An essay on the beneficent distribution of the sense of pain / by G.A. Rowell.

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ON

THE BENEFICENT DISTRIBUTION

OF THE

SENSE OF PAIN,

BY

G. A. ROWELL,

HONORARY MEMBER OF THE ASHMOLEAN SOCIETY,

AND ASSISTANT UNDERKEEPER OF THE ASHMOLEAN MUSEUM.

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M.DCCC.LVII.

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ON THE SENSE OF PAIN.

In 1847 I submitted a paper to the Ashmolean Society, "On the Beneficent Distribution of the Sense of Pain." I did so with some hesitation, and had, at that time, no idea of giving further publicity to it; but from its favourable reception, and the interest it seemed to excite, I was induced to send a copy to the late Professor Jameson, who published it in the "Edinburgh New Philosophical Journal," Oct. 1847; from whence it was copied into the American Journal of Science and Art, and some other works. A favourable opinion was expressed on it by many persons well qualified to judge on the subject, amongst whom was the late Dr. J. Kidd, the then Professor of Anatomy, and author of a Bridgewater Treatise. The only expression of opinion in deprecation of my views, of which I am aware, was an article in "Chambers' Journal," entitled, "Do animals feel pain?"

There are many points of interest connected with an inquiry into the use and distribution of the Sense of Pain; it is therefore surprising that so little has been written on the subject. I did hope my former paper might have stimulated some one to take up the question, who was well qualified to discuss it in all its bearings, but I am not aware of any publication of such a character: the few articles on Pain, which now and then appear in the Zoologist, the Naturalist, &c., seem to be written as an excuse for the entomologist and angler, rather than in reference to its importance to man and other creatures.

Under these circumstances, I again venture to bring the subject forward, although I know I am wanting in the

necessary qualifications for doing so. I have no knowledge of anatomy wherewith to support my opinions; I can refer to no experiments in illustration of my views: all I can advance is simply the result of observations on such cases, bearing on the subject, as have from time to time come under my notice, and an earnest consideration of the question which has more or less occupied my mind for many years.

I have endeavoured to make my remarks as concise as possible, but have introduced many points connected with the question, to which I could not even allude in my former paper, which was of necessity very brief.

The conversations I have had with many persons on the subject have given me a fair knowledge of prevailing opinions with regard to the sense of pain. Many justly consider pain to be a protective sense; but I believe very few fully appreciate its importance, either as regards the physical or social condition of mankind, or the evidence of its beneficent distribution throughout the animal creation; while by far the greater number have no opinion on the subject, or consider pain only as an infliction on the animal creation.

In the following pages I hope to shew, that the sense of pain is not an infliction, but one of the most useful and important senses we possess. That it is given to animals only in as great a degree as is necessary, and that no creature has a higher sense of pain than is required for the preservation of the class to which it belongs. I shall not attempt to shew how it is that animals differ in their sense of pain; whether it be that the nerves are more or less numerous, or different in their sensibility; or if a want of reflecting faculties, in some classes, render them more insensible to pain than other creatures: the only cause I can assign is, that it is the will of the Creator, and is evidence of merciful and benevolent design.

A slight investigation of the distribution of the sense of pain in man, shews how important it is for his protection. Man is liable, from many causes, to injuries, from which other animals are exempt; he alone has a knowledge of,

and uses fire, edge-tools, destructive chemicals, &c.; he has no natural covering, either for defence, or for protection from the weather; and from his higher organization, injuries would be much more severe in their effects on him than on any of the lower animals; he therefore requires some protection more than other creatures have, and this is given him in his possessing the sense of pain in a higher degree.

The human skin, although apparently a simple membrane, is in reality laminated, consisting of several subdivisions; but as far as regards the subject in question, it may be considered as composed of two. The outer or scarf skin is a sort of horny substance, and insensible; it is this portion of the skin which becomes thickened on the hands of labouring men, rendering them so hard; but the inner or true skin is chiefly composed of minute blood-vessels and nerves, and is so highly sensitive, that the starting or shrinking from any sudden injury is as it were instinctive, and independent of the mind. The body is thus enveloped in a membrane susceptible of the slightest injury, while the greater portion of the internal parts of the body, although the most important, being thus enveloped and guarded, are in a great degree insensible to pain.

The muscles of the body are almost insensible; and it is known that the chief pain in most surgical operations, both human and veterinary, is in the first division of the skin. A gentleman, whose leg was amputated, and who I know underwent the operation with more than usual fortitude and nerve, informed me, that he felt more pain from the cutting of the skin, than from the division of all the muscles of the calf of the leg: and when we bear in mind the mass of the muscles to be divided in such an operation, compared with that of the skin, it is a subject for doubt whether any person could bear up against the intense pain of it, if the muscles were as susceptible of pain as the skin surrounding them. It is a popular opinion, that the pain in such operations is most severe in cutting the bone, and especially so from dividing the marrow; but both bone and marrow are alike insensible to pain, or nearly so.

The tendons are also insensible, and may be divided with little or no pain. But although the bones and tendons are so insensible, there is a high degree of sensibility about the joints: sprains or dislocations are exceedingly painful, and it is well they are so; a broken bone cannot be used, and the necessary rest must be afforded it; but a sprained joint may, and worse consequences follow, if the care necessary for the restoration of the injured part is not enforced by the pain of using it.

The exterior of the eye, or rather the inner side of the eyelid, is extremely sensitive, and the eyelid closes almost instinctively to prevent injury to that organ; but the back of the eye, being less exposed to danger, is almost insensible to pain; so also is the interior, as in cases where the eye-ball has been pierced, the whole of its fluids have been discharged with little or no pain.

The sense of pain in the mouth guards the throat; in the stomach it affords a warning against improper food; and, in fact, every part of the body is susceptible of pain, wherever that sense is necessary to indicate disease or injury; but the heart, the brain, and the lungs, although the most vital organs, are protected from injury by the sensibility of the exterior parts of the body; a high sense of pain in them is unnecessary, and they are almost insensible to it.

The heart beats upwards of four thousand times in an hour; and if the pain from a diseased heart were very acute, it would indeed be sad for the sufferer; but the pain from a disease of that organ is seldom more than an uneasy sensation, and this more especially after violent exertion, being a check to unnecessary action, and so far useful. Sudden death often occurs from disease of the heart; not from the heart being suddenly diseased, but from the disease causing very little pain, and being therefore unknown.

The brain, although the source of sensation, is itself insensible to pain; in surgical operations portions of the brain have been removed without the patient exhibiting any sign of pain.

The lungs are highly susceptible of impurities in the air;

and thus we are guarded against the inhalation of injurious gases: their sensibility during inflammation indicates the danger and compels the necessary care; but they are almost insensible to pain from mutilation or decay; in such cases the sense would be useless, and an infliction. The lungs have been cut without causing pain, and during their decay in consumption the pain is very little.

It is not only the organs which differ in their susceptibility to pain, but a similar difference may be observed in the various parts of the exterior of the body. The thumb and fingers are very liable to injury, and those parts are highly susceptible, as in them a slight cut, or prick from a pin, will cause much pain; whereas I have seen both men and boys *amuse themselves* by driving pins up to the head into the calf of their legs, and exhibiting no sign of pain from so doing. A high degree of sensibility in those muscles is unnecessary, as they are protected by their position; but it is very different with the front of the legs, as the shins are very susceptible of pain, and one scrape of them against the edge of a bucket will give a lesson for life, on the importance of walking with the eyes open. It is not in cases of severe injury we find the greatest benefit from the sense of pain; at such times pain may be useful in as far as it compels attention to the injured part; but it is in our every day occupation that the sense is so necessary as a warning against injury. A few homely cases will best serve to illustrate the subject. The value of the sense of pain was forcibly brought to my mind a short time since. I had a plumber at work in a cellar lit only by the candle he was using; in going to look on I struck my foot against something on the ground, and picking it up, I found it to be a piece of iron burning hot, and immediately dropped it. My fingers were burnt, and the pain was rather severe for a few days; but if my hand had been devoid of the sense of pain, I should probably have held the iron till the muscles of the fingers had been destroyed, and thus have lost the use of them for life. I was once present when a young man sat down on some needlework, when he was sharply reminded of his want of cau-

tion, and bounced from the chair with a spring which would have done credit to a clown in a pantomime: I have no doubt the pain he felt was acute for a short time; but if the sense of pain had not intimated the hidden mischief, the needle might have penetrated to the joint, and caused lameness for life; or it might have injured a nerve, and paralyzed the limb; or, by piercing an artery, have caused a more serious injury.

Similar cases almost without end could be advanced if necessary; but I think every one, on reflection, must see how much our well-being depends on this possession of the sense of pain: but for this sense, we should be in continual danger of burning or scalding the mouth or throat; we might have lime blown into our eyes, and thus lose our sight, if not warned by the pain; we should have no knowledge of our internal ailments, and therefore be unable to apply remedies, or avoid the causes producing them. In fact, there would be no end to our dangers, if not possessed of this useful monitor, which is *a guard against injury*, and *a check to excesses*. There may be pain and suffering, the use of which it may be difficult to see; but I would rather attribute this to a want of knowledge, than believe that the rule which holds good in so many cases does not hold good in all.

It is not only with respect to man as an individual that the sense of pain is beneficial; it is especially so also as regards his moral and social condition: but I am quite incompetent to do justice to this part of the subject, and therefore leave it for the reader to imagine, what would be the condition of society if there were no sense of pain to curb and restrain the excesses and passions of mankind.

The sense of pain is also of great importance as regards the distribution of mankind over the globe: most creatures are adapted for certain localities, and clothed by nature accordingly, (or are possessed of the means for rapid migration); but man has no such clothing; and it is the sense of pain, which enables him to adapt himself to any climate; as it tells him when it is necessary to shelter himself from tropical heats, or protect himself from the cold of a frigid

region. No instrument invented by man would suffice for the purpose; the thermometer would be comparatively useless. How often we find the weather piercingly cold, with a temperature above freezing; and at other times, with several degrees of frost, the weather may not feel unpleasantly cold. It has been remarked by some polar voyagers, that at times, with the thermometer about zero, it has been so cold, that the least exposure to the open atmosphere was dangerous; and at other times, with the thermometer 20 or 30 degrees lower, they could walk out with little or no inconvenience. As it is, frost-bites are not uncommon during winter in high latitudes; and how much oftener would this be the case with the inhabitants of such climates, if the painful sensations from cold did not compel the necessary attention to warmth at such seasons.

The painful sensation produced by extreme cold gives evidence of Divine mercy: if it compels man to take shelter, or to increased activity, so as to obtain the necessary degree of warmth, it is well; but if not, pain ceases when it becomes useless, and drowsiness, insensibility, and a painless death, are the natural consequences.

Many other points could be advanced on the benefit we derive from the sense of pain, but I believe quite enough has been given to show that it is one of the most necessary and useful senses we possess; this seems so obvious to me, that I should not have dwelt so long on this part of the subject, but that I considered it necessary for the elucidation of the question as to the use and distribution of the sense of pain amongst the lower classes of animals[a].

[a] In using the term "sense of pain," I wish to be understood as speaking of a sense apart from that of touch or feeling: I know it is usual to class them as one and the same, but I believe there are grounds for considering them as separate and distinct senses. It is true that the principal organs of touch, i. e. the fingers and tongue, are highly susceptible of pain, but there are other parts of the body which are equally so, which have not the sense of touch. Any thing blown into the eye causes great pain, but I believe no one could distinguish the form of the offending object from the sense of feeling in that part. The stomach and bowels are also susceptible of pain,

With respect to the degree in which the lower animals are susceptible of pain, there are various opinions. One is, that as the general organization of mammalians is so similar to that of man, they must feel pain as acutely as ourselves; but that cold-blooded creatures, such as fishes, reptiles, insects, &c. may be less susceptible. Another opinion is, that the higher the organization of an animal, the higher is its sense of pain, and thus its susceptibility is in accordance with its higher or lower degree of organization.

These opinions, although in the main they may be correct, are far from giving a fair view of the question; they represent the sense of pain as a sort of penalty on organization, and a constant accompaniment of animal life. I hope to show cause for believing, that the sense of pain is given to animals, *let their degree of organization be what it may*—only as far as is necessary and useful to guard them from injury, or to compel them to the functions they have to perform; and that many of the lower animals do not possess the sense of pain, as to them it would not only be useless, but an infliction. In fine, my object is to show, that the distribution of the sense of pain, and the great law of nature, "Eat, and be eaten," by which animals of one class live on those of another, are both conducive to the general well-being and happiness of all classes of the animal creation, and afford the strongest evidence of the mercy and benevolence of the Creator.

As the amount of pain of which the lower animals are susceptible is a question which does not admit of absolute proof, it is necessary to view the subject under various aspects to arrive at a fair and probable conclusion; and it may be well, in the first place, to consider the degree in which other senses, such as seeing, hearing, and smelling, are distributed throughout the animal creation.

It is not the highest organized beings that have the sense of sight in the highest degree; birds in general far

but not of touch. On these grounds I believe the sense of pain and the sense of touch may exist independently; and that an animal may have the one sense without of necessity being possessed of the other. The remarks on actiniæ, page 31, bear on this subject.

surpass man in this respect; and this is necessary for them, as flying high in the air they have a more extensive field of view; many of them living on carrion have to distinguish their food at great distances: eagles, hawks, &c. depend on sight to catch their prey; and many of the smaller birds live on very minute and active insects. The capability of seeing to great distances is also necessary for birds in their migrations. But if man cannot see so far as eagles or hawks by day, he can see better than most of those birds by night, and thus has the sense of sight as is best suited to his wants.

As we descend in the scale of animated beings, we find a like adaptation of the sense of sight to the wants of all creatures. The mole has very small eyes, well suited to its subterranean habits; but the blind rat (mus typhlus) *has no eyes;* this animal is a mammalian, as large as the common mole, and therefore stands high in the scale of organized beings; yet as its habits are strictly subterranean, it requires no eyes, and has none, while thousands of creatures, of far inferior organization, have the sense of sight in great perfection; and flies, &c., after their last transformation, although their lives may not in general extend over more than a few hours, have eyes of most wonderful construction.

The above facts show that a higher or lower organization is no rule with regard to the distribution of the sense of sight, but that all classes of animals have it in as great a degree as is necessary for them; and it may be fairly advanced, as an *a priori* argument, that, as in the case of the blind rat, we see a sense withheld where useless, it may be presumed that the sense of pain would be withheld where unnecessary, as it would not only be useless, but an infliction.

The analogy between the sense of sight and the sense of pain holds good still further; for as we see in man that the sense of pain is given to those parts of the body where necessary, so also the organs of sight in all animals are placed in the positions best adapted for their well-being. Thus rabbits, hares, and herbaceous quadrupeds, liable to the attack

of other creatures, have very prominent eyes placed on the side of the head, so as to enable them to see objects behind them as distinctly, or nearly so, as in front; but most beasts of prey have their eyes in front of the head, so as to enable them to follow their prey with greater certainty. Amongst birds also we find the like provision; eagles, hawks, &c. having their eyes in front, and birds liable to attack having them on the side of the head. The woodcock affords an apt illustration on the subject; it feeds in the dusk of morning and evening, inserting its long bill in the ground in search of worms, &c., depending chiefly on the sense of touch and smell for its food; when thus occupied it would be quite at the mercy of its enemies if its eyes were placed in front of its head, and near the bill; but they are placed near the back of the head, are very prominent, and thus afford the bird all the security the sense of sight can give.

It is difficult to ascertain in what degree any animal is possessed of the sense of hearing, but the position of the ears in various animals shows the like evidence of beneficent design. In the skull of the rabbit, hare, and such like quadrupeds, we find the auricular tube large, and directed upward and backward; so that when the animal is in its ordinary position, its ears are inclined in the direction best adapted to prevent surprise, and when feeding, they are upright, so as to catch a sound from any direction. But in the polecat, weasel, and such animals as have to follow their prey through holes in the ground, the ears are directed toward the front; and in the owl, which depends in a great degree on the sense of hearing for its prey, the ears are directed downward and forward, so as to enable the bird in its flight to hear sound from below.

The sense of smell is in many respects analogous to the sense of pain; nature in both cases using offensive means to produce beneficent effects; pain as a protection to the body; offensive smells to compel cleanliness, or the avoidance of injurious gases, food, &c.

Man is far from having the sense of smell in as high a degree as many of the lower animals, and it is well that it is so; an extremely acute sense of smell would be of but

little use to him, and often an infliction; but it is necessary to the dog and creatures who hunt by scent, and they have it in accordance with their wants. Many creatures, very low in the scale of the animal creation, have this sense in a very high degree. In "Insect Miscellanies[b]," the writer says, "We once observed a pair of burying beetles (necro-"phorus sepultor, De Jean) in Copenhagen fields flying at "the height of about twenty feet from the ground; when "they suddenly descended, and crept under the body of a "dead frog, hid amongst the grass, though this was so "dried up with the extreme heat of the weather that we "could perceive little or no smell, even when close to the "place, and it was forenoon, when the sun was bright and "powerful, a time when scents are much less diffusable "than in the cool of a dewy evening. Few circumstances, "we think, could more strikingly illustrate the acuteness "of smell in these useful insects."

The common flesh-fly is attracted to dead animal matter long before any effluvia can arise from it sufficient to attract the attention of man. Some naturalists have expressed the opinion, that the senses of insects are not strictly analogous to our own, but I believe they have a similar sense of smell. I have seen, in the hot-house in the Botanical Garden, a flower of the stapelia grandiflora completely speckled with the eggs of the flesh-fly; this flower has the smell of putrid flesh, and it must have been the smell of the flower which had deceived the fly, and caused it to deposit its eggs on it. Prawns, shrimps, and such like creatures, being nature's scavengers in the sea as the flies are on land, have the sense of smell in a similar high degree.

These facts show that the sense of smell in animals, like the sense of sight, is not in accordance with their higher or lower organization, but is given to all creatures in the degree which is best adapted to their necessities, be their station in the scale of organized beings what it may; and affords some ground for assuming that the sense of pain is distributed in like manner.

[b] Library of Entertaining Knowledge, published by C. Knight.

It may be remarked, that smells which are disgusting and repulsive to some animals, may be attractive to other classes; the analogy still holds good, as very painful effects may be produced on some creatures by causes which seem to have little or no effect on those of another kind[c].

The situation of the organs of smell in animals is that which is most useful to them; and the habits of many creatures, which are generally attributed to instinct, may perhaps be the effects of smell. The mouth of a cow, when grazing, is preceded by her nose; and the general rejection of injurious plants is probably from some odour arising from them, which is unpleasant to the animal; for it is not only in the distribution of the sense of smell, and the position of the organs that we find evidence of beneficent design, as it is equally shown by the odour bestowed on various kinds of matter. The offensive smell of coal-gas is extremely useful as a detective of its presence; but as this is an artificial production, it may not be fairly applicable to the question. I believe the degree in which the excrements of various animals is offensive, will afford the best illustration. I shall make no apology for alluding to such a subject; and I think any objection to its consideration must be fastidious, as nothing created can be unworthy of the consideration of man, and it is in some of the meaner operations of nature we find the most striking evidence of a beneficent Providence.

It is a very general opinion, that the difference in the degree in which the excrements of various animals is offensive, is owing to the different sorts of food the animals live on; and that the smell from the excrements of carnivorous animals is repulsive, but from those of herbivorous creatures it is not so, or in a less degree. According to this opinion, offensive effluvia are simply the result of the decomposition of certain substances; but this gives a very poor and insufficient explanation, making the subject in question a mere matter of chance, and overlooking the evidence of merciful design which the case affords. I believe that nothing is offensive to smell except for some beneficent purpose; and that the smell from the excrements of animals is

[c] The badger and wasp, page 23; the earth-worm, &c., page 36.

more or less repulsive, according to their natural habits, to compel them to that degree of cleanliness which is necessary for their well being. Rabbits in a state of nature burrow in the ground; their excrements are offensive, and they go to some distance from their holes to void them; their burrows are very free from dung, and when they have young, the nest and hole is particularly clean. Hares are similar to rabbits in habit, except that they do not burrow; there is therefore less necessity for offensive smells to compel them to cleanliness, and they have but little or none. The dung of horses, cows, sheep, and the like, is not offensive, although they live, like the rabbit, on herbage; with them no such compulsion to cleanliness is necessary, as in a state of nature they rove here and there, and their young can follow them as soon as born. The like remark may be made with respect to pigs; they are not naturally offensive, but rendered so from being kept in a state quite contrary to their habits when wild; the stinking condition of pigsties being caused by the unnatural accumulation of dung, and its consequent decomposition; and stinking under such circumstances cannot be otherwise than beneficial, as compulsory to some degree of cleanliness. That animals of this class may be kept free from unpleasant smells, is shewn by the condition of those of the hog kind in the Regent's Park Zoological Gardens; and, as a general rule, it will be found that the excrements are inoffensive, or nearly so, of those animals who have no fixed habitation, and whose young have the power of locomotion from their birth.

The fox, dog, cat, and such like creatures, whose nature it is to live in holes, and whose young are produced in a very helpless condition, have excrements of a most offensive odour. It is true they are carnivorous, but so are eagles, hawks, vultures, and such birds, and their dung is not offensive to smell, or but very slightly so; and as they roost in trees, or fly here and there, any unpleasant smell from their excrements would only be offensive to other creatures, and of no benefit to themselves. As a proof of the inoffensive nature of the excrements of birds of this kind, I may state that a large sea-eagle was kept till lately

in the Fellows' Garden at Worcester College, and although it was chained to nearly one spot for some years, it was but slightly offensive; whereas had a dog or cat been kept under like circumstances for so long a time, the stench would have been intolerable.

The difference in the degree of offensiveness of the excrements of the seal and otter, affords an apt illustration in support of my views. Both creatures live alike on fish, but they differ considerably in other respects; the otter frequenting some cave or hole, bringing forth its young in a blind and very helpless condition, and its excrements are highly offensive; but the seal merely frequents the seashore, and its young, when born, is able to go at once with its dam into the water, where they chiefly reside: there is therefore, in this case, no necessity for an offensive odour to compel cleanliness, and from all I can learn the excrement of the seal has none.

Much more might be advanced on this part of the subject, but I believe enough has been stated to shew, that offensive effluvia are not a mere matter of chance, but given only where necessary, and for beneficent purposes; and if in matters like these, such as man would almost consider beneath his notice, we see the well-being of animals has been so fully provided for, it is fair to assume, that the like provision for their comfort and happiness has been made with respect to the sense of pain, and that this sense also is only given where necessary and useful.

The provision for the cleanliness of some animals when in a young and helpless condition is singular; and although a consideration of them may not be necessary with respect to the subject in question, a statement of a few of them may afford grounds for reflection.

It has been shewn, that the excrements of animals, which have the power of locomotion from their birth, are not offensive, and the same seems to be the case with respect to some others up to a certain stage; as with dogs, foxes, cats, and the like, the excrements are eaten by the mother, so long as the young are in a helpless state; but nothing would prevent their becoming offensive as soon as the ani-

mal has the power to run about. The dung of young birds, which can run as soon as hatched, is like that of the old ones; the young of birds, whose nests are suspended, have the instinct to discharge their excrements over the side of the nest, and this without reference to feeding, or any other time: this habit may be seen with rooks, the house-martin, &c., and in the latter case the young bird instinctively turns to the mouth of the nest for the purpose; but where birds build in holes, the young one only mutes immediately after being fed, its dung being enveloped in a pellicle, similar to the white of an egg, by which the old bird takes it away: starlings may be seen doing so, dropping it after carrying it some fifty or eighty yards from the nest. The chimney-swallow and sand-martin may be seen to do the like.

The entrance to the nest of the kingfisher is said to be very filthy; this habit, so different from that of other birds, may be a provision for the protection of its young from the depredations of rats, &c., its nest being generally made in a hole in the bank of a river. But in this case the nest is clean, and the old birds, from their aquatic habits, would soon be free from any filth which may attach to them in going to or from it; and although the smell may be offensive to other creatures, it may not be so to them or their young.

The animal creation affords another proof that nature enforces beneficent effects by unpleasant means. The common bug is extremely offensive; yet if we think on the thousands of bedsteads which would never be taken down or cleaned but from the existence of bugs, and the heaps of rubbish which would accumulate in closets and elsewhere but from the dread of them—it seems probable that the fact that there are bugs, contributes more to the health of the inhabitants of large cities and crowded districts, than all the sanatory measures ever promoted by parliament.

Fleas are troublesome things, but when we see the exertions a dog will make to get at some parts of its body when teazed by these creatures, and the thorough scratching and biting he gives himself in routing them out, it is obvious

that fleas promote the cleanliness and consequently the health of the animal they live on; as it is a fact, that when a dog becomes too old or too fat and lazy to scratch himself, the middle of the back and parts most difficult to get at are the parts which first become offensive and diseased.

Lice are held in general disgust, but afford an interesting field for reflection. Mr. Denny, in his *Monographia Anoplurorum Britanniæ, or Essay on the British Species of Parasitic Insects,* gives the figures of upwards of 200 species; and from their variety in colour and form they would make a very interesting collection of pets for microscopic observation, if it were possible to keep them alive, and separate the idea of filthiness from the existence of lice.

Almost every species of bird and beast has its own peculiar parasite, and there can be no doubt that they are designed by nature for some useful purpose. Even to human beings they are useful. The dread of lice leads to personal cleanliness, and especially in this respect to the care of children; to those who are cleanly they are unnecessary, but to those of dirty habits they are a benefit. To put a strong case in point, let us consider the condition of a child—and unfortunately there are many in such a condition—whose parents are quite careless on such matters; its hair might not be rough and tangled only, but almost a hard mass from filth, were it not that these little stimulants compelled the child to scratch itself, and thus in some degree get rid of the dirt with which it may be coated. This is not an over-drawn case, and if we fill up the picture with that of a dog getting rid of its fleas, a bird preening its feathers, a horse scrubbing itself against a tree, or a whale at its toilet, scraping itself clean against the edge of a rock or iceberg; the whole tends to the same point, and shews that these parasites are not inflictions, but necessary and useful to the creatures they infest.

Many persons think that all animals have parasites of some sort or other, and the opinion has been humourously expressed, that

> Great fleas have little fleas upon their backs to bite 'em,
> And little fleas have lesser fleas, and so ad infinitum.

I believe there are no grounds for such an opinion, and that parasites (except in extreme cases) are only inflicted where necessary, and for the well-being of the animal creation.

Many animals are injurious to man; this, in some cases, is probably owing to his having disturbed their natural distribution, by introducing animals foreign to the place: in such cases, the natural habits and uses of such creatures cannot very well be known. The common rat was first observed in England about 100 years ago; the cockroach (Blatta Orientalis) is, as its name implies, of foreign origin, and this may be the case with many other creatures, which are now looked upon as the natural productions of the country.

Some creatures may seem to be injurious from our looking on them only as regards ourselves, and not with respect to their uses in the general system of nature. The white ant, the woodworm, the teredo, clothes-moths, &c. are only injurious in carrying out the necessary law of nature, that all organic matter shall be destroyed and reduced to its original elements; and the importance of this law is obvious, if we consider what must have been the consequence, if any animal or vegetable production had gone on increasing from the creation, and remained indestructible.

Wasps are generally condemned as useless and mischievous; but during the late summer I had two wasps' nests in glass cases, in the Ashmolean Museum, which gave me a good opportunity for observing their habits; and from the number of flies, caterpillars, &c. which they brought in for food, I am convinced that their office is important, if it is only to act as a check to a superabundance of such creatures, and thus assist in keeping the balance in the animal creation; for bearing in mind the various creatures which inhabit the earth, the destructive habits of some, and the enormous fecundity of others, it is difficult to conceive how the balance has been preserved, so that none preponderate in an overwhelming degree, and the various species continue to exist.

Leaving out of the question those extinct creatures, whose

fossil remains show that they belonged to a former system of creation, it is true, we have proofs that some species of animals have ceased to exist since the creation of man; but there are grounds for assuming that their destruction has been owing to the agency of man rather than to natural causes. The dodo lived and flourished in the Isle of Mauritius, from the creation till about the year 1600, when the island was first resorted to by Europeans; the bird then soon became extinct, being destroyed either directly by man, or by his introducing animals which were foreign to the place. A like fate probably awaits the apteryx, as the introduction of dogs and pigs into New Zealand, where they have increased enormously, must soon lead to the annihilation of a bird which is unable to fly or swim, and has no adequate means of defence against its new and non-natural enemies. The great auk, at one time a British bird, has been driven further and further into the northern regions, as the shores of Europe have become more and more occupied by man, and is now nearly or quite extinct. The penguins will probably follow the same fate, as the islands of the Pacific Ocean and the southern hemisphere become more densely populated. Almost all the larger birds of prey have been destroyed or driven away, and many birds which once inhabited England in great numbers, are lost to us, or only known as strange visitors. The natural distribution of quadrupeds has in like manner been disturbed, as nearly all the larger species of mammalia, which once inhabited Europe, have (as civilization advanced) been destroyed, or forced to migrate to other districts.

The smaller quadrupeds and birds are held in check by man, but over the lesser animals he has comparatively but little influence, and amongst these the balance must be kept by the means nature has provided; yet even in this respect also the natural balance is often disturbed by the operations of man. Many kinds of birds, &c. are destroyed in great numbers, either wantonly, or from an idea that they are mischievous; that they may be so at times is probable, but the mischief they do is in most cases more than counterbalanced by the benefits they confer, in destroying

the smaller creatures, whose increase would otherwise be enormous. Instances might be mentioned where, after some kinds of birds have been almost exterminated on account of their supposed mischievous habits; means have been resorted to for promoting their increase, to prevent fearful effects from the swarms of destructive insects, consequent on the destruction of their natural check—the birds. Rooks are often killed because they sometimes take a little corn, while their chief food consists of grubs, worms, &c.: they seldom eat corn except in dry or frosty seasons, when they are driven to it from necessity. The kestrel is destroyed as destructive of game, whereas its food consists chiefly of cockchafers and other coleopterous insects. The sparrow, with all its impudence and mischievousness, is extremely useful: on one occasion when ill, I for some hours watched a pair of sparrows who had young: I forget the particulars, but I was led to believe that, going on at the same rate, they could not have destroyed less than thirteen or fourteen hundred insects in the course of the day.

The common flesh-fly affords an apt illustration, both as regards the fecundity of the lower animals, and the importance of the check nature has provided against a superabundance of them. This insect, although generally considered a nuisance, is in fact one of nature's most useful scavengers, in clearing away dead animal matter, which would otherwise become injurious and offensive: their value must not be estimated from the annoyance they sometimes cause in the larder, but by their operations in the great field of nature. During the winter in the late war in the Crimea, there was a general expression of fear, that the dreadful mortality of men, horses, and cattle at Sebastopol, would be followed by a pestilence as the heat of the summer came on, and it was with surprise and thankfulness that the reports of improved health in the army were received; but in the letters in which the general health was spoken of with gratitude, there were often complaints of the enormous quantities of flies. These flies may have caused annoyance, but probably they were the principal agents in promoting the salubrity of the place; as flies could not have

been produced, unless there were some dead or decomposing matter, in the removal of which they had been instrumental.

Some eminent Naturalist has said, that two flies and their progeny, would devour the carcase of a horse in less time than a lion could; and there can be no doubt of the correctness of the opinion. Such work is the duty nature has assigned for flies; and for this purpose it is necessary they should be produced rapidly and in great numbers. Reaumur has stated, that one fly will deposit twenty thousand eggs; these are hatched almost as soon as deposited, and the young maggots then set to work in earnest; as it has been ascertained that they will increase in weight 200 times in 24 hours; in eight or nine days they become full-grown maggots, and then, after lying in the pupa state for another eight or nine days, they come forth perfect flies; ready, if necessary, to produce their legions of maggots to forward the great work of purification: but as from the enormous number of flies produced they would soon become an evil, a necessary check is given to their increase. During the time they are in the maggot state, and performing the useful part nature has assigned to them, they are very little disturbed, and I know of no animal which naturally hunts for or preys on them when in a dead carcase; but as soon as they change to the perfect fly, they are the natural prey of a vast variety of animals, such as birds, bats, frogs, &c. The balance is thus restored, and the flies become in their destruction a source of sustenance and enjoyment to other animated beings.

The necessity for this destruction is obvious, if we consider what would be the consequences if flies could go on increasing even for a few months without a check. From sixteen to twenty days are sufficient for the development of the perfect fly from the egg; a month therefore is full time enough for a generation of flies, and it has been ascertained by Reaumur, (as stated above,) that a single fly will deposit 20,000 eggs; if these produce one half females, there would be in the first generation 10,000 flies, each capable of producing another 20,000, so that in less than six months

from the deposit of eggs by a single fly, the sixth generation (without calculating those previous to it) would amount to 2,000,000,000,000,000,000,000,000 flies.

It is scarcely possible for the mind to form a fair estimate of such enormous numbers, from a mere statement in figures; it may be some assistance to know, that calculating each fly as half an inch long, a quarter of an inch wide, and the same in depth, that is, 32 flies to the cubic inch, there would be enough to cover all England and Wales, (which contain nearly forty millions of acres,) to the depth of upwards of three thousand eight hundred miles, or the whole world, both land and sea, to the depth of about one mile and a quarter.

Many other creatures are probably as prolific as the common flesh-fly; every ditch or pond affords an example, and the more it is filled with decomposing matter, the more stinking and filthy it may be, the greater is the number of its inhabitants assisting in its purification; these, when their work is done, are destroyed by other creatures, and so the balance is restored. Animalcula from the Thames water are often shown in microscopic exhibitions, causing alarm and disgust amongst the audience; far better would it be, if they were shown as examples of the wisdom and mercy of the Creator; as but for such creatures, during seasons when the rivers are low, the Thames, from its various sources of contamination, would be stinking and pestilential.

If we look to the sea, we find similar examples of the abundance of animal life and enormous fecundity; its shores swarm with living creatures, most of them doing the work of scavengers, in devouring the various substances thrown by the waves upon the beach. Were it not for the abundance of these creatures, the sea-shores must be avoided as offensive and a source of disease, rather than resorted to as healthful and pleasant. Amongst these scavengers of nature, shrimps, prawns, lobsters, and the like, are striking examples, both with regard to their activity and usefulness in the offices nature has assigned them, and also the extreme rapidity and numbers in which they are produced; but

still, although they abound in myriads, they are kept within proper bounds by the voracity of other creatures. The codfish is another example of extreme fecundity; according to Leeuwenhök, the roe of one fish will contain eight or nine millions of eggs, and yet out of the myriads of fishes produced from these eggs, not more than about two, on an average, can arrive at the same maturity as the parent fish; the remainder being destroyed at different stages of their growth, thus becoming food for other animals.

When we reflect on the enormous and constant destruction of life amongst the lower classes of animals, and in fact throughout the whole animal creation; it is difficult to reconcile such a system with the proofs we have around us of the mercy and beneficence of the Creator, if we believe that these creatures feel pain in their destruction. Take the case of the flesh-fly; we may see the necessity for their being produced in great numbers, and we must see the necessity for their being destroyed; but can there be any necessity for their feeling pain in their destruction? Pain would not assist them to discover and escape from their enemies; it could produce no moral effect with them as on man; they are created to be destroyed by a violent death, and pain to them would be an infliction. It may be difficult to conceive animal life to exist without the sense of pain, but surely no one can doubt the power of the Creator to render it so, especially when we bear in mind, that some of the most vital parts of our own bodies are almost or quite insensible to pain. It may be said, that all animals must have the sense of pain; but I doubt whether it can be proved. I might assert, that as vegetables have life, they must have the sense of pain, and who can prove that they have not?

Some years ago I observed a rather extraordinary illustration of the law of nature, "eat and be eaten." I kept in a glass globe (a miniature aquarium) a variety of the smaller aquatic animals, such as the larvæ of dragon-flies, &c., and one day introduced amongst them a few of the common newts and water-beetles, one of which was the dyticus marginalis. The dragon-flies had been living on

the animalcula, &c.; the newts attacked and devoured the dragon-flies: the next morning I found one of the newts lying at the bottom of the vessel half eaten, and, while looking on, saw the dyticus attack another newt. Not wishing to have them all destroyed, I took the dyticus out of the water, and put it in the sunshine; when after a few minutes it flew away, and had not gone more than thirty or forty yards, when a sparrow flew after and caught it. This case presents a miniature picture of the whole system of nature, and one which it would be fearful to contemplate, if all animals feel pain in their destruction.

With respect to the different degrees in which various classes of animals are susceptible of pain; I have met with many cases in which the effects of injuries to various animals seem to support the views I advance, (these were mostly given in my former paper;) but before I state them, it will be well to consider what signs may be depended on as proofs of animals feeling pain. Convulsions are taken by many as indications of pain: this I believe is an error: convulsions only occur when sensibility has ceased, and the will has lost all control over muscular action. If an animal is killed by the dislocation of the neck, convulsions follow immediately; but if it be wounded so as to cause death, no convulsions are caused by the pain, or occur till the animal becomes insensible: convulsions therefore are indicative of the cessation of pain rather than otherwise. The cry of animals cannot be depended on as a proof of pain; pigs make a strange outcry if taken up ever so carefully; and hares utter loud cries if caught in a net, which can give no bodily pain. It is also necessary to make allowance for the struggles when under restraint, which are natural to all wild animals.

Analogy affords no certain indications on the subject, as that which will cause severe pain to some animals may have little or no effect on others. Most animals are painfully affected by the sting of a wasp or bee; but these insects are swallowed alive by frogs and toads as ordinary food; and badgers seem to delight in wasps and bees, digging their nests out of the ground, and devouring both them and their

larvæ. Some assign a degree of sensibility to animals in accordance with their nervous development; but I believe the strictest anatomical research, alone, would not have led to a knowledge of the fact that badgers are so insensible to the sting of wasps, while mankind, horses, dogs, &c. are so painfully affected by them.

I believe the only means of forming an opinion as to how far animals are susceptible of pain, is by observing the effects injuries may have on their health, and the degree in which it interferes with their usual habits and appetites.

I will now state a few cases, to shew that injuries, apparently the most dreadful, have but little effect on many of the brute creation.

The first case which forcibly took my attention, was that of a horse, feeding by the side of the road between St. Clement's and Headington Hill, having its leg broken by a coach-wheel passing over it just above the fetlock joint; the poor beast shewed evident signs of pain at the moment, the bone being dreadfully crushed, and protruding in parts through the skin. A number of persons collected around, but no one liked to despatch it, and on their standing aside, so that it might get out of the way of things passing, the moment the horse got to the side of the road it began grazing; shewing no other sign of pain than holding up the injured leg.

Another case is that of a post-horse, which was going along the road between Botley and Eynsham; when it came down with such violence that the skin and sinews of both the fore fetlock joints were so cut, that on its getting up again the bones came through the skin, and the two feet turned up at the back of the legs, the horse walking upon the ends of the leg bones. The man who was with it would not consent to its being killed, till he had informed his master (who, I believe, was Mr. Masters, of Staple Hall Inn, Witney): the horse was therefore put into a field by the road side, and was found the next morning, quietly feeding about the field with the feet and skin forced some distance up the leg bones; and where it had been walking

about, the holes made in the ground by the leg bones were three or four inches deep.

A similar accident once happened to a coach-horse, the property of the late Mr. Costar, of Oxford: it was found, when the coach stopped to change horses, to have dislocated the fetlock joints, and from the worn appearance of the ends of the leg bones, must have run a considerable distance along the road in that state.

I do not lay much stress on this case, as it is not very surprising that a spirited horse in harness with others, should continue running under such circumstances; but, in the former case, there was nothing to excite the horse but its hunger; and if the pain had been equal to what such a dreadful injury would seem to indicate, it would probably, if in ever such a famished state, have gone upon its knees to feed, rather than upon the injured parts.

In giving these cases, I do not wish to be understood as arguing that horses are insensible to pain; their starting from the prick of a spur, or the bite of an insect, is a proof that they have the sense of pain in a high degree; and the fact that a horse is lamed by an injury to its leg or foot, is not only a proof that they have the sense of pain, but also that it is useful in compelling the necessary rest to the injured part. My object in giving these cases is to shew, that as the sense of pain is not so necessary to horses as to man, they have it in the less degree. These remarks apply more or less to many of the following cases also.

It is curious to observe the apparent indifference with which some animals will devour parts of their own bodies. I once kept tame dormice, and, in shutting the cage-door, accidentally caught the tail of one of them, when it squeaked out, and left the skin of about two-thirds of its tail sticking to the door. Whether the cry was caused by pain or fear, I cannot decide; but it went about the cage for a few minutes apparently rather uneasy, it then took hold of its tail with its paws and eat all the injured part, and then seemed as well as ever.

Rats will often eat their tails when in confinement, if kept short of food; and the habit of eating their own tails

is not uncommon amongst the monkey tribe. I knew a person who used to dip the end of his monkey's tail in tobacco water to keep it from being eaten, and some of the monkeys in the London Zoological Garden may at times be seen enjoying themselves in this way. But from whatever cause this propensity may arise, I believe it is never indulged in by the monkeys with prehensile tails; their tails seem to be too useful to be so wantonly disposed of, and I have no doubt are therefore possessed of a much greater share of the sense of pain.

A few years since, the Quarterly Review, in a notice of the late Dr. Buckland's Work on the bones found in the cave at Kirkdale, stated that an old hyena, kept in the Jardin des Plantes at Paris, had its leg broken, when one night it bit off the leg at the broken part, and eat it.

Pigs make a sad outcry when being killed, but I believe it is caused by fear, and the uncomfortable way in which they are held, rather than by pain. I once saw a large pig which had been stuck, get away from the men who were holding it, and there was not the least cry after it had got out of their hands, although it was bleeding to death: when smaller pigs are killed by sticking them, and then letting them run about till they drop, there is no cry after they are let go; and if stuck skilfully, without taking hold of them, there is no more noise than a mere grunt or squeak, about the same as there would be if the pig had a slight blow with the end of a stick; and I have no doubt that a pig may feel more pain from a heavy blow, than from being killed in the usual manner. When it is considered that the nose of a pig is so very useful to the animal from its habit of routing in the earth, and may therefore be very sensitive, it does seem probable that the opinion is correct, that a pig feels more pain from having a ring put through its nose than in being killed.

In the next class of animals to which I shall allude, that is, rabbits and hares, I will endeavour to shew that the use of the sense of pain is, in a great degree, or almost completely, superseded by other senses, and that their sense of pain is very trifling, compared to that of most other quad-

rupeds. There can be little doubt that, although so very prolific, very few rabbits or hares in a wild state die of old age, as they are the food of a large class of beasts of prey. Foxes, wild-cats, martins, pole-cats, stoats, and weasels, could not exist without them; they are their natural prey; against the least of which the rabbit or hare has no means of defence when once caught; therefore, the sense of pain would be of no use to them, either to warn them from danger or to cause them to exert themselves to escape. But a slight examination of the form of both rabbits and hares will shew that they have other means of defence: their eyes are not placed in the front of the head as in beasts of prey, but on the side of he head, very prominent, so that they are enabled to see, before, behind, and all around them; their ears also can be turned this way or that way to catch the slightest sound, added to which they have a degree of timidity which keeps them always on the alert.

With regard to their sense of pain, it is well known that a hare never, or very seldom, cries out when shot, even if she receives her death-wound, if she can run a few yards and hide herself; but if her legs are broken, or she is in any way stopped from running, even if (as before stated) caught in a net, which can give her no real pain, she utters most piteous screams; when followed by dogs, her screams always begin before they have actually caught her, and it is worthy of notice that she is much more readily despatched than perhaps any other animal of her size.

Rabbits resemble hares in this respect, as they utter no cry when wounded, but will do so from fear: if run down by a stoat or weasel, they always cry out when the enemy gets within two or three yards of them, and are generally so terrified that they lie down and are caught: therefore the cry in this case is evidently from a natural instinct, which induces them to avoid their enemies, and cannot arise from any previous experience of the sense of pain.

I one day disturbed a rabbit which ran away in so singular a manner that I followed it, and saw that the flesh had been eaten away from the back of the head to the top of the shoulders; the sight was so sickening, that I turned

away, thinking the poor creature could not live many minutes. About two hours afterwards I went with a view to pick up and examine the rabbit, and when I came to the spot, was surprised to see it jump up and run away as before; the person who was with me ran after it; the rabbit ran into a bush, and he caught it. Now, although the poor thing was so injured, there was no cry when I first disturbed and ran after it, or when it was disturbed and followed the second time, but the moment it was caught it began to cry out, shewing that fear could excite a cry which all its sufferings could not.

Many experiments have been made to test the sense of pain in animals; some of them, such as any person with a fair share of humanity would shrink from trying; but there is one which I believe no one need hesitate to make on the rabbit. Perhaps the best way will be for the experimenter, in the first place, to test the sense of pain in himself by pinching the skin in various parts of his body: a few trials will be enough to prove the sensibility of that membrane: let him then try the like process on a dog or cat, and he will find them highly indignant at such a liberty, and they may retaliate with a bite or scratch: but if the skin of a rabbit be pinched very hard between the finger and thumb, the rabbit will scarcely wince; that is, if he be one sufficiently tame to be handled.

When rabbits are caught in traps, if not taken out in a short time, they are almost sure to escape, either by breaking away by force from the trap, and tearing off the leg, or by biting the leg off. These traps are made to clasp very strongly; but to prevent escape as far as possible, they are made purposely not to close nearer than about the eighth of an inch, and the teeth are rounded so as not to cut; but rabbits are so indifferent to pain, that I have seen their legs left in traps with the sinews attached to them, just as the sinews are drawn from a fowl's legs previous to cooking; and yet although the bone is so broken, and the muscles and sinews torn apart in this manner, it seems to have little or no effect on the health of the animal.

I have seen them caught after having recently lost a leg,

and to all appearance in as good health, and as fat as if nothing had happened to them. A short time since, I saw a rabbit caught which had but one leg, having lost one hind-leg apparently some time, and the two fore-legs very recently, but although the poor animal had been obliged to go along as it could with its one leg and the bare stumps of the others, it was in good condition and healthy.

In the notice of my former paper in Chambers' Edinburgh Journal, the writer, in allusion to the above cases, observes, that a jolly sailor sometimes gets fatter than ever after losing a leg, or even two. It may be so, but he must indeed be a jolly sailor who, if caught as described above, could pull away from the trap, leaving his foot in it with the sinews attached, and then walk about on the broken stump, and keep in good condition. He would beat the celebrated hero of Chevy Chase,

> "Who, though in doleful dumps,
> "When both his legs were smitten off,
> "Still fought upon his stumps."

Rats will bite off their legs in a similar way, and escape; but I do not know of any animal which is strictly a beast of prey, or rather a hunting animal, that will do so. I have never known a cat, polecat, or such animals do it, although they may sometimes lose a leg in a common trap which shuts close and is apt to cut; and I have lately known a fox found in a wood in a dying state, from starvation, with a trap on its leg, an incumbrance that a rabbit would have been free from in a very short time.

These facts, will, I believe, bear me out on the point, that the sense of pain is for the preservation of animals, by compelling them to take due care of themselves, and that no animal has a greater share of the sense of pain than is necessary for the preservation of the race to which it belongs. The loss of a leg must be a great inconvenience to any quadruped, but rabbits or rats may still procure food without it; even the case before alluded to of the hyena does not tell against it, as the hyena does not get its food by swiftness of foot alone, nor is its foot the weapon of attack, as with the cat tribe; but if a fox, cat, polecat, or any

animal of that description, loses its leg, it is a great chance if it does not die of starvation, unless its prey be very plentiful; therefore, as the legs are of so much importance to these animals, they seem to be endowed with a sense of pain in proportion to their usefulness, as a guard for their preservation.

Lobsters and crabs will throw off their legs and claws when under the influence of fear. This is not a mere occasional occurrence, but will often take place from very slight causes; a clap of thunder, the firing of a gun, or a bump against the shore or another vessel, will often cause the whole, or nearly so, of the freight of a lobster-vessel to throw off their claws. If those parts are injured, they are thrown off, and in time a new claw or leg is formed: and in the case of the hairy porcelain crab (porcellana platychelas), "this is not only done on the infliction of violence, "but as if to occupy the attention of some dreaded object, "while the timid creature escapes to some place of safety. "The general method of defence is to seize the object with "the pincers, and while these are left attached, inflicting "by them spasmodic twitchings, all the pain they are able "to give, the crab, lightened of so great an incumbrance, "has sought shelter in its hiding-place[d]." These facts show, that in these creatures the sense of pain from mutilation must be very little; and, according to the argument I have advanced, it may be asked, of what use can the sense of pain be to any of the crustaceous tribes? They are coated in armour sufficient to protect them from all minor enemies, and if they get into the power of an enemy strong enough to crush through their shells, of what use can the sense of pain be to them then? But they shew signs of great pain when thrown into boiling water, and I see no reason why they may not be insensible to pain from mutilations, and yet be sensible, in a high degree, to pain from extreme changes of temperature; for, as there are no bounds to prevent their ranging over all parts of the sea, it is probable that a sense of temperature is necessary to

[d] Bell's British Stalk-eyed Crustacea, p. 247.

them, and many other animals also, to keep them to those parts of the world which they are formed to inhabit. It may also be useful to keep them to those parts and depths in the sea that are necessary for their young to arrive at maturity.

Actiniæ, or sea-anemones, (now so often an ornament of the aquarium,) inhabit the sea-shore, some species being commonly found between high and low tide mark. They are therefore exposed to extreme changes of temperature; sometimes submerged in the sea; at others exposed for hours on the rocks or in shallow pools to the direct rays of a summer's sun; and often to severe frosts during winter. Under these circumstances any great amount of sensibility to temperature would be an evil, and the following extract will show that in this respect no unnecessary susceptibility is inflicted on them. *That they have the sense of touch in a high degree* may be seen by the readiness with which any article of food is seized by its tentaculæ, and conveyed to the mouth; but from their exposed situation, and the softness of their bodies, they must at times be exposed to severe mutilations from animals of prey, and also from the dashing of the waves; a sensibility to pain from mutilations would therefore be an infliction, and in this respect also they seem to have a merciful dispensation from unnecessary pain. From their natural habit of attaching themselves to the rocks, they have no means of obtaining food except such as chance may bring within their reach; it is therefore necessary that they should be able to fast for a long time; and they can do without food for an almost incredibly long period.

"The actiniæ are very patient of injuries; and rival "the hydræ in their reproductive powers. They may be "kept without food for upwards of a year; they may be "immersed in water hot enough to blister their skins, or "frozen in a mass of ice, and again thawed; and they may "be placed within the exhausted receiver of the air-pump, "without being deprived of life, or disabled from resuming "their usual functions when placed in a favourable situa-

" tion. If the tentacula are clipped, they soon begin to " bud anew, and if cut away, they grow again; so that " 'it seems these reproductions might extend as far, or be " as often repeated, as patience or curiosity would admit.' " If cut transversely through the middle, the lower portion " of the body will after a time produce new tentacula " 'pretty near as they were before the operation;' while " the upper portion swallows food as if nothing had hap- " pened, permitting it indeed at first to come out at the " opposite end, 'just as a man's head, being cut off, would " let out at the neck the bit taken in at the mouth,' but " which it soon learns to retain and digest in a proper " manner. In an experiment of this kind, the upper half, " instead of healing up into a new basis, actually produced " another mouth and tentacula; so that an animal was " formed which caught its prey, and fed at both ends at " the same time! If again the section of the body is made " in a perpendicular direction so as almost to divide it " into two halves, the halves unite again in a few days. If " the section is complete, two perfect individuals is the re- " sult; and to complete the wonder, if the body be torn " away, and only a portion of the base remain, from this " fragment a new offspring will sometimes rise up to oc- " cupy the place of its parent! Yet these creatures, almost " indestructible from mutilation or injury, may be killed " in a few short minutes by immersion in fresh water." Johnson's British Zoophytes, vol. i. page 239.

The above statement of facts shows that these creatures have but little or no sense of pain, and to an animal so exposed to injuries, and incapable of moving to escape from its enemies, such a sense would not only be useless, but an infliction.

From the observations of Sir Humphry Davy, and others well acquainted with the habits of fish, it seems probable that the sense of pain in these creatures is very trifling; many cases might be advanced in support of this opinion, and when we consider the enormous fecundity and consequent destruction of some kinds of fish, it is in accordance

with the evidence of merciful design already advanced, that their susceptibility of pain should only be proportionate to their necessities for it.

In reptiles the sense of pain is generally believed to be very low, while their tenacity of life is almost incredible. "They seem, for the most part, to vegetate rather than "live, to be insensible of a wound, and even scarcely to "discover any considerable degree of anguish when cut to "pieces[e]." Experiments which have been made on the subject can hardly be recited without horror, as they must have caused misery if not absolute pain; and examples enough may be given to show the insensibility of such creatures, without wilfully injuring or mutilating any of them.

The slow-worm (or blind-worm) has the power of dismembering itself, and takes its name (*anguis fragilis*, Linn.) from that peculiarity. This reptile is almost defenceless, as it is not venomous like the viper, is much slower than the snake, and its jaws are so feeble that its bite seldom draws blood from the hand; it is to the process of dismemberment it resorts for security, doing as the beavers of old were said to do, that is, give up a part of the body to save the remainder alive. When caught hold of, or even if much alarmed, it will with a sudden jerk throw off the whole or part of its tail, which starts and jumps about, as much as to say, "Stay and eat *me*," while its lawful owner glides away into security. This tail is not a mere trifling, nerveless appendage, but is nearly as long, and contains as many vertebræ, as the whole body, and is so nervously excitable as to continue in motion a long time after being thus voluntarily thrown off. A friend informed me, that one day his attention was attracted by the rustling of some leaves, which he found to proceed from the starting and wriggling of a newly discarded tail of a slow-worm, its owner having disappeared in the shades below; from the singularity of the circumstance, he was induced to pay some attention to it, and found that muscular action had not entirely ceased in the tail till after about five hours.

[f] Cuvier's Animal Kingdom.

These facts tend to show the absence of the sense of pain in these creatures, and also, that mere muscular action is not always indicative of feeling, as it cannot be possible that any pain could be felt by the tail after being thus severed from the body. A knowledge of these facts may also be a source of gratification to the lovers of fried eels, as explanatory of a phenomenon sometimes exhibited during that kind of cookery.

Newts seem to be very insensible to pain, and will sustain life under severe injuries; the loss of the tail or legs appears to interfere but little or nothing with their usual appetites, and the reproduction of these organs seems like an approach to vegetable growth.

Frogs also appear to have but little sense of pain, and it is in accordance with the merciful designs of Providence that this should be the case; for of all deaths, that of the frog, when swallowed by a snake, seems the most horrible, if these creatures are susceptible of pain. The frog is the natural prey of snakes, and when followed by one will utter loud screams: this can only arise from an instinctive knowledge of its natural enemy, and not from any previous experience of pain: if caught, the snake generally seizes it by one of the hind legs, and begins at once to swallow it; this is a work of some time, the frog being drawn into the mouth by a peculiar motion of the jaws of the snake, and then passed slowly into its stomach. All this while the frog is alive[g]; but during the time this apparently dreadful process is going on there is no cry; for as soon as the frog is seized by the snake its screams cease, and it seems to submit to its fate without a struggle. It is difficult to assign any certain cause for this apparent apathy; we know how readily the sense of pain is suspended in ourselves by the use of chloroform, or by excitement, and it may be that the breath of the snake has some peculiar effect on the frog, so as to suspend the sense of pain, or it may be suspended from the effect of fear; but

[g] I have seen a snake killed directly after it had swallowed a frog, which was found alive in the stomach, and managed to crawl or hop slowly away.

however, it is quite opposed to all evidence of the mercy of God, to suppose that these creatures should be created to undergo such a dreadful and lingering death, and be subject during the time to a feeling of pain. I believe frogs have the sense of pain from mutilation in a very slight degree; they seldom cry out except followed by a snake, or something which they take for one. I have seen a duck try for some minutes to swallow a large frog, without any cry being uttered by the frog, although still alive, and it is seldom that a frog does cry out under such circumstances; but I have known one to scream loudly from a long stick being pushed towards it when in high grass, and which I have no doubt it took for a snake.

I once was witness to a curious (and to me painful) circumstance bearing on the subject. I was in a field, between the Oxford Canal and Port Meadow, where a man was mowing grass; the fields about this part are surrounded by ditches, in which frogs breed in great numbers, and they were very numerous in the grass. My attention was drawn to them by the mower, who said he was sick of his work, as the frogs were screaming out at every stroke he took with the scythe; but what seemed to puzzle him was, that the frogs which were uninjured screamed out, while those which were cut so that they could not get away, even if maimed ever so badly, made no noise. However, such was the case, and I could only account for it by supposing the scythe in passing through the grass was taken by the frogs for a snake, as the frogs hopped away screaming when the scythe came towards them, while those that were cut in two, or lost their legs, made no noise, but seemed as if, knowing the worst, they had determined to bear it with philosophy.

The foregoing cases—and many other such might have been given—show the general insensibility to pain in these reptiles: this insensibility I by no means attribute to their merely being cold-blooded, but to the merciful designs of Providence; for as these creatures are very prolific, have but little or no means of defence, and are generally too slow to escape their enemies, a violent death is to most of them

unavoidable, and consequently a sense of pain from mutilation would be an infliction.

Some creatures, much lower in the system of organized beings, and also cold-blooded, are far more susceptible of pain than reptiles; the common earth-worm may be taken as an illustration. It is impossible for man to know the designs of Providence, or the purposes for which any animal has been created; but one great object in nature seems to be, that living beings shall abound upon the earth: all things tend to this great end, and nothing is wasted; the death of one creature provides food and enjoyment for others; even the excrement of animals is the food of other creatures provided with tastes and appetites for such kind of sustenance; and the dead leaves and parts of plants become the food of worms, &c., who thus reduce them to the condition necessary to promote new vegetation. The worms in their turn become the food of other creatures, and consequently are subject to mutilations, which they cannot avoid: how far they may be susceptible to pain in their destruction I cannot pretend to say, but I believe they may not have the sense of pain from mutilation, and it is certain that the mere division of a worm does not destroy it, but, as in the case of the actiniæ, may be productive of two or three separate beings; be this as it may, it is well to give them the benefit of the doubt on the subject, and mutilation *must* cause misery and inconvenience, if not real pain. Another function of the worm seems to be that of keeping the earth in a condition for the percolation of water, and in dry seasons worms will penetrate to great depths in the earth, sinking lower and lower as the drought increases; they thus perform a necessary and, in some soils, a most important office in the economy of nature, to which they seem impelled by an intolerance and high degree of susceptibility of drought. Worms seem but little affected by temperature, as they will work up and lie out of their holes in very cold weather, short of absolute frost, or in very warm seasons, if moist; but the least exposure to dry air will evidently cause them uneasiness, and if they are placed in the rays of the sun, if even but moderately warm,

(and such as would be pleasing to most other creatures,) they seem in misery. That worms are so highly sensitive may be seen in other ways; the most minute portion of salt (which is so grateful to the human taste) will produce apparently intolerable pain if dropped on a worm, and a like effect will follow from the application of a mere particle of quick lime. It may appear inconsistent to attribute so high a degree of sensibility to worms from these causes, and doubt their susceptibility of pain from mutilation; but such I believe is the case, and that this also is evidence of merciful design: worms are naturally liable to mutilation from the animals that prey on them, and the division of a worm does not destroy its life; but exposure to dry air, or the sun, or the effect of salt or lime, they are only liable to from the agency of man; and by any of these means the worm may be destroyed.

With respect to the absence of the sense of pain in insects, I have seen a wasp eat a fly almost immediately after a portion of its abdomen had been cut off; I have also seen a cockchafer crawling and eating on a hedge, after its abdomen had been emptied of its viscera, probably by some bird; and a stag-beetle (*lucanus cervus,* Shaw) has been caught while flying in the like condition. It is well known that the dragon-fly (*libellula varia,* Shaw) will eat freely while confined by a pin through its body; and every one who has collected entomological specimens, must know the difficulty there is in killing some of the larger moths, as the tenacity of life in these creatures is truly surprising. I will give one case illustrative of the tenacity of life in beetles, as it is singular, although not exactly bearing on the subject in question. A dead toad was taken to be stuffed by the person who preserves the animals for the Museum; this was on the Wednesday morning; the toad was not skinned till the Friday evening, when, as toads swallow their prey whole, the contents of the stomach were turned into a basin of water, and remained there till the Saturday evening; several small beetles were then taken from it, and pinned down as specimens for a cabinet, and on the Monday morning some of them were found to have revived, and

were moving their legs about. I mentioned this case to the Rev. F. W. Hope, the munificent donor of the Entomological Collection in Oxford, who stated, that he had known of similar cases of revival; and also informed me that he once had a case of foreign insects destroyed by one of the carnivorous beetles, which got loose, and, although with the pin through its body, walked about and devoured all the other specimens. Many other cases might be brought forward to shew the absence of the sense of pain in insects; but it is unnecessary, as the subject, as far as regards insects, may be referred to in many entomological works; and I shall again have to allude to them on another part of the question. I could state many cases to shew that the sexual habits of animals (even those of the larger domestic kinds) are but little affected by injuries or operations of (apparently) a most painful character; but I suppose enough has been advanced to shew, that there are fair grounds "*for believing*, that the "sense of pain is given to animals, let their degree of or-"ganization be what it may, only as far as is necessary and "useful to guard them from injury, or to compel them to "the functions they have to perform; and that many of the "lower animals do not possess the sense of pain."

I have not alluded to the diseases of domestic animals, as they require a separate consideration. Sheep are liable to many diseases, but these may be owing to the artificial system under which they are bred and kept: in fact, the sheep, in its present condition, may be said to be an artificial animal, as no creatures, so deficient in means of defence, so inactive and incapable of long exertion, and so wrapped up in wool, could long exist where there were large carnivorous animals, except under the protection of man. It is evident that an animal so thickly clothed by nature was not created to inhabit low damp meadows, or to be exposed (panting for breath) to the direct rays of the sun in open fields during the hot summer months; and therefore their being liable to the attack of flies, the foot-rot, &c., may not be the work of nature, but of man. How far sheep are snsceptible of pain from mutilation it is impossible to deter-

mine; but the fact that they submit so quietly to the attack of dogs, seems to show that their sense of pain in such cases is not great. In one respect sheep are treated with great cruelty, that is, in shearing them at inclement seasons, or without consideration as to the state of the weather at the time they are stripped of their warm clothing. Many times, when early in spring I have seen sheep shivering from cold, I have wished that their owner could be obliged to undergo a like process, by being exposed to the weather in nothing but his shirt: yet such doings may not arise from a disposition to cruelty, but from a want of thought; as, generally, the infliction of an injury producing blood is considered cruelty; but without such outward signs of injury much suffering may be inflicted, and excite no notice. Nature did not clothe sheep with wool for the benefit of man alone, but also for the comfort and well-being of the animal itself; and it is possible that much more pain and misery may be inflicted on sheep, by shearing them at improper seasons, than by very severe mutilations. As it is, the laws of the country take no notice of the subject; but Nature sometimes inflicts a fine, as some three years since, a farmer, not many miles from Oxford, had about thirty sheep die in one night from exposure to cold after being sheared.

There can be no doubt that many diseases of domestic animals, such as the colic in horses, &c., are the cause of much pain: how far these diseases may be attributable to domestic habits, or owing to natural causes, it is impossible to decide; but be this as it may, where nature holds the balance, and carnivorous and herbivorous animals are duly proportioned, no suffering could continue long from these or any other diseases; as the moaning and cries of the distressed animal would attract its enemies, and it would at once be destroyed; this would be the case whether the diseased animal be herbivorous or not, as it is well known, that, under such circumstances, carnivorous creatures do not spare each other: even dogs in a kennel will often kill one amongst themselves, if diseased or wounded. It is true that amongst our wild animals we sometimes meet with cases

of distress and suffering; I once found a pigeon with both its legs broken, and otherwise injured by shots, literally starved to a mere skeleton: I have seen a wild rabbit with so large a tumour that it had great difficulty in running, and must have had a miserable life. But although these are cases of wild animals, it must be borne in mind that our woods and fields are far from being in a state of nature, as all carnivorous birds and beasts (except foxes) are killed down as far as possible. I remember seeing a poor sparrow hanging by its leg from a spout, by what appeared to be a thread of a carpet, with which it had built its nest; it was fluttering in this miserable condition for some two or three days before it died: had it been in a wood, the birds of prey would have been attracted by its cries, and put it out of its misery in a few minutes: for so readily are magpies, jays, &c. attracted by such cries, that gamekeepers sometimes draw them within gunshot, by hiding in a thick bush and imitating the cry of some animal in distress.

The consideration of these cases brings me to the last part of my subject, which is, that the great law of Nature, "Eat, and be eaten," by which animals of one class live on those of another, is conducive to the general well-being and happiness of all classes of the animal creation, and affords evidence of the mercy and benevolence of the Creator.

There are so many points connected with this part of the subject, that I must of necessity pass them with merely an allusion to some two or three. Much might be advanced with respect to the necessity of a "superfecundity," and subsequent destruction of life, to keep the balance in the animal world. The vast number and variety of living beings, consequent on the remains of one animal affording food and enjoyment for others, opens a wide field for argument and reflection: but I will leave all these points, and confine myself simply to the consideration of the one, that the system of prey by which some animals live on and destroy others, is productive of very little pain and misery; and much less than would be the result if all animals were to die by what is termed a natural death.

Leaving mankind out of the question, as they can assist

each other when aged and sick, let us consider what would be the state of the world if all animals lived till they were worn out, and died of old age; the animal creation would then present to view creatures decrepit, lame, blind, and miserable. Who has not sometimes seen a dog, a cat, or a horse, kept by its too fond owner till its existence has become a source of misery to itself, and a nuisance to all around it? Such must be the fate of every creature if all died a natural death; and every one in the last stage of its life must experience a period of weakness and misery, and all wild animals starvation also. But under the system of Nature as it now is, the animal world presents a picture of active life and enjoyment, weakness and misery being the exception, and not the rule; for as soon as any creature becomes incapable, either from accident or sickness, of enjoying life, it is attacked by its enemies, and put out of its misery. It may be said, that the liability to the attack of enemies, and constant exertion to escape them, must be a source of misery; but this is by no means certain: animals avoid their enemies, not from a dread of death or pain, of which they can have no knowledge or experience; but from instinct, such as compels many of the lower animals to perform the functions for which they are created.

The principal question then for consideration is, in what degree are animals susceptible of pain when undergoing that destruction which is in reality the natural death of by far the greater part of the animal creation?

It is a very general opinion, that death, under any circumstances, must be the cause of pain; and that even the smaller insects when dying are susceptible of pain in a high degree. Shakespear is often quoted in support of this idea; and we are often told with great pathos that

> "The poor beetle that we tread upon,
> " In corporal sufferance, finds a pang as great
> " As when a giant dies."

Had Shakespear written these lines in the sense in which they are usually quoted, he would have appeared as a very indifferent naturalist; but it is a libel on the memory

of the great poet of nature so to quote them. The lines occur in "Measure for Measure;" in the scene where Isabella, in persuading her brother to submit to his fate with fortitude, says,

> "The sense of death is *most in apprehension;*
> "And the poor beetle," &c. &c.

It is evident that (taking the whole passage) Shakespear's meaning was, not that the pain of death in the beetle is great, but that it is little or nothing in man. And there can be no doubt that this is a correct view of the question; for however painful the causes producing death may be, there are ample proofs that no actual pain occurs from death itself. This could be proved by hundreds of persons, who have been drowned beyond all sensibility, and felt no pain. A heavy blow on the head may deprive any one of sensation, but give no pain at the instant: of this effect I have had some experience: a flower-pot fell from a window and struck me on the side of the head, and on the shoulder; for the moment, I felt nothing but a sudden loss of all sensation, (although I afterwards felt pain from the effects of the blow,) and had the blow deprived me at once of life, I am convinced I should have felt nothing of it. I know of a case where a man was hung for amusement, and his testimony is to the same effect: he was in company with several boon companions, and having in some way transgressed the laws of conviviality, he was forthwith tried, convicted, and sentenced to be hung; and as a beam in the room was convenient for the purpose, execution was at once proceeded with, so far as placing him in a chair, and tying him by the neck to the beam: here, of course, it was intended the proceedings were to stop, but one, more thoughtless than the rest, kicked the chair away, and the man was in reality hung by the neck: his dangerous position frightened his companions, he was cut down quite insensible, and it was some time before he recovered. He had not anticipated being made the subject of such a foolish experiment; *he felt nothing of the sense of death in apprehension,* and experienced no pain: all he remembered of the circumstance

was that of seeing a flash of brilliant colours at the moment, as he supposed, of his sudden suspension.

If death (apart from the sense of apprehension of it) be painless to man, there can be no doubt it is equally so to the inferior animals; and as they can have no anticipation of it, or conscientious reflections on an ill-spent life, and no dread of future punishment, the only question therefore respecting the pain of death to them is, what is the amount of pain they undergo from the causes producing death?

Whenever any of the larger animals, either bird or beast, attacks another for prey, their first aim is to destroy life: the lion kills by a stroke of its powerful paw; eagles, hawks, &c. dislocate the neck of their victim, or destroy some vital organ; and the mustelidæ instinctively attack the head; the polecat, stoat, weasel, &c., always aiming to destroy the brain, or divide the principal blood-vessels of the neck. The ferret, in killing a rat, does not bite here and there indiscriminately, but shifts its hold till it can give the fatal grip, which is done by one of its long carnivorous teeth, piercing the brain, or spinal cord close to the head, choosing the very spot a skilful surgeon would select to give the most instantaneous death. Life is thus extinct before the devouring of the carcass is commenced, and by a speedy death, so that the animal destroyed has no unnecessary period of suffering[h]. And when we consider how readily the sense of pain is suspended in man, when highly excited, and this even in battle, where he must know his danger and liability to injury, it seems not only probable, but almost beyond a doubt, that the like effects are produced in animals when attacked, and that during their excitement, and endeavours to escape, the sense of pain is suspended, so that the death stroke is not felt, and their death is painless. That the sense of pain in man is suspended during great excitement, is shewn by severe wounds sometimes received in battle, which are unheeded and unfelt at the time,

[h] The habit of the cat catching and tormenting a mouse, does not tell against the above, as, being a domestic animal, and not hunting for food, this habit is not strictly natural.

although they may be of a fatal character. There are men in Oxford, who, during the late war, received wounds sufficient to disable them from further service in the army, but from which, *at the time*, they felt no pain, and did not know they were wounded. I have been informed of many extraordinary cases of like character, but will merely state one, the correctness of which I cannot doubt. During the siege of Sebastopol, an officer was with a party of his men in the trenches, when a shell fell and burst amongst them: he was lighting a pipe at the moment the shell exploded, and making some exclamation relative to its having knocked the pipe out of his hand, his attention was directed to a sergeant near him, who was killed by the explosion; when, seeing that the eyes of his men were turned upon himself, he found that the shell had taken off one arm between the wrist and elbow, and three fingers from the other hand; but till his attention was thus drawn to it, he did not know he was wounded, and felt no pain from it.

In the system of prey on the lower animals, such as reptiles, insects, &c., there is no such provision for the speedy destruction of life: birds will devour insects in part while they are still living; the eggs of the ichneumon are deposited and hatched in the body of the caterpillar, whose natural habits seem in nowise affected by its lively occupants, although they are devouring it alive: and the common snake swallows the frog alive, (as before described;) while serpents, living on animals who evidently are more susceptible of pain, kill their prey by a speedy and almost instantaneous death. These facts afford additional ground for believing that the sense of pain is little or nothing in many of the lower animals; as it is quite opposed to the attributes of Divine mercy, and the proofs of beneficent design, already advanced, that these creatures should be subject to such lingering deaths, and during the time be susceptible of pain.

In considering the works of Nature, we are too often led by appearances; and many natural operations are set down as productive of pain without sufficient proof that they are so. The destruction of drone bees is described by writers

on the subject as a dreadful slaughter; but although they are stung to death by other bees, we have no right to assume that their death is painful: that the stings of bees and wasps should be painful to man and many other creatures, is necessary; for, as they are gregarious, their nests would afford a fine harvest to many creatures who are now kept at a distance by the dread of their stings; but in the case of the destruction of the drones, the sting is not for defence, but to cause death, therefore a painful sensation from the sting would be unnecessary and useless; and with the examples before us of frogs, toads, and badgers devouring live wasps with impunity, who can say that the death of the drone bee, when stung, is not painless?

One point, in some degree connected with the sense of pain, has been to me very difficult to reconcile with the otherwise evident beneficent designs of Providence,—that is, the use for which venomous serpents were created. I have never met with any thing calculated to throw light upon the subject, and cannot believe they were created otherwise than for some useful and necessary purpose. It has often occurred to me, that they may have been designed as a check on the superfecundity of the larger carnivorous quadrupeds: and that there is some such check cannot be doubted, as many of them are more prolific than the animals they feed on; lions, tigers, &c., producing more than one at a birth, but this is seldom the case with antelopes and the like. Carnivorous animals, when prowling for food, would be far more liable to be bitten by serpents than the herbivorous kind, who generally feed on open ground: with an abundance of prey, little exertion would be required of them in procuring food, and, consequently, they would incur but little risk of injury from their venomous foes: but with a deficiency of prey, there would be a superabundance of carnivorous animals, who must use greater exertion in hunting for food; they would be more eager, and consequently less heedful while doing so; and therefore more liable to be bitten by their deadly enemies. Thus the check to the increase of these creatures would be at the time when most needed and useful; preventing an

over due increase and consequent state of starvation amongst them, and the annihilation of the class of animals they prey on,—and this by the most merciful means, as the bite of venomous serpents, when in full vigour, is productive of a speedy death, in some cases painless, and perhaps so at all times to the animals they were created to destroy.

The ideas advanced on the last case are more by way of suggestion for the consideration of others, than as a solution of the question of the importance of venomous serpents in the economy of nature. Practically, of these creatures I know nothing; but as a proof of the painless effects of the bite of some of them, I have been informed by a reverend gentleman now living in Oxford, and who resided for some years in India, that when there, a native was brought to his house, who had been bitten by one of the venomous serpents of the country; the wound was just above the knee, and no more than a simple puncture, from which the man felt no pain. The means adopted to prevent the usual deadly effect of the bite were, exertions to keep the patient awake; consisting of sundry shakings, pinchings, prickings, &c., together with shriekings, and all the most unearthly noises the company were capable of producing; the man being dragged about and kept in continual motion; the whole proceedings were apparently calculated to produce the fatal effects they were intended to prevent; however, the remedies were effectual, the man was prevented from sinking into a state of torpidity, and in a day or two was at his work again in the fields. Similar means are used in Australia as a remedy for the bite of venomous serpents.

In concluding this Essay, I hope that due allowance will be made for the circumstances under which it has been produced. My means of obtaining knowledge on some of the points were very limited; the paper has been written at such odd times as my usual occupation has afforded; and the variety of subjects touched on, and crowded into a mere pamphlet, are enough, if fully dilated on, to fill a volume. My aim has been to shew that the whole system of Nature is one of mercy and benevolence, giving existence

to myriads of animated beings, whose life is enjoyment, and whose death is merciful and painless. How far I have succeeded in rendering my views clear and acceptable to others, I know not; but I trust that what I have advanced will induce some master mind to take up the question of the Sense of Pain, and give it that development it so fully deserves.

It may be objected, that I have *proved* but little, and assumed much; it is so, and on a question like that of pain, it cannot be avoided: no absolute proof can be given either in support of or against the opinions I have advanced; yet I believe enough has been stated to shew the probability of their being correct; to enable many to see the natural system of the animal creation under a far more pleasing aspect than it has been usually exhibited, and that torment and misery seldom arise from natural causes. That much cruelty is inflicted on animals by mankind cannot be doubted, and on this ground my pamphlet may be in some degree useful, if it is only in directing attention to the sources of pain. Domestic animals are sometimes beaten unmercifully, and so that no blood be drawn, or only a surface wound be inflicted, very little may be thought of it, under the idea that it is only the skin, whereas a deeper, but less extensive wound may be much less painful. The remarks on the shearing of sheep may perhaps save some of those creatures from unnecessary pain; and the facts I have given, of animals feeding when suffering from severe injuries, must shew that more misery may be caused by an insufficiency of food, than the infliction of severe bodily injury; and in this respect animals are too often neglected, and their sufferings but little thought of.

The greatest objection I anticipate to the promulgation of my opinions is, that they may tend to promote cruelty toward the lower animals; but I cannot give much weight to such an objection, or fear such results. It is one of the first duties to teach children to be merciful to all creatures, but I would not do so by teaching a false system of humanity. A child may be told that he must not injure a fly, "as the poor thing has as much feeling as himself, and

"how would he like to be served so," and directly afterwards be treated to a dish of prawns, shrimps, or other shell-fish, which he may have heard hawked about the streets, with the tempting assurance of the stentorian salesman, that they "were all boiled alive:" or he may see oysters brought to table, and swallowed almost in a living state. What, under such circumstances, must be the child's opinion of the sincerity of its teachers? He may be told that these creatures were designed for the food of man; but he must doubt the necessity for so many lives being destroyed for a single meal, if all animals suffer such pain in their destruction. As he advances in life, and sees that a continual warfare, from one creature living upon another, is the general system of nature; he may be led to believe that all is the effect of chance, and to doubt the existence of a merciful Creator. He may throw his humanity aside, and join in the general slaughter, as in one of the ordinary operations of nature; and we find an illustration in point in the Life of Franklin, who held the opinion, that man had no right to destroy life for the purpose of procuring food, and was a vegetarian for some years; but by chance seeing one fish swallow another, he at once concluded, that as they eat each other, he had a right to eat them, and so became an eater of fish, flesh, and fowl from that time. But teach a child that pain is a necessary and useful sense; that the destruction of one animal by another is necessary for and conducive to the well-being of all classes; that nothing in nature is painful or offensive, except for some useful purpose; and that even in the meanest operations of nature we find evidence of beneficent design:—he will then learn to respect the works of the Creator, and not wantonly injure or destroy his creatures, especially when he considers that it is impossible to *know* in what degree any animal is susceptible of pain. With such teaching he may learn to bear pain with patience and resignation; to look on the works of nature in their brightest aspects, and thus

"Find tongues in trees, books in the running brook,
"Sermons in stones, and good in every thing."

One great cause of cruelty is teaching children to look upon the lower animals, unless they are "very pretty," with general dread and dislike. I can well remember how, when a boy, I have often picked up a caterpillar, and, while admiring its beauty or form, being told to throw it down, and kill it; that it was a devil's ring, and if it got round my finger I should never get it off again. Such ridiculous ideas are not so common now as then, but, even at this time, children are too often led to adopt feelings of dislike to many creatures, merely because they are not pleasing to the sight, or have habits which run counter to our ideas of amiability. Toads and other creatures are cruelly used by boys from an habitual dread and disgust of them; and it is often thought quite right to torture carnivorous animals, such as the polecat, weasel, &c., as a punishment for their cruel propensities. Children are sometimes taught to look upon such creatures as "wicked things;" they are told of the crafty spider that catches the poor flies, or of the cruel hawk which kills the pretty birds: such teaching is not only ridiculous, but in some degree impious, as arraigning the laws of nature. Man may be cruel, when, although endowed with reason, he wilfully tortures or injures any creatures; but how can any animal be said to be cruel, when following the instincts with which its Creator has endowed it, and performing the functions for which it was created? A like charge of cruelty might be made against every human being who eats animal food; but the feeling that prompts such teaching is of a piece with that of the tender-hearted female, who, after dining off roast veal, expressed her surprise that butchers should be so cruel as to kill poor innocent calves.

The antipathies adopted in childhood often lead to ridiculous feelings in after-life. What can be more absurd than the conduct of a woman, claiming to be of years of discretion, and yet screaming and frightened at the approach of a frog: or that of a man, perhaps tall enough and big enough to be one of her majesty's guards, running away from a blind worm, which is in reality one of the most harmless of our British reptiles; and yet such cases

occur, not so much from a want of courage, as from the effects of early teaching.

Few persons, unless they have had experience on the subject, can fairly appreciate the pleasure to be derived from watching the habits of the lower animals: I have, from my childhood, been fond of such pursuits, and at some time or other kept a great variety of creatures. When an apprentice I was on intimate terms with a large spider, which would come at my call to be fed; the minnows in the ditch would almost take food from my fingers; nearly all the animals I have had became familiar, and seemed to appreciate the kindness with which they were treated; and all were a source of amusement: I do not hesitate to say, that even now I find pleasure in such pursuits, and perhaps as much enjoyment as others may from those of a more expensive and exciting character. I give this statement to show the pleasure to be derived from such pursuits, and not to imply that all should or could be led to have a similar liking for them as myself: but under every circumstance children should be brought to look upon all creatures without unnecessary dread or dislike; and be taught that all were created for some useful purpose; that the destruction of any of them, when necessary, should be by the most speedy and consequently most merciful death; but that none should be destroyed from mere caprice, or because their forms may not be pleasing to look upon, or their habits congenial to our feelings; for all are the works of the same Almighty Power; and if He who created the heavens in all their glory, the earth, and all that inhabit it, has created such creatures as they are, who may presume to arraign the wisdom of his Creator?