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ORDINARY MEETING.

SIR JOSEPH FAYRER, K.C.S.I., M.D., F.R.S., VICE-PRESIDENT, IN THE CHAIR.

The Minutes of the last Meeting having been read and confirmed.

The CHAIRMAN.—I have the pleasure of introducing the Rev. Mr. Wood, son of the naturalist whose name is so familiar to us all, who will now read a Paper on *The Apparent Cruelty of Nature*. I am glad he has used the word "apparent," and no doubt when he reads his Paper he will explain the meaning he attaches to that word.

The following Paper was then read by the Author :—*

THE APPARENT CRUELTY OF NATURE.

By the Rev. THEODORE WOOD, F.E.S.

THIS question of the Apparent Cruelty of Nature has suggested itself to me as a suitable subject for a paper this evening, partly because of its very great intrinsic interest, quite apart from any bearing which it may have upon matters of revealed religion, and partly because of the frequency with which it is still brought forward by a certain class of infidels as an argument against the wisdom and beneficence of the Creator. The former of these—namely, the inherent interest of the subject—is self apparent, and requires no exposition; to the latter, perhaps—the argument based upon it—a few prefatory words may be devoted.

We are called upon, then, to notice that throughout the animal kingdom, not merely death but destruction is the law and condition of life; that many animals appear to live only that they may be destroyed and devoured by others; that a vast proportion of these are doomed to suffer death in its most terrible and agonizing forms; and that cruelty, in varying degree, appears to be the great and prevailing characteristic of that which we call "Nature." It is further argued that this suffering is for the most part wholly

* April 6th, 1891.

unmerited, in the broadest sense of the term; that it cannot, as in the case of man, be in any way regarded as the just retribution for personal or ancestral wrong-doing, or for any disregard of the laws of health or life; that a wise Creator could have avoided it, and a merciful Creator would have prevented it; and that, in the face of its existence, to attribute Creation to an essentially wise and beneficent God implies a contradiction so great, that the doctrine in question must perforce be given up by every thoughtful and observant mind.

Now it would, of course, be vain and useless to deny the existence of the main facts upon which this contention is based. To those who are even in a slight degree familiar with the economy of the animal kingdom, it would be almost a platitude to assert that there is an amount of apparent suffering in nature which no human mind can estimate or realize:—

> "The mayfly is torn by the swallow, the sparrow is speared by the shrike,
> And the whole little wood where I sit is a world of plunder and prey."

So writes the Laureate; and he might with equal truth have said the same of the world at large. For, as far as animals are concerned, it is one huge, perpetual battle-field; one wide, vast, endless scene of almost universal carnage and blood. Might alone is right, and might alone prevails. Thousands are ever dying that one may live, and the battle is always to the strong. And certainly death, in many forms in which it is commonly inflicted, seems terrible and painful enough to substantiate the charge of cruelty against Nature.

There is no group of animals even without its creatures of prey. The cats and the dogs among mammals; the hawks and owls among birds; the alligators, crocodiles, and serpents among reptiles; the sharks and the pike among fish; the cuttles and the boring whelks among molluscs; the *Carabidæ* and *Ichneumonidæ* among insects; the crabs and lobsters among crustaceans; the sea-anemones among the zoophytes: all these are but a few examples of the ever-recurrent Destructive Idea, which appears and re-appears at frequent intervals throughout the animal kingdom. And with this it is asserted that cruelty, excessive in amount, although perhaps varying in degree, is inseparably bound up. And how, we are asked, can a God, supposed to be essentially wise and beneficent in

character, not only permit such a state of things to exist among His sentient creatures, but even render it necessary and inevitable by the conditions of Creation itself?

I do not propose to enter into the theological question of the Fall of Man as affecting the lower animals, or even to lay any particular stress upon the obvious fact that a very large proportion of such suffering as they may endure is directly or indirectly due to his agency. Man, in his present condition, is *un*-natural; and it is rather my purpose to gather together such evidence and argument as may enable us to judge whether there be any true cruelty in Nature—rightly considered—at all.

THIS line of investigation, of course confronts us, in the first place, with the question of pain. What *is* Pain, physiologically speaking? Perhaps we may best define it as the sensation experienced by the brain as a result of certain injuries to, or affections of, the sensory portion of the nervous system; for we know that a prick in the foot, for instance, is not felt until a sufficient time has elapsed for a message to be telegraphed, as it were, to the brain, and a return message telegraphed back to the seat of the injury. If the spinal cord be divided, again, pain at once ceases to be felt in the parts below the region of severance, owing to the interruption of communication with the brain. Clearly, then, if the sensation of pain be ultimately resident in the brain, the degree of that sensation which can be felt in individual cases must depend very largely indeed upon the degree of perfection attained by the brain, as well as of the nervous system which depends upon it. And the character of *this* must consequently be the groundwork of any investigation which we may make into the existence of the sense of pain in the animal kingdom.

Here, perhaps, it may be as well to divide our subject into three heads, each of which shall claim our attention in turn. These are:—

1. Is the sense of pain present in the whole, or in any extensive portion, of the animal kingdom?
2. To what degree does the sensation of pain extend in those creatures in which it may be proved to exist?
3. Are such sufferings as animals may endure enhanced by the anticipation or recollection of pain, or by the fear and dread of death?

1. We know, of course, as a fact ascertained beyond all possibility of question, that the nervous system, in different animals, varies enormously, both in extent and in sensibility. At the one extreme of the scale we have man, with almost every part of his body so permeated with sensory nerves that the slightest injury, under normal conditions, is immediately felt, while their sensitiveness is so great that even a mere local chill may be productive of prolonged and almost unendurable agony. At the other end we have the jelly-fish, with a nervous organization so scanty and imperfect, that until the researches of Ehrenberg proved its existence, its presence was not even suspected. Of a corresponding organization in creatures lower in the natural scale than the jelly-fish we know little or nothing, save that the tentacles of certain zoophytes—such as the sea-anemones—appear very sensitive to irritation, although the organs of special sense are rudimentary in the extreme.

But it does not, of course, follow that even in the jelly-fish, in which we know that nerves exist, anything at all approaching to the sensation which we call pain can be in any degree experienced. It is true, no doubt, that many of these lowly organized creatures will contract their tentacles if any outside object should come into contact with them. But, on the other hand, we see a precisely similar phenomenon under similar circumstances in the case of the well-known sensitive plant, in which, of course, there is no question of a nervous system, properly so-called; far less of any sense of pain. And the few nerves which have been detected in the jelly-fish are almost certainly of a strictly motor character. Most of these animals, as is well-known, possess some slight power of altering the form and the relative position of their discs; and this process, which is undoubtedly due to muscular contraction, necessarily implies the existence of motor nerves. Examination proves, too, that the whole of the nervous system, as at present known, is in these creatures more or less intimately connected with the muscular fibres; for the latest investigations tend to prove that the band of sensitive nerves described by Haeckel as surrounding the circular canal in the ball-shaped *Medusæ*, is absolutely non-existent. And it is scarcely necessary to say that no vestige of evidence has ever yet been offered which would support in these remarkable animals an argument for the existence of the sense of pain.

All available testimony, indeed, seems to show that in the

lower forms of animal life the sensation of pain, as we commonly understand the word, is absolutely unknown. When a crab will calmly continue its meal upon a smaller crab, while being itself leisurely devoured by a larger and stronger; when a lobster will voluntarily and spontaneously divest itself of its great claws if a heavy gun be fired over the water in which it is lying; when a dragon-fly will devour fly after fly, immediately after its abdomen has been torn from the rest of its body, and a wasp sip syrup with evident zest while labouring—I will not say suffering—under a similar mutilation: it is quite clear that pain, at any rate among the crustaceans and the insects, must practically be almost or altogether unknown. I have watched, too, the oviposition of an ichneumon-fly in the body of a caterpillar; and nothing in the conduct of the victim showed that it was in any degree conscious of pain, although the sharp lancet of the fly was introduced into its body some fifty or sixty times. All entomologists, too, are familiar with the fact that a "stung" caterpillar continues to feed most heartily, and apparently to enjoy existence, although several hundred grubs are ceaselessly preying upon the non-vital parts of its body.

I may mention, also, that, when collecting *Lepidoptera* as a boy, some of my best specimens were captured upon a fence on which, owing to its peculiar structure, the pill-box could not be used in the orthodox manner. The only way, indeed, in which many a moth could be extracted uninjured from the recesses of this fence, was by passing a pin through its thorax as it sat at rest, and so transferring it to the killing-bottle. This I was often obliged to do; and I did it at first with much reluctance. But I frequently observed—so frequently, indeed, that at last the fact altogether ceased to cause surprise—that the moth seldom moved when the pin was passed through its thorax, although that operation, proportionately speaking, was about equivalent to the thrusting of a lamp-post through the body of a human being. When the insect was lifted from the fence it struggled violently; probably because it found itself supported in mid-air without a foothold. If, however, I replaced it upon the fence, it usually settled quickly down into its former state of quiescence. And the inference was almost irresistible, that, although the pin had passed through a portion of its body containing two at least of the principal ganglia, and more closely and thoroughly traversed by branch

nerves than almost any other part of the frame, the insect had suffered no pain.

It may, perhaps, be argued that these moths, when thus pinned, were sleeping, and that—as has frequently happened in the case of vagrants who have resorted to a lime-kiln for warmth, and have been overcome by slumber—very severe injuries may be received during sleep, of which the sufferer, although of high nervous organization, is entirely unconscious. But cases in which the injury is caused by the sudden application of great bodily violence do not come under this category. One cannot imagine a human being continuing wrapped in slumber while a lamp-post, or even a hedge stake, was being driven through his body. And the further fact that the wounded insects, when replaced upon the fence, frequently settle themselves again to slumber, effectually disposes, I think, of the objection.

There is very little indeed, in fact, to show that insects experience the sensation of pain, as we understand the expression, and very much which tends to show that they do not. Probably the great poet who tells us that—

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

is as incorrect as poets usually are when they venture upon statements relating to natural history.

Upon the molluscs, perhaps, it is unnecessary to dwell. Their nervous organization is very little higher than that of the insects, and susceptibility to pain still appears to be wanting. Even when we pass the half-way house of the animal kingdom, indeed, and ascend from the higher invertebrates to the lower vertebrates, we find that the sense of pain is apparently absent. The seemingly complete indifference of fish, for example, to bodily injury or mutilation, is well-known. Not long ago, in one of the journals devoted to outdoor sports, an account appeared, on the authority of Mr. Cholmondely Pennell, of a perch which in some mysterious manner was hooked through the eye, and managed to break away, leaving its eye behind it. Yet, so little did it appear to suffer from that which in a mammal or a bird would have been a most serious and painful injury, that in the course of a few minutes it returned, and, attracted by its own eye, which still remained upon the hook, swallowed it, and was captured and brought to land!

Instances, again, in which the mouth of a fish has been severely lacerated by the hook, without the result of deterring it from a second visit to the too tempting bait, are well known to every angler.

We have many records, too, of a like insensibility to pain in the case of the shark. Upon one occasion, as described to my late father by an eye-witness of the occurrence, the cheek of one of these fish was torn completely open in a successful attempt to break away from the hook which had passed through it. Although the wound bled profusely, the creature seemed to feel no pain, and in the course of a very few minutes was again fast upon the very same hook which had already proved so disastrous to it.

Among the higher animals, any serious bodily injury at once deadens the sense of hunger. A state of collapse almost immediately results from the shock; and not until some little time after this has passed away can food again be taken. So, too, while a sufferer, from any cause, is enduring intense pain. While that pain lasts, to take food is a practical impossibility. But, in the case of these injured fish, there would appear to have been no pain, no shock, and consequently no collapse, for their sense of hunger was not dulled, and they almost immediately returned to the bait. Yet the wounds which they had received would have rendered a human being prostrate for days. So far, in fact, as we can gather from the present state of the evidence, fish seem practically as insensible to pain as the insects or the crustaceans.

The writhings of an eel's body, of course, after such an injury as the amputation of the head, are so obviously due to reflex action that it is quite unnecessary to take them into consideration.

Even among the reptiles the sense of pain appears to be little, if at all, more developed. For among these animals we find perhaps the most remarkable instances of that singular instinct of self-mutilation in moments of danger to which we have already adverted in the case of the lobster. Our well-known British blindworm, or slowworm, for instance, in common with many other lizards, will voluntarily part with its tail if it be suddenly seized, and thus deprive itself of nearly half of its bodily substance; and the vertebræ at the point of severance are modified in a very remarkable manner, apparently with the sole purpose of rendering this self-mutilation practicable. The lizard itself, after the act of

dismemberment has taken place, creeps rapidly away, and appears to suffer no pain or inconvenience whatever. The wound quickly heals, and the lost member, in due course of time, is reproduced. But, strangely enough, the laceration of the flesh, which appears to have no exciting effect upon the nerves of the body, in which pain might conceivably be felt, throws those of the tail, in which plainly it cannot, into a state of extreme irritation and activity; and for some minutes the severed member leaps and dances in the air as though possessed of independent and vigorous life. Its movements, of course, like those of a decapitated eel or tortoise, are entirely due to reflex action. But it is both interesting and instructive to notice such action taking place in a part of the body wherein pain is by the very conditions of the case impossible, while the very same injury which gives rise to that action seems wholly without effect in a part in which, judging by the analogy of the higher forms of life, suffering of no slight degree would seem to be inevitable.

It may, of course, be argued that Nature, in furnishing these self-mutilating lizards with their curious power of dismemberment, may have also modified the nerves of the region in which severance takes place, in order that the injury may entail no bodily suffering. I do not know, however, that such a theory could be in any way supported by anatomical evidence; while it is certain that none of the members of the reptile race appear to be at all susceptible to suffering, no matter in what particular region of the body an injury may be inflicted.

In the birds, of course, we enter upon entirely new conditions of the bodily structure. They are warm-blooded creatures, with an exceptionally rapid circulation, animated by a vivid and vigorous life, and possessed of bodily senses far exceeding in keenness those of the animals below them in the zoological scale. Alike in sight and in hearing, and most probably also in delicacy of scent, they are far superior to any reptile or fish. And therefore it would seem only natural to suppose that the sense which in the reptiles, fishes, and invertebrates allows merely of some small degree of tactile power would in them be so intensified and developed as to admit of the sensation of pain.

Whether birds are capable of experiencing this sensation, however, in any marked degree, is exceedingly doubtful. For this at any rate is plain, that in the members of the

feathered race the sense of touch—upon the existence of which, in a somewhat highly developed degree, of course, the possibility of experiencing pain absolutely depends—is *not* highly developed. The conditions of the entire structure practically forbid that it should be so. The body is entirely enveloped in a dense coating of feathers; clearly tactile nerves beneath this would be useless. The limbs are clothed either with plumes or with horny scales; and the same result necessarily follows. The mouth, again,—usually a highly sensitive region—is enclosed in a hard and callous beak, which only in such birds as the duck and the apteryx appears to possess anything approaching to delicacy of touch; while even the tongue is encased in a horny sheath, necessarily rendering the sense of taste rudimentary in the extreme. Such being the case, it would seem scarcely possible that birds can ever be conscious of a *keen* sense of pain, although it would be rash indeed to assert that the sensation of pain is altogether unknown to them.

Only the mammals remain to be considered; and there can be no reasonable doubt that these, as a class, are susceptible to pain, although not a few are as densely clothed with scales, spines, or fur as the birds with feathers. To what extent this susceptibility may extend, however, is another and a wider question.

2. This, of course, brings us to the second branch of our subject; the question, namely, of the *degree* of pain experienced by those animals in which sensitive nerves can be proved to exist. In other words, are we justified, when an animal exhibits unmistakable signs of suffering, in ascribing to that suffering a character and degree similar to that which we ourselves should experience under the like circumstances?

But how, we may ask at the very outset of our enquiry, are we to obtain a definite standard for the comparison? for the pain consequent upon an injury to one man is often far more intense and prostrating than the pain consequent upon a precisely similar injury to another. We all know how differently a simple surgical operation—such as the extraction of a tooth—affects different individuals. One endures tortures, both in anticipation and in reality; another scarcely suffers at all.

A very curious case of this character was related to me by my brother, who is a schoolmaster, and who was himself a witness of the operation in question.

One of the boys under his charge fell upon the school-room floor while struggling with a companion, and in so doing drove a tolerably large splinter of wood beneath the entire length of one of his finger nails. He made an attempt to extract it, but without success; and, finding that it did not inconvenience him, said nothing about the matter to the authorities. In the course of a few days, however, the wound very naturally festered, and the boy was sent to a surgeon; a proceeding to which he took exception, on the ground that he felt no pain. The surgeon, however, on examination, pronounced the case to be a bad one, and declared that the finger nail must be removed; an operation which he proceeded then and there to perform. At its close, he looked up at his patient, with a word or two of praise for the remarkable courage with which he had borne the severe suffering inflicted upon him, and was utterly amazed to find that the boy had been watching his proceedings throughout with the liveliest interest, but without the slightest idea that he ought to have been suffering excruciating pain. The removal of the nail, in fact, had caused him no real pain whatever, although he had undergone what is commonly regarded as perhaps the most severe of the minor operations in surgery.

This particular boy, perhaps, may be regarded as somewhat of a natural phenomenon; but it is a matter of common experience among schoolmasters that corporal punishment is as unequal in its effects upon different recipients as can well be the case. To one boy a few strokes with the birch or the cane are nothing—scarcely felt at the time, and forgotten in five minutes. To another they represent an amount of anguish under which nature almost gives way. And there can be little doubt that much of the shrinking from physical suffering which we observe in many individuals of either sex is due to an unusual susceptibility to pain, with which they are endowed by nature, and which can be neither appreciated nor understood by those of more vigorous nervous organization.

But the capacity for appreciating pain, in the human subject, is not only to some extent a matter of temperament; it is also, and very largely, a consequence of (α) Civilization and (β) Education.

(α) It is almost a matter of common notoriety that pain to the savage and pain to the civilized man are so different in character and degree as practically to constitute two totally

different things. I think it is Livingstone who tells us of an accident which befel one of his camp-followers, and which resulted in a broken thigh. A rough litter was constructed, the man laid upon it, and borne upon the shoulders of four of his comrades. Suddenly, in the course of the march, a shout of laughter was heard, and it was found that, through the carelessness of the bearers, the patient had fallen to the ground, with the result of converting a simple into a compound fracture. The bearers were convulsed with laughter at the doubled-up appearance which the wounded limb presented; and the injured man himself was laughing as heartily as anyone.

It is only necessary, again, to mention the Maquarri Dance of the natives of Guiana, the Sun Dance of the North American Indians, and the horrible rites by which the young braves of the Mandan tribe are "initiated" into the enjoyment of the full privileges of their manhood, to show that the nervous organization of the savage is far less susceptible to pain than that of the civilized man.

Dr. Felkin, in a series of carefully planned experiments, for the carrying out of which he enjoyed unusual facilities, arrived at the conclusion that the relative susceptibility to pain in the European, the Arab, and the Negro, was in the proportion of three, two, and one; his attention having been in the first instance directed to the subject by the remarkable fortitude with which patients of the two latter classes endured severe surgical operations. When, indeed—as Mr. Christie assures us happened in a case under his own notice—a Bosjesman can walk into a surgery, exhibit a hole in the crown of his head, due to a blow from a "knob-kerry," which had resulted in the forcing of a piece of the skull down upon the brain, submit to the operation of trepanning, and then walk away as if nothing had happened, it is difficult to believe that the members of these uncivilized races can possess any true sense of pain at all.

(β) In the course of the above-mentioned experiments, Dr. Felkin also discovered that the result of education upon negroes was to increase their susceptibility to pain by one-third. And that such is a result of education is daily manifested by the comparative indifference with which a field labourer, for example, will endure an injury which would lay a brain worker prostrate. For education, in a sense, is only civilization carried on. It results in a considerable development and refinement of the brain, and this, necessarily re-

acting upon the entire nervous system, induces a far higher susceptibility to suffering than would otherwise have been possible. And, as a general rule, it will be found that highly educated men and women are the most susceptible to bodily pain. They obtain, by their studies and mental culture, a great accession of intellectual power; but they pay the price in an increased sensitiveness of nervous organization.

Among animals, too, we find a similar rule prevailing. The highly-bred, highly-trained race-horse or hunter will be thrown into a state of extreme nervous excitement by the merest touch of the whip or the spur. But the cart-horse, which is neither highly-bred nor highly-trained, and may be taken as the representative of equine un-education, plods stolidly on, apparently half unconscious of the blows which its impatient master is raining upon its back. So, too, with dogs; the pure-bred animal—generally speaking, of course—suffers much more severely from a beating than the mongrel. To put the matter briefly, in fact, susceptibility to the sense of pain increases in exact proportion to the degree of perfection attained, through evolution, civilization, or education, by the brain and the nervous system; and where the latter remain undeveloped, the former cannot be felt.

WE have already seen how considerably the power of appreciating pain varies in the human subject; how dependent it is upon the influences of civilization and education; how the degree in which pain can be felt, in fact, is proportionate to the degree of perfection attained by the brain, and (as a consequence) the nervous system. Now let us recollect what a vast difference there is between the brain and nervous system of even uncivilized man, and the brain and nervous system of the highest of the monkeys. In principle they may be similar; but in development how widely asunder! And as we work our way down the zoological ladder, the proportionate size of the brain—to say nothing of the delicacy of its organization—decreases at almost every successive step, until from man, with a brain of perhaps one-fortieth of his entire weight, we come to the carp, with a brain of only one eight-hundredth; while in the lancelet, the lowest of all the vertebrates, there is absolutely none. Would it not seem logically to follow, on this one ground alone, that the capacity for appreciating pain must be far lower in even the highest mammals than in man, and that it must decrease still further in proportion as the interval between the two increases?

It is hardly fair, of course, to adduce the known susceptibility to pain of horses and dogs as an argument upon the other side of the question; for these, by long domestication and careful selection, have become civilized, so to speak, with their mental powers, and consequently their capacity for suffering, increased in a proportionate degree. To them Nature *cannot* be cruel, for the simple but sufficient reason that they have been elevated by the agency of man to a position which is wholly unnatural. And therefore, considered in this respect, they are outside the scope of our inquiry.

So far, then, our line of investigation has tended to show that pain, as we usually understand the expression, must be almost, if not altogether, unknown to the invertebrates, the fish, and the reptiles; that by the birds it can scarcely be experienced in any great degree; and that even in the higher mammals it cannot be what it is in the human subject. That pain can be felt by mammals, however, it would be idle to deny; and therefore it remains for us to see whether, in its infliction upon the members of even this comparatively small division of the animal kingdom, Nature can consistently be described as "cruel."

The "cruelty" in question, of course, would be caused by the teeth, claws, or other weapons of creatures of prey, to which, probably, the vast majority of deaths in the animal kingdom are due. And we have to see to what extent the injuries inflicted by these are likely to be productive of suffering.

PREDACEOUS birds, as a general rule, kill their victims instantaneously. The sharp, curved talons, which are invariably the weapons of offence, are practically automatic in their action, and are driven, by the mere weight of the body pressing upon the limbs at the moment of seizure, deeply into the vitals of the prey. In such cases, little or no pain can be inflicted. But when the flesh is lacerated, as by the claws of the larger cats, suffering in no slight degree would appear to be inevitable. And as these animals do not in all cases kill their victims before proceeding to devour them, that suffering would frequently seem to be of lingering character, as well as of great intensity.

Whether such is in fact the case, however, is more than doubtful. Even in the human subject, severe local injury commonly deadens the sense of pain for a time. The im-

mediate result of a bruise, very often, is to numb the nerves in the part affected, and pain is not felt for some minutes. And that such is the case also in more serious injuries I have had some slight personal experience, for I was once unfortunate enough to fracture the larger bone of my leg, and felt absolutely no pain whatever until the limb was set more than an hour afterwards.

Soldiers in action, too, are said to be frequently unconscious of the reception of wounds of great severity until weakened by the consequent loss of blood. This fact has been accounted for as due to the great mental excitement under which they are labouring; but I have been informed by a near relation that in closing a pocket-knife he once cut his forefinger to the very bone, and was quite unaware of the fact until a sensation of faintness overcame him. And this man, as a general rule, was perhaps unusually susceptible to bodily suffering.

This temporary insensibility to pain, of course, attends only such injuries as are suddenly inflicted; but of this class, in almost every case, are the wounds received by animals attacked by the creatures of prey. All the members of the cat tribe, for instance, take their victims by surprise; the first intimation of their presence is a blow from the death-dealing talons. And hence it might, perhaps, be inferred that the sufferings which these animals seem to inflict may be more apparent than real.

That such is actually the case is proved—although from a perfectly different standpoint—by the well-known experience of Dr. Livingstone, which—although, no doubt, familiar to all present—I may perhaps be permitted to cite as so admirably illustrating this branch of my subject. I quote his own words:—

"Starting and looking half round, I saw the lion just in the act of springing on me. I was upon a little height; he caught my shoulder as he sprang, and we both came to the ground below together. Growling horribly close to my ear, he shook me as a terrier dog does a rat. The shock produced a stupor similar to that which seems to be felt by a mouse after the first shake of the cat. It caused a sort of dreaminess, *in which there was no sense of pain or feeling of terror*, although I was quite conscious of all that was happening. It was like what patients, partially under the influence of chloroform, describe, who see all the operation, but feel not the knife. This singular condition was not the

result of any mental process. The shake annihilated fear, and allowed no sense of horror in looking round at the beast. This peculiar state is probably produced in all animals killed by the carnivora; and, if so, is a merciful provision by our benevolent Creator for lessening the pain of death."

In referring to this same passage, my late father mentions a very similar experience undergone by a German nobleman in Bengal. In this case a tiger was the assailant, and its intended victim describes his mental condition while in its power in terms almost identical with those employed by the great African traveller. "The chief sensation," he remarks, "was that of a pleasant drowsiness, rather admixed with curiosity as to the manner in which the brute was going to eat me." "Only by his reasoning powers, which remained unshaken, could he feel that his position was one of almost hopeless danger, and that he ought to attempt escape."

I believe that I am right, also, in attributing to Sir Edward Bradford, the present Chief Commissioner of the Metropolitan Police, an even more remarkable adventure with a bear, in which the flesh of his left arm was literally torn away by the infuriated animal. Even this rough treatment, however, under the peculiar fascination induced by the act of seizure, appears to have caused no pain at the time, and Sir Edward remarks that his chief sensation was one of extreme disgust at the evident enjoyment with which the brute smacked its lips over its meal!

In a recent issue, too, of a popular serial appeared an article from the pen of a well-known Indian traveller, who therein narrates his own experience of capture by an elephant. The animal, quite a young one, apparently did not know how to kill him, and contented itself with kicking him backwards and forwards from foot to foot, and then leaving him lying upon the ground. Although very severely bruised and shaken, the writer declares that he felt no pain whatever until after the animal had left him—a fact the more interesting inasmuch as his injuries were not inflicted by any of the ordinary beasts of prey.

When we remember, indeed, how very powerfully the susceptibility of the nervous system is affected by mental emotions, we can well understand that the sudden and violent shock due to seizure by a beast of prey may well influence the nerves in such a manner as to render the sensation of pain for the time inappreciable. Probably the

result of such a shock is to induce some kind of hypnotic condition. And, since we know that a similar condition can often be artificially engendered merely by gazing intently at some bright object, it may, perhaps, be that the gaze of the animal's eyes has some influence in bringing it about.

In this connexion the question of serpent fascination, and its supposed dependence upon the steady gaze of the eyes, will at once occur to us.

3. THE question which constitutes the third part of our enquiry—namely, whether animals suffer by recollection or anticipation of past or future pain—may be unhesitatingly answered in the negative. It is true that some few domesticated animals do occasionally appear to remember bygone sufferings, but only, as a rule, when those sufferings are in some way called to their minds. Dogs, too, undoubtedly suffer at times in anticipation, and clearly dread the beating which they know will follow some act of mischief. These, however being domestic animals, are *ipso facto* unnatural, and beyond the limits of our enquiry.

In Nature, properly considered, there is nothing of the kind. Pain past is pain forgotten and done with; possible pain to come never clouds the enjoyment of the moment. Wild animals, in fact, seem to live entirely in the present; and suffering, when it comes, has neither been dreaded nor foreseen.

Neither have animals any terror of death, of which, indeed, as concerning themselves, they seem to know absolutely nothing. If a wild animal meets with the dead body of even one of its own kind—domesticated animals sometimes behave differently—it either passes it by as an object utterly devoid of interest, or it inspects it with a languid curiosity, or it hails it with delight as affording the material for a substantial meal. But it never seems to draw from it the inference that its own decease must one day take place. Farmers hang up dead rooks to scare living rooks from their fields, and game-keepers suspend the carcases of weasels, stoats, cats, hawks, and owls as a warning to other "vermin." But even these worthies themselves would hardly assert that such warnings are ever effectual.

We must not, of course, omit all reference to the instinct of self-preservation, which might perhaps be considered as implying the existence of a knowledge of pain or death.

Such, however, does not follow at all. An instinct with an animal *is* an instinct pure and simple. The creature does what it does, not knowing why it does it. The young squirrel, for example, lays up its winter store of provisions, with no possible knowledge that a foodless season of frost and snow is to follow. And if an instinct taught an animal more than this, it would be an instinct no longer—it would be reason.

We ourselves possess the same instinct of self-preservation, and often act upon it without the smallest thought of the consequences which may ensue if we do not. There is no time for thought; but the instinct does its work. Clearly, then, the presence of that instinct in an animal does not necessarily imply anything beyond it; and all available evidence tends to show that nothing more is possessed.

BRIEFLY to review, then, the line of my argument:—

The lower animals, and, indeed, the vertebrates, as far at least as, and including, the reptiles, appear to possess no sense of pain whatever. And this deduction is based partly upon the very undeveloped character of the brain and the nervous system, partly upon the inference which must necessarily be drawn from ascertained facts. In the birds, the almost total absence of tactile nerves would seem to imply also the absence of sensitive nerves—the sensation of pain being only intensified touch. In the mammals, however, a capacity for suffering clearly exists; but the analogy of the human subject leads us to infer that even in them pain, when felt, must be far less in degree than that to which our own nervous organizations are subject, while the remarkable experiences of Dr. Livingstone and others seem to prove that predaceous animals, apparently the principal authors of pain in the natural world, inflict no real sufferings upon their victims at all. No dread of death to come, lastly, overshadows an animal's life; and, therefore, it seems only just and reasonable to conclude that no accusation of cruelty can be substantiated against Nature and Nature's God.

Much, on the contrary, may be said on the other side of the question. The law of destruction, and the incessant conflict waged between creatures of prey and their victims, practically ensures the survival of the strongest and healthiest forms. The slightest tendency to disease is at once eliminated, although by the rough surgery of the

death of the sufferer; physical deterioration is prevented; and the standard of the race is maintained. As the natural world is constituted, in fact, the so-called cruelty of Nature is cruelty only in appearance; in reality, it is a blessing and a boon.

The CHAIRMAN (Sir JOSEPH FAYRER, K.C.S.I., F.R.S.).—I am sure you will agree with me that we are much indebted to the Rev. Mr. Wood for his thoughtful and interesting Paper. The subjects of which he has spoken so well have always interested me. I have no hesitation in pronouncing the physiology of the Paper to be good, and the deductions drawn from his observations and researches fair, but I do not quite agree with him when he excludes the possibility of pain from the lowest animals. That invertebrates do not suffer pain as vertebrates do, I believe. They respond to stimuli, but they do not feel as higher animals do. We should not feel so intensely if we were not so highly organised, and subject to many artificial conditions which are apart from our original constitution. As the Author has told us, savage races suffer less than others. We ourselves frequently do not feel pain when we meet with injuries that are sudden and unexpected. A man so injured may scarcely know what has happened to him and not feel the effect till afterwards. I have known men wounded by a sword thrust who have not been aware of it, and of men being shot through the limbs, who felt no pain at the time.

Speaking of wild animals, not long since I saw an officer who, when in India, was anxious to shoot a tiger, and having made his arrangements, had a machaun or native bed put up in a tree on which to sit at night with his attendants, with a young buffalo tied up to attract the tiger. He sat there waiting some time and did what is so often done on such occasions—fell asleep. He was aroused by one of his men, and saw two tigers coming up to the buffalo. He was much excited, and took up his rifle to fire, when his man prevented, him, saying "Don't fire yet." Presently he fired, and one tiger rolled over. The other disappeared,—the wounded tiger rolled down on to lower ground. He was most anxious to follow, but his man prevented him. He waited till

day dawned and got down, the man following him amongst the long grass. Suddenly he became conscious that he was in the presence of the tiger, seeing its yellow face looking at him from the grass. He fired, and they fell together. He heard the bones of his shoulder crunch, but felt no pain. He said he was so stunned that he hardly knew what occurred, but remembers wondering whether he was going to die. He then heard a sort of sigh from the tiger, and his man, who was near him, pulled him out of the tiger's mouth. The man said, "For God's sake, fire, the tiger is moving again!" He raised the rifle to his shoulder and felt the crushed bones as he fired. It was all done in a dreamy, semi-conscious state. He was carried home, where he remained for months, and was at last sent to England, exhausted by suffering, with the shoulder crippled and a wasted arm with bone exfoliating. This is an instance of a man suffering no pain under severe injury; but it is not to be supposed that pain is never felt on infliction of a serious injury.

I remember on a critical occasion during the siege of Lucknow, talking to an officer, who, half an hour after our conversation, was shot dead. A man had been shot somewhere in the spine, close to us, and his sufferings were intense. My companion said, "I hope when my time comes, I shall not suffer like this," and within an hour he was dead, with a bullet through the head.

Whether it be correct to speak of cruelty in connection with Nature, I think is questionable. To be cruel, implies a conscious intention. An animal cannot be cruel, I take it; man can be. A wolf is not cruel; he only obeys his instincts.

I think the Paper is most interesting, and the Author's remarks on the lower animals are very true. False sentiment should not be thrown broadcast throughout the world; it hinders the advance of knowledge, and leaves our nation behind others in the march of science. Some persons, without hesitation, will impale one creature and drag it through the water till it impales another on a hook, then go home and sign a petition against vivisection. I am glad this paper has been written. People see an invertebrate creature writhing on the ground, and think that it suffers pain, when it is merely reflex action. Reflex action is often mistaken for pain or suffering. After certain injuries to the spine, you may see a man lying in bed paralysed—you tickle the sole of his foot, and his leg is drawn up, but he does not feel it. The

lower animals of the mammalia suffer in proportion as they are highly organised; but I do not think they have any apprehension or anticipation of suffering. I often wonder if sheep, when they see their relatives hung up in that disgusting way, feel it, or understand it: I hope not, but I have seen instances where, from the smell of blood or from some instinct which we cannot explain, animals have shown a dread and horror at being near the place where they were to be slaughtered—an instinct of self-preservation. I will not detain you further, but ask you to discuss this most interesting paper.

The Hon. Secretary (Captain F. Petrie).—Two brief letters have been received from those not able to attend.

The first is from Dr. D. Biddle, M.R.C.S.E., who writes:—

I believe the cruelty of Nature to be more *apparent* than real, and that the largest share of horror is contributed to it by the imagination; sudden catastrophes are never so full of pain as an anticipated calamity. At the same time there is much mystery about the subject, for the carnivora seem to have been constructed to devour animated victims.

The second letter is from Dr. Gerard Smith, M.R.C.S.E. He writes:—

"The Apparent Cruelty of Nature" is indeed an important subject to make clear, for so many are satisfied with a superficial knowledge of Nature, that they are unable justly to balance the two columns of the account. I feel, with Darwin, after his long and careful life of study, "that on the whole, pleasure decidedly predominates." Death comes to animals, as a rule, quickly; they have none of the mental and moral struggle and sorrow of man, and if we examine the accounts given us by those who have escaped from the jaws of wild beasts after injury, it would appear probable that even the mouse feels little pain when the cat plays with it (*vide* Livingstone and the lion). Personally, I look to *man* as the agent intended to modify the pain of the lower animals. Man's dominion over them, God-given as it is, should be exercised in doing all he can to make them happy; but still we see the *apparent* cruelty of Nature, added to by the *actual* cruelty of man; though, thanks be to God, this latter is less day by day. Our use of the lower animals was never intended to include such acts as useless and merely curious vivisection, and the barbarities of unskilled sportsmen and clumsy butchers.

Mr. D. Howard, F.C.S., &c.—It seems to me that the Chairman has admirably added to the Paper exactly what is wanted to complete it. We all have a natural anthropomorphic instinct, and attribute to animals our own thoughts and feelings, and every child naturally

fancies that animals think and talk. This feeling has an important bearing on the question of cruelty, and I believe it is quite right to sternly put down cruelty to animals, for, apart from the question whether they feel or otherwise, there is nothing more demoralising than the wanton infliction on animals of what would give pain to ourselves. Scientific researches stand on quite another ground. I do not think there is any fear of such studies increasing cruelty to animals. The difference that has been shown between educated animals and wild animals is of great importance. It is wonderful how contact with the human mind changes the characters of animals. We must not argue that the sensitiveness of the race-horse, for instance, is a measure of the feeling of the undomesticated lower animals, it is a totally different thing—you cannot argue from the one to the other. Of this I feel sure that *if it be taken rightly, such a Paper as this will not justify any wanton cruelty on the part of any careless or cruel person, old or young.*

Rev. F. A. WALKER, D.D.—I see one of the first Entomologists in the country present to-night, and I hope Mr. Kirby will favour us with some remarks on this very interesting Paper. As regards my own views, I cordially agree with a great deal of Mr. Wood's Paper, but there are some points in it upon which I hesitate to do so. I cannot help thinking that the feeling of pain is rather underrated in Nature. Mr. Wood brought forward, for example, the case where the ichneumon fly exerts its ovipositor on the body of a moth. The caterpillar of the Puss moth (*Cerura vinula*) when pierced, so far from remaining quiescent under the operation, evidently uses its forks and not unfrequently drives away the fly, which then awaits an opportunity to renew its attack. With regard to the higher orders of Nature, there are, I think, abundant instances of whales suffering intense pain from the persistent attacks of sharks, and from the thrasher leaping on their backs, and they are often quite unable to escape or survive the repeated and fierce attacks of their natural foes. The thrasher, when it leaps out of the water, falls with great force on a whale's back, and I understand that on such occasions the whale gives a sickening throb throughout its whole bulk, as though feeling agonising pain, and it ultimately succumbs to the combined attacks of two or three of its foes. As regards birds, I think, from the cry that cocks utter when in fighting they pull feathers out of each other, they must suffer great pain; and the noise a dog makes when a cat claws

him, shows he suffers also; but doubtless the author would say that it is not fair to argue from domestic animals. I suppose it is true that serious and even fatal wounds do not necessarily entail pain. It is said in respect of Charles XII of Sweden, when he received his death wound at the battle of Friedrichshall, that so far from suffering pain, his first instinct was an endeavour to clasp his sword-hilt with his shattered arm.

The CHAIRMAN.—May I add one remark as to a dog dreading punishment and crying out. I was once much struck when grouse shooting in the Highlands. With the keeper were two Gordon setters, dogs that worked well. The keeper was a strict man, and something went wrong. I was a little distance off, heard one of the dogs howling, and saw the whip going in the air. I went up and said, "Why do you beat the dog?" He turned to me and said, "I never touched the dog. I was beating the heather by his side; it answers the purpose just as well."

Rev. A. K. CHERRILL, M.A.—I should be glad to say a few words on the controversial aspect of this question which has hardly yet been touched on. The Author pointed out at the beginning of his Paper that attacks upon Christianity and theism in general have been founded on the supposed cruelty of Nature. Objectors say that the Creator cannot be merciful and powerful to have created a world in which suffering so much abounds. Mr. Wood's argument took the form of minimising the amount of suffering, which he did very successfully, showing that the suffering in Nature is not nearly so great as it is often supposed to be. But I doubt whether this goes far enough for a controversial argument, for the man who started the objection that an all-powerful and merciful God could not have created a world in which so much suffering exists, might answer that this only affects the question of degree; why should God create a world in which suffering exists at all? Therefore, to meet the objection fully we require something more than diminished suffering; we require to show that the suffering of pain in itself is not to be set down purely as an evil. I think it was Hans Andersen who wrote a story to show the use that suffering is to man, and the extraordinary evils into which he would fall if he had not the power of feeling or suffering pain. But we do not need fairy tales or stories to illustrate the point, for it seems to me that a strong scientific argument can be advanced to show that the suffering of pain is not really an evil but a good. As the Author

truly pointed out, we cannot suppose that the lowest classes in the animal kingdom are capable of suffering pain, but as we ascend in the scale of animal life, the capacity for suffering increases. If that be so, then evolutionists must admit that the capacity for suffering is one of the products of evolution, and, therefore, that it must be beneficial, because the very principle of evolution is that only those varieties that are beneficial are preserved. Therefore I think the principle of the evolutionists shows that the capacity for suffering pain is not an evil, but, on the contrary, a benefit, and the contention that the suffering of pain is a cruelty falls to the ground, for Nature is no more guilty of cruelty than the surgeon who inflicts pain for our ultimate good.

Professor H. LANGHORNE ORCHARD, M.A., B.Sc.—The fact of pain is, on Herbert Spencer's reasoning, a calamity. Every pleasure, he says, advances and raises the tide of life, and every pain lowers the tide of life. The great aim of life is accorded by him to pleasure. Therefore, the fact that as man becomes more civilised he feels pain more keenly, is an argument against evolutionism. It cannot be denied, I think, that the lower animals suffer pain—very little, probably, but still some; the very fact of weariness is, of itself, a form of pain. No one, I think, can dispute that the lower animals suffer from that form of pain at all events. They suffer from thirst and hunger, and those things are forms of pain; but the existence of suffering in the universe is a very different thing from the existence of cruelty accompanying it. Pain, in fact, has been called the sentinel which attracts attention to some injury in the system which, but for pain, we should neglect and not attend to. In order to establish cruelty, there would have to be proved the intention to inflict unnecessary pain. Unless such an intention can be established, the charge of cruelty against the Author of Nature must fail. The mere infliction of suffering is not cruelty. To pull a person by the hair of the head would ordinarily be considered a cruel operation; but supposing it were to save him from drowning we should no longer call it cruel, but even benevolent. Similarly, an operation by a surgeon is not cruel but benevolent, and why so? Because it is not done with the intention to cause unnecessary suffering, but it is done with a remedial object for the ultimate good of the person. As it is impossible to show that the suffering and pain that occurs in Nature is not for the ultimate benefit of its recipients, the charge of cruelty must fail.

Mr. W. F. KIRBY, F.L.S., F.E.S., &c.—It has always seemed to me that pain is simply calculated to effect a useful end. I think I am correct in saying that it is generally distributed in such a manner as to be a warning when an injury is inflicted, or else to prevent worse injury. Consequently, when a sudden injury, that cannot be foreseen and provided for in the ordinary course of events, is inflicted, pain sometimes ceases to operate, being no longer useful. As to insects, I need hardly go into that question, which the Lecturer has treated so well; but I may say, in the case of beetles, that they will sometimes remain alive for many months with a pin through them, and apparently enjoy themselves. It has been recorded that one beetle remained alive for upwards of two years in this state. A caterpillar will certainly wince at times when attacked by ichneumons, but whether that is from pain, fear, or reflex action, is, of course, open to doubt. I remember reading a story—I think by Professor Jesse—of a pike that was thrown out of the water and injured its head and appeared to be in great pain. A gentleman, who was a naturalist, going by, relieved it and returned it to the water, and the pike always recognised him when he came back to the same place afterwards.

With regard to the cases of human susceptibility to pain that have been adduced, I may say that it frequently happens that when operations have been performed under chloroform, or under the influence of mesmerism (or as it is now improperly called, hypnotism), patients have often been unconscious of it until they have actually seen the wound, and only then have they declared that they felt pain. There are several instances of this kind on record.

The CHAIRMAN.—Before the Author replies, perhaps I may remind you that if you take away the capacity for feeling pain, you take away that for feeling pleasure also; for pain is often the excess of that which in more moderate degree gives pleasure. If invertebrates feel no pain, probably they feel little pleasure, for the mere reflex movement and response to stimuli does not necessarily imply either pleasurable or painful sensations.

The AUTHOR.—I will begin by noticing some of Dr. Walker's statements as to insects and animals.

First as to the *Cerura vinula* caterpillar. How do you prove that it is capable of feeling pain? Is not its action simply

attributable to the instinct of self-preservation? [Dr. WALKER: I suppose it felt something on the penetration of the skin.] That, I think, is only self-preservation, as I instance in the Paper. [Dr. WALKER: It was not a mere wriggling, but it was the vigorous brushing with its two caudal appendages by which it tried to save itself.] I do not see that it was anything more than self-preservation before the piercing really took place. As to cocks fighting, is it certain that it is pain or passion? [Dr. WALKER: Pain, I should say, when the feathers are pulled out.] In some cases of savages screams are emitted which do not seem to apply to pain. As to hounds, of course they are domesticated animals, and cannot be put in the same category as wild animals. Where these have to some extent been civilised, sensation is increased: they are then not wild animals, and you cannot draw any argument for the purposes of this question from them.

As to the piercing the thorax of the insect that I referred to, of course the thorax is closely permeated with large nerves connected with the head, and is therefore a pretty good test. I have known of moths being stuffed—they have been chloroformed and the whole of the abdomen slit open and the interior taken out and replaced with cotton wool and closed—and five minutes after they have recovered from the chloroform, they have been walking about the table, with nothing inside their bodies but the cotton wool. Then as to the dog referred to by the Chairman, which cried when he was not being beaten, I had a similar case in my own dog, a very nervous one and a great humbug. A sister of mine has beaten him with a straw and he has howled as if in agonies, and anyone hearing him would have said he was suffering excruciating pain. Then Mr. Cherrill, I think, spoke of evolution. It is not necessary to treat evolution as a proved fact, but if it brings a sense of pain with it, I do not see that it is an argument against pain being useful; for we know that it warns us that we are receiving injuries, which, if it were not for that warning, might proceed in such a measure as to bring about loss of life. I should suppose, therefore, that the sense of pain would be a benefit.

Then, with regard to the attack made by the thrasher on the whale, and its supposed results. A whale's body is encased throughout in a coating of blubber, varying from eight or ten inches to nearly two feet in thickness. I cannot quite understand how even a blow from a thrasher's tail could be felt through this

blubber; but I *can* understand that the blow would necessarily cause the animal to quiver from head to tail, *not* from any sense of pain, but from the simple mechanical effect of the stroke on a semi-solid mass. And this, I think, amply accounts for the "sickening throb" to which Dr. Walker refers.

I possess records of several cases in which whales have been killed by thrashers, but in every instance the assailants were assisted by sword-fish, which were apparently by far the more formidable of the two.

With reference to the theological aspect of the question. I purposely abstained from entering thereon on this occasion. Of course we all grant, as Christians, that, God being beneficent, there can be no cruelty in Nature; but in a Paper of this description it is necessary to meet the unbeliever on his own grounds, and we must show from facts in Nature that cruelty does not exist. For our own part, we can understand without proofs of this kind; but with an unbeliever one must try to confute his statements from facts in Nature. I thank you sincerely for the kind way in which you have listened to my remarks.

The Meeting was then adjourned.