as have the native bisons, but not so the cattle introduced into Europe.

In regard to the changes which take place by what we may call the mingling of different families, the agencies may be divided into two classes. One class Darwin includes under the head of "natural selection," that process which has had so great influence in regard to fertility, capacity for habitation, and survival, which has developed the form of organisation best suited to the soil, climate, and circumstances of the country. This is seen, as in the case of the wild duck, power of flight affected by a wild life with the necessity of travelling over great distances in search of food, and which finds all his wants satisfied in the farm-yard, will make an effort even to fly across a pond. The other class of agencies is included in the art of breeders to continue the best breeds, and to the appearance of unexpected varieties to develop also new breeds. Thus, if we regard the shepherd dog, as approximated to the wolf, and the lap dog, as we may take the bull-dog and the greyhound, as presenting varieties accidentally but gradually produced, and to their present extremes, by the concurrence of favourable circumstances of climate, food, &c., with the sportsman's art. Perhaps no other animal would possess more popular interest in our own neighbourhood, than those on the sheep and sheep and their variation.

It is almost certain that abundant food given during many generations of shepherds, will, in the size of a breed, but climate directly affects the thickness of the coat, hair is likewise certain; thus Rozina asserts that the tides of Spain, a fertile part of the Tarpeia are as much less heavy than those of the cattle raised on the high plateaux of Bogota; and that their hides yield in weight and value only one-half of those of the latter, which have run wild on the lofty Paramos. The same difference has been observed in the hides of the cattle reared on the bleak Falkland Islands, and on the pampas. Low has remarked that the cattle bred in Scotland that the more humid parts of Britain have longer hair and thicker coats than other British cattle; that the hair and horns are so closely related to each other that they are apt to vary together; that climate has little influence on the latter, while the form and habit of the horns. When we compare highly improved breeds of cattle with the wilder breeds, or compare mountain and lowland breeds, we find that the former are fatter, leading to the free use of the limbs and muscles, the shape and proportions of the body. Youatt, in his valuable scholastic work, has done wonders within a recent period in modifying our cattle, sheep, and horses, during the process of methodical selection, it has occasionally happened that deviations from the more strongly pronounced than mere individual differences, yet by no means deserving to be called monstrosities, have been taken advantage of, and the famous long-horn bull, Shakespeare, though of the Teeswater breed, has scarcely inherited a single point of the long-horned breed, in his extraordinary horns. Mr. Fowler, this bull greatly improved his breed, but we have also reason to believe that selection, even so far unconsciously that there was no distinct intention to improve or change the breed, has in fact occasionally produced most of our valuable breeds by the process, aided by more abundant food, which in British breeds have increased greatly in size, and in early maturity since the reign of Henry VII. It must never be forgotten that many animals have been slaughtered, so that each owner must be thinking what shall be the next animal to be killed. In every district, as Youatt has remarked,

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

there is a prejudice in favour of the native breed, as that animal is considered the best adapted for man, to which are most valued in each district, will be oftenest preserved, and this unmethodical selection assuredly will in the long run affect the character of that whole breed. Therefore, looking to the origin of the many breeds of cattle which formerly inhabited the several districts of Britain, I conclude that, although slight differences in the nature of the climate, food, &c., as well as changed habits of life, aided by correlation of growth, and by the principle of reversion, have caused considerable deviations of structure, have all probably played their parts; yet that the occasional preservation of the best animals, and the destruction of animals which were most valued by each owner, has perhaps been even more effective in the production of the several British breeds.

It would be impossible within our space to take in that section of Mr. Darwin's work which surveys the vegetable world, and which is familiar alike to the field and the garden, with the recollection of the miracles effected by the farmer and the gardener, would show how large a material the philosopher has drawn from this region. It may be said broadly, that all the flowers of the garden have been created by art, and that they differ from their wild types far more than the most accurate species differ from each other in the natural Flora. Unquestionably Mr. Darwin has produced ample grounds for the investigation of his subject; the difficulty lying, from the very mass of the facts adduced, in the fact that he cannot actually trace his varied genealogy of plants or animals to the beginning, nor follow their progress to the end, and that only permanent species like those which are supposed to exist among wild creatures in their natural state. He might say that the time embraced by the period under which we have any record of the varieties is too short also to refute his theory; and while we may admit that there are defects in the completeness of his evidence, we must also admit that it is at least one which has escaped general attention. And while a frank and industrious study will probably earn a knowledge of the truth, it is quiet certain that the inquiry will throw a flood of light on all the practical arts of cultivation. Mr. Darwin does not finally leave even the section of the subject embodied in the two volumes without endeavouring to trace out the laws which regulate the working of natural selection. If species can be modified why not genera? if genera, why not the higher groups of plants and animals? I think it is at what is the principle at work which modifies the aspects of life, which originates genera, classes, and even kingdoms, in the vegetable and animal. Mr. Darwin is not appalled by the stupendous nature of the question, but he approaches it with equal boldness and modesty. He advances towards it under the cover of what he calls "hypothesis," and of the inductive sciences, who says, "hypothesis may often be of service to science, when they involve a certain portion of incompleteness and even of error;" and it is then sometimes highly useful to the inquirer to submit "the provisional hypothesis of pangenesis, which implies that the whole organisation, in the course of every atom, each reproduces itself. The seed of the egg "includes and consists of a multitude of germs thrown off from each atom of the organism." In chapter XXVII. of the second volume, Mr. Darwin has given a brief abstract of his writer shows that the variations in the character of the species vary in proportion to the complexity of the organism. In some of the lowest plants, every cell divides after the procedure of reproducing itself. In some of the lower animals, such as a mass or fresh water worm, every piece will become a perfect animal, and in many vegetables, every bud will form as many as forty separate segments. As we advance higher in the animal or vegetable kingdom, not only do the variations in the several stages of existence become more and more distinct, but the parts are liable to many more accidental modifications. There are remarkable cases of animals which are produced in a manner extraordinarily different from that resembles the budding of plants; a circumstance, along with many other phenomena, which the writer adduces to show that the development of life originally, is more under the influence of chance than we generally imagine, and more alike in all departments of the living creation. In this view, therefore, the whole organism is to be varied by process, which has been called by Professor Owen metagenesis, "the new parts are not moulded upon the inner surface of the old ones. The plastic force has changed its mode of operation. The outer case and all that pave form and character to the precedent individual perish and are cut off; they are not developed into the parts of the new one, but a new individual. These are due to a new and distinct developmental process."

"Metamorphosis, however, graduates so insensibly into metagenesis that the two processes cannot be distinctly separated. For instance, in the last change that chrysalis undergo, the alternate segments that which Cirripedes undergo, the alternate segments of the outer case are formed upon pre-existing parts; but the eyes of the old and the young animal are developed from the same points. The wings and the tips of the mature limbs are formed within the larval limbs, and may be said to be metamorphosed from them; but the internal organs are entirely new and are developed in a place actually at right angles to the limbs and thorax of the larva; and this may be called metagenesis. But in this latter case, as in the first, the extreme degree in the development of some Echinodermas, for the animal in the second stage of development is free, and the latter being then cast off like an old vestment, yet sometimes still maintaining for a short period an independent existence.

After the living organism has become thus formed, it may be again modified in every direction,—enlarged, stunted, partially contracted in some of its details, or even reduced to a mere germ, as in many instances in the dwarfed maize of hot countries cultivated in Germany, the altered fleece of sheep within the Arctic circle, and the wool of the developed walking power of the tame duck. It is almost universally admitted that the cells or units of the body propagate themselves by self division or multiplication, and that the tissues and organs of the body become converted into the various tissues and substances of the body. But besides this means of increase, Mr. Darwin supposes that before their conversion into completely passive or formed material, throw off minute granules or atoms, which circulate freely throughout the system and when supplied with proper nourishment, multiply by self division, subsequently becoming developed into cells like those from which they were derived." This is the process that gives every new form of life; and in the view of the writer, "a germ or reproductive must be looked upon as a microcosm—a little universe formed of a host of self-propagating organisms, innumerably small, which have been thrown off from all parts of the organism, and which in their development in heaven." The theory is at least a bold one, and inspired by a vivid imagination. It is remarkable that just at this time, when physicists are reviving the doctrine as to the existence of "ether" and of "inert matter" and "atoms," Mr. Darwin should be thus bringing forth a scientific prose poem, which imagines that the whole of the living creation is but neither more nor less than so many living creatures, as numerous in each individual microcosm, as all the constellations in the firmament. Assuredly, the publication of such a work is a great boon, while we find ourselves totally unable to follow these wild sublime flights, we cannot deny that there is much in the theory of pangenesis to be explored by his keen and systematic observation, which merit the most careful study, with every prospect of adding fresh truths to the accumulated stores of science.

The Gentleman's Magazine, famous as the world over, has entered on a new career. On the first of June it will appear in a new cover, under the editorship of Mr. Joseph Hatton, formerly connected with this journal, and with the *Morning Star*, and known as heretofore. John Leighton is designing the wrapper, which will, we hear, fully indicate the character of the new series. In the first issue of *The Gentleman's Magazine* will aim at supplying the wants and desires of the present day. It will be a manly healthy work, treating of subjects in which gentlemen are interested; dealing with our sports and pastimes from a high standard; discussing smartly of the arts, music, the drama, society; and will in these as always a running story by some recognised writer of position. In addition, there will retain a pet corner in its old serial; and we augur for Mr. Hatton's venture a most extended venture a marked and certain success.

THE LAMBING SEASON.—The cooling and purifying properties of the "Red Drench" prepared by Messrs. Elliman, Sons, and Co., of London, render it of unspeakable value in all inflammatory affections incident to cows after calving and in ewes after lambing. Nature is gifted with the power of curing and easy aperient influence of the "Red Drench"; and many easy aperient brings about a healthy action of the system, while the "Cascara Sagrada" acts in safe and gentle manner as a permanent tonic and invigorator. Sheep will retain a pet owner in his old serial; and we augur for Messrs. Elliman's venture a most extended venture a marked and certain success.

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BREAKFAST.—EPPS'S COCOA.—The very agreeable character of this preparation has rendered it a general favourite. Invigorating and sustaining, with a refined and grateful flavour developed by the special mode of preparation applied, this Cocoa is used as their habitual beverage for breakfast by thousands who never before used Cocoa or Chocolate, and is much higher than Coffee or Tea at a fraction of the cost. Sold only in packets, labelled—"James Epps and Co., Homœopathic Chemists, London." Also makers of Epps's Homœopathic Cocoa.