

[July 13, 1867.]

Mr. Darwin at the Antipodes.

(FROM THE SPECTATOR.)

"The native [Maori] saying is, 'As the white man's rat has driven away the native rat, as the European fly drives away our own, as the clover kills our fern, so will the Maoris disappear before the white man himself.'" Thus quotes Dr. Hooker, the eminent naturalist of our Kew Gardens, in a remarkable article in the new number of the *Popular Science Review* on "The Struggle for Existence among Plants." "The European house-fly," says Dr. Hooker, "seems to drive out before it the native blue-bottle of New Zealand,

so that settlers, knowing its value, carry it in boxes and bottles to their inland stations." So, too, in the vegetable world, the vegetable emigration from Europe seems to drive before it the native products of the New Zealand soil. "The noisy tran of English migration is not more surely doing its work than the stealthy tide of English weeds, which are creeping over the waste, cultivated, and virgin soil, in annually increasing numbers of genera, species, and individuals." Dr. Hooker quotes a New Zealand correspondent to the same effect:—

"You would be surprised at the rapid spread of European and other foreign plants in this country. All along the sides of the main lines of roads through the plains, a *Polygonum* (aviculare), called 'cow-grass,' grows most luxuriantly, the roots sometimes two feet in depth, and the plants spreading over an area from four to five feet in diameter. The dock (*Rumex obtusifolius* or *R. crispus*) is to be found in every river-bed, extending into the valleys of the mountain rivers, until these become mere torrents. The sow thistle is spread all over the country, growing luxuriantly nearly up to 6,000 feet. The water-cress increases in our still rivers to such an extent as to threaten to choke them altogether: in fact, in the Avon, a still, deep stream, running through Christ Church, the annual cost of keeping the river free for boat navigation and for purposes of drainage exceeds £300. I have measured stems twelve feet long and three-quarters of an inch in diameter. In some of the mountain districts, where the soil is loose, the white clover is completely displacing the native grasses, forming a close sward."

And later in his article he tells us the most remarkable fact of all, that—

"The little white clover, and other herbs, are actually strangling and killing outright the New Zealand flax (*Phormium tenax*), a plant of the coarsest, hardest, and toughest description, that forms huge matted patches of woody rhizomes, which send up tufts of sword-like leaves, six to ten feet high, and inconceivably strong in texture and fibre. I know of no English plant to which the New Zealand flax can be likened, so as to give any idea of its robust constitution and habit, to those who do not know it; in some respects the great matted tussocks of *Carex paniculata* approach it. It is difficult enough to imagine the possibility of white clover invading our bogs, and smothering the tussocks of this *Carex*, but this would be child's play in comparison with the resistance the *Phormium* would seem to offer."

It is an illustration of the same process that the European horse so increases in South America as to gain rapidly upon the native animals of these plains, and that in New Zealand the English pig runs wild, and multiplies at a rate which is a serious danger to the sheep-farmers, whose flocks of lambs the wild hog decimates. That a little and apparently feeble plant like clover should be able to win a complete victory over the formidable sworded flax of New Zealand, and that the English fly should drive out the blue-bottle which is such a nuisance to the settlers, are striking illustrations of the apparent power which human civilisation seems to lend to even the animals and plants that have thoroughly adapted themselves to its conditions,—illustrations which inevitably suggest the superstitious view of the subject conveyed in the Maori presage with which we commenced this article. It seems as if the mere local connexion with civilised beings which is implied in buzzing in civilised windows and growing on ploughed fields, were a physical tonic to the constitution of animals and plants which enables them, when put in competition with the native insects, animals, or plants of barbarous countries, to win as easy a victory as civilisation wins over barbarism. Does not

the English fly contract a cunning from its residence in English larders, which makes it more than the match of the big Maori blue-bottle? Have not the clover and watercress imbibed, by the process of selection, structural habits of economising the juices of the comparatively poor English soil, which gives them an advantage over the plants that have grown up for ages in a soil too rich to need any such provisions for assimilating all the most nutritious elements of growth? It is quite conceivable that in an old and much filled country only the more hardy species, those which have the most powerful attraction for the juices in the soil on which they live, will succeed in yielding good crops; while in a very rich country,—especially when combined with a milder climate—this process of contest between the more and less vigorous species will go on much more tranquilly and slowly, so that the race between one plant and another for nutrition may not have elaborated anything like such special powers of competition for sap. Dr. Hooker tells us that seedlings of the cedar and the maple come up even with us in the early spring by thousands in the grass-ground where they are planted, but then, as soon as the grass begins to grow again, the grass draws away all their supplies of nourishment, and they die away. This seems to show that perennial grasses have a much stronger relative attraction for the nutritious elements of the earth than seedling trees; but in New Zealand it would seem, from Dr. Hooker's account, that even annuals from Europe often beat New Zealand perennials in the race. That is, it may be, the seeds of the European plants obtain in a few months as strong a hold of the ground as the native perennials have gained in many years, and then, by virtue of their "naturally selected" species, assimilate with more rapidity and effect than their perennial neighbours the juices of the soil, and so starve the plants in their vicinity. The vegetable, which in England has gone through centuries of competition for existence with other vegetables, has lost by the death of the weaker plants all the more languid and feeble elements of its physiology, while the New Zealand perennial, living undisturbed in a milder climate and much richer soil, has been left comparatively without any process of competitive selection, till, like the luxurious man who has had all his comforts and necessities at his elbow, when competing for existence against the trained hunter who has lived by his knife and gun, it is worsted at every turn by the harder rival. It would be easy, of course, to suggest a similar account of the success of the European fly and European rat in competing against the native blue-bottle and the native rat. In neither case, probably, is it due to greater strength or ferocity, greater

aptitude for war, but to instincts trained through successive generations under more difficult circumstances. Those European flies and rats which have not been able to adapt themselves to their condition in a country where the most nourishing food is usually jealously guarded, and where all wild animals have less and less chance every year, have died out, and only those remained which by harder constitution, greater caution, less offensive habits, and more subtle instincts, have been able, while supporting themselves, sufficiently to avoid the enmity of man to prevent any war of extermination being waged against them. And these trained instincts of course tell greatly in their favour when they come to be pitted against races which have not hitherto needed them for their protection. Such is the apparently most natural inference from Dr. Hooker's strange array of facts to prove that while the plants and animals of the antipodes show no increased fertility when transplanted to Europe, no tendency to run our native plants hard in the struggle for existence, our plants and animals show as much colonising capacity as man himself when they emigrate with him to New Zealand. We take the case of New Zealand rather than that of any other virgin soil, like South America, because though many of the same phenomena are true of South America also, the conditions of climate are there generally so different that the experiment is disturbed by many other considerations. In New Zealand, on the contrary, though the climate is rather milder, owing to the greater extent of sea, the climatic conditions are exceedingly like those of England.

We have striven purposely to suggest an interpretation of these very curious and as yet unexplained facts which is entirely in the spirit of Mr. Darwin's great work—not, of course, as if any suggestion of ours could have the least scientific weight, but because the science of the day evidently inclines to attach more and more value to Mr. Darwin's hypothesis, at least as explaining the *modus operandi* of all those modifications of species which concern the vitality and tenacity of the surviving races. But now what picture does

this process really present to us of our little universe?—one, as some of the Darwinians think, of inexorable law sifting out the weak and casting them away as refuse, or one of strangely wise preparation for the dwelling-place of a being in whom the principle of "natural selection" gives way to the higher principle of moral selection? To us the latter seems the true image left upon the mind by the curious process the naturalists indicate to us. Here are a great number of strange laws at work, the total effect of which is to give to all the plants and animals which are least inconsistent with, and most useful to, the life of the most civilised races of men, a direct share in the protection of that civilisation. The shield of civilisation is as it were in some sense thrown over those inferior races of existences which, themselves incompetent to share it, and generally not even directly protected or guarded by man, are yet at the second remove, as it were, most important, in order to enable him to carry with ease into the still uncultivated and uncivilised parts of the earth the full advantages he has gained by long residence in cultivated and civilised regions. The animal and vegetable train of life which he cannot help drawing after him wherever he goes, the old grasses and weeds and flowers, the old insects and beasts, as well as those more valuable plants and domestic animals which he takes pains to carry with him, have all gained by their conditions of life in the Old World that hardiness which fits them to colonise as well as man himself, and to force their way into his new home without asking his consent, at the expense of the native flora and fauna. Everything not only that man intentionally brings with him, but that crawls after him almost by accident, spreads as he spreads. A moving atmosphere of power clings to his steps, so that even the lowest creatures which he has found useful or even but supportable for centuries in one place, will drive out, without giving him any trouble, the creatures which he would find comparatively useless or even insupportable in another. The clover driving the fern and even the sword-flax before it, and so preparing a rich pasture for the sheep,—the little house-fly, transported in boxes and bottles, and then left to supplant the disgusting native blue-bottle by its own energies, are but special illustrations of the general law that all that man has found on the whole—very often unconsciously, as in the case of the fly—suitable and, comparatively speaking, advantageous to him in ages of civilisation, has during those ages been acquiring, without knowing it, the power to follow him successfully into other regions, where the conditions of animal and vegetable life would otherwise be much less favourable to his existence, and so to share the charmed life of civilisation without being the objects of his intentional protection. Naturally one would have supposed that by the law of the "conflict for existence," the lush tropical forests of South America, the sworded flax tree and thick ferns of New Zealand, would have struggled with the most tremendous advantages against the foreign growths which civilised man brings with him, and which are so essential to his progress. And so it would be certainly, if art alone were his only dependence; if every animal and vegetable inconsistent with his comfort and safety had to be industriously exterminated, instead of retreating almost as if by magic, before him. But the fact is quite otherwise. The wild animals and wild growths even of the tropical forests yield easily before the weakest invader that has gone through the selecting process inseparable from civilisation. The clover follows man into the heart even of South American jungles, displacing the rank grasses it finds there. The horse and the sheep and the pig multiply in these raw wastes of vegetation with infinitely more rapidity than the wild animals which are native there. Man, of course, takes his arts with him, but where he might expect to have to fight Nature hardest with his most marvellous efforts, nature seems to acknowledge the mere magic of his preparations, and to yield to him without insisting on any laborious application of them. Even the tangled forests of the Amazon will probably yield to the first sincere effort at immigration with infinitely less difficulty than we expect. Rich, wild, and virgin soils nourish weak and comparatively untenacious forms of life, both animal and vegetable. The very luxuriance of growth is perhaps a sign of this weakness. The harder and subtler vitality of "selected,"—i.e., civilised,—nature,

soon beats the luxuriance of wild nature in the race.

And we must remember that this process of "natural" selection—selection with respect merely to weakness and strength—is arrested directly we reach man, directly we reach a being endowed with a character which can see that there is a weakness stronger than strength,

indeed a strength in weakness itself, when that weakness is the weakness of reverence, self-denial, and love. Our poor-laws, our hospitals, our healing art, our charities, are all so many agencies for counteracting the process of "natural selection" so soon as we arrive at a stage of culture when we can see that mere strength, mere tenacity of life, is not itself divine. Natural selection stops, or begins to stop, with the very race for whom it has hitherto worked with so beneficial an effect. It prepares a region suitable for civilised man, and enables him to conquer with infinitely greater ease other regions not thus suitable for him, and then the being for whom all this has been done is taught that, after all, his highest duty and noblest function in relation to his own race lies in reversing the process, in protecting the weak, in lifting up the hands that hang down, in strengthening the feeble knees, in guarding with the tenderest care every spark of human reason and human love. How should a being placed in the position which man holds on the earth by long ages of merely "natural selection," of struggle for existence, have learned that this very process, this fierce competitive strife, is one of the very lowest of his functions,—the one, indeed, which he shares with the lower order of plants and animals,—if the Providence which had watched over the one process had not been waiting to give the corrective and the great supplement to His own teaching, the moment He had at last prepared for Himself a being worthy of it? To our minds the most wonderful side of the Darwinian theory is, that it shows us, in such strong contrast, what God has really done to perfect our physical and animal nature, and that the being for whom He has done all this, and who is the first to know it, is the first also to know that the law of conflict and competition is the lowest of the laws of human nature, and is recognized by us only in learning to keep it well under us. It would be the strangest of all paradoxes if a universe really accounted for by the law of competition, was crowned by the one being who, in his highest moments, reverses and repudiates that law.

Mr. Darwin at the Antipodes.

(FROM THE SPECTATOR.)

"The native [Maori] saying is, 'As the white man's rat has driven away the native rat, as the European fly drives away our own, as the clover kills our fern, so will the Maoris disappear before the white man himself.'" Thus quotes Dr. Hooker, the eminent naturalist of our Kew Gardens, in a remarkable article in the new number of the *Popular Science Review* on "The Struggle for Existence among Plants." "The European house-fly," says Dr. Hooker, "seems to drive out before it the native blue-bottle of New Zealand,

so that settlers, knowing its value, carry it in boxes and bottles to their inland stations." So, too, in the vegetable world, the vegetable emigration from Europe seems to drive before it the native products of the New Zealand soil. "The noisy train of English migration is not more surely doing its work than the stealthy tide of English weeds, which are creeping over the waste, cultivated, and virgin soil, in annually increasing numbers of genera, species, and individuals." Dr. Hooker quotes a New Zealand correspondent to the same effect:—

"You would be surprised at the rapid spread of European and other foreign plants in this country. All along the sides of the main lines of roads through the plains, a *Polygonum* (aviculare), called 'cow-grass,' grows most luxuriantly, the roots sometimes two feet in depth, and the plants spreading over an area from four to five feet in diameter. The dock (*Rumex obtusifolius* or *R. crispus*) is to be found in every river-bed, extending into the valleys of the mountain rivers, until these become mere torrents. The sow thistle is spread all over the country, growing luxuriantly nearly up to 6,000 feet. The water-cress increases in our still rivers to such an extent as to threaten to choke them altogether: in fact, in the Avon, a still, deep stream, running through Christ Church, the annual cost of keeping the river free for boat navigation and for purposes of drainage exceeds £300. I have measured stems twelve feet long and three-quarters of an inch in diameter. In some of the mountain districts, where the soil is loose, the white clover is completely displacing the native grasses, forming a close sward."

And later in his article he tells us the most remarkable fact of all, that—

"The little white clover, and other herbs, are actually strangling and killing outright the New Zealand flax (*Phormium tenax*), a plant

New Zealand flax (*Phormium tenax*), a plant of the coarsest, hardest, and toughest description, that forms huge matted patches of woody rhizomes, which send up tufts of sword-like leaves, six to ten feet high, and inconceivably strong in texture and fibre. I know of no English plant to which the New Zealand flax can be likened, so as to give any idea of its robust constitution and habit, to those who do not know it; in some respects the great matted tussocks of *Carex paniculata* approach it. It is difficult enough to imagine the possibility of white clover invading our bogs, and smothering the tussocks of this *Carex*, but this would be child's play in comparison with the resistance the *Phormium* would seem to offer."

It is an illustration of the same process that the European horse so increases in South America as to gain rapidly upon the native animals of these plains, and that in New Zealand the English pig runs wild, and multiplies at a rate which is a serious danger to the sheep-farmers, whose flocks of lambs the wild hog decimates. That a little and apparently feeble plant like clover should be able to win a complete victory over the formidable sworded flax of New Zealand, and that the English fly should drive out the blue-bottle which is such a nuisance to the settlers, are striking illustrations of the apparent power which human civilisation seems to lend to even the animals and plants that have thoroughly adapted themselves to its conditions,—illustrations which inevitably suggest the superstitious view of the subject conveyed in the Maori presage with which we commenced this article. It seems as if the mere local connexion with civilised beings which is implied in buzzing in civilised windows and growing on ploughed fields, were a physical tonic to the constitution of animals and plants which enables them, when put in competition with the native insects, animals, or plants of barbarous countries, to win as easy a victory as civilisation wins over barbarism. Does not the English fly contract a cunning from its residence in English larders, which makes it more than the match of the big Maori blue-bottle? Have not the clover and watercress imbibed, by the process of selection, structural habits of economising the juices of the comparatively poor English soil, which gives them an advantage over the plants that have grown up for ages in a soil too rich to need any such provisions for assimilating all the most nutritious elements of growth? It is quite conceivable that in an old and much tilled country only the more hardy species, those which have the most powerful attraction for the juices in the soil on which they live, will succeed in yielding good crops; while in a

will succeed in yielding good crops; while in a very rich country,—especially when combined with a milder climate—this process of contest between the more and less vigorous species will go on much more tranquilly and slowly, so that the race between one plant and another for nutrition may not have elaborated anything like such special powers of competition for sap. Dr. Hooker tells us that seedlings of the cedar and the maple come up even with us in the early spring by thousands in the grass-ground where they are planted, but then, as soon as the grass begins to grow again, the grass draws away all their supplies of nourishment, and they die away. This seems to show that perennial grasses have a much stronger relative attraction for the nutritious elements of the earth than seedling trees; but in New Zealand it would seem, from Dr. Hooker's account, that even annuals from Europe often beat New Zealand perennials in the race. That is, it may be, the seeds of the European plants obtain in a few months as strong a hold of the ground as the native perennials have gained in many years, and then, by virtue of their "naturally selected" species, assimilate with more rapidity and effect than their perennial neighbours the juices of the soil, and so starve the plants in their vicinity. The vegetable, which in England has gone through centuries of competition for existence with other vegetables, has lost by the death of the weaker plants all the more languid and feeble elements of its physiology, while the New Zealand perennial, living undisturbed in a milder climate and much richer soil, has been left comparatively without any process of competitive selection, till, like the luxurious man who has had all his comforts and necessaries at his elbow, when competing for existence against the trained hunter who has lived by his knife and gun, it is worsted at every turn by the hardier rival. It would be easy, of course, to suggest a similar account of the success of the European fly and European rat in competing against the native blue-bottle and the native rat. In neither case, probably, is it due to greater strength or ferocity, greater

aptitude for war, but to instincts trained through successive generations under more difficult circumstances. Those European flies and rats which have not been able to adapt themselves to their condition in a country where the most nourishing food is usually jealously guarded, and where all wild animals have less and less chance every year, have died out, and only those remained which by hardier constitution, greater caution, less offensive habits, and more subtle instincts, have been able, while supporting themselves, sufficiently to resist the enmity of man to prevent any

able, while supporting themselves, sufficiently to avoid the enmity of man to prevent any war of extermination being waged against them. And these trained instincts of course tell greatly in their favour when they come to be pitted against races which have not hitherto needed them for their protection. Such is the apparently most natural inference from Dr. Hooker's strange array of facts to prove that while the plants and animals of the antipodes show no increased fertility when transplanted to Europe, no tendency to run our native plants hard in the struggle for existence, our plants and animals show as much colonising capacity as man himself when they emigrate with him to New Zealand. We take the case of New Zealand rather than that of any other virgin soil, like South America, because though many of the same phenomena are true of South America also, the conditions of climate are there generally so different that the experiment is disturbed by many other considerations. In New Zealand, on the contrary, though the climate is rather milder, owing to the greater extent of sea, the climatic conditions are exceedingly like those of England.

We have striven purposely to suggest an interpretation of these very curious and as yet unexplained facts which is entirely in the spirit of Mr. Darwin's great work—not, of course, as if any suggestion of ours could have the least scientific weight, but because the science of the day evidently inclines to attach more and more value to Mr. Darwin's hypothesis, at least as explaining the *modus operandi* of all those modifications of species which concern the vitality and tenacity of the surviving races. But now what picture does this process really present to us of our little universe?—one, as some of the Darwinians think, of inexorable law sifting out the weak and casting them away as refuse, or one of strangely wise preparation for the dwelling-place of a being in whom the principle of "natural selection" gives way to the higher principle of moral selection? To us the latter seems the true image left upon the mind by the curious process the naturalists indicate to us. Here are a great number of strange laws at work, the total effect of which is to give to all the plants and animals which are least inconsistent with, and most useful to, the life of the most civilised races of men, a direct share in the protection of that civilisation. The shield of civilisation is as it were in some sense thrown over those inferior races of existences which, themselves incompetent to share it, and generally not even directly protected or guarded by man, are yet at the second remove, as it were, most important, in order to enable him to carry with ease into the still uncultivated and uncivilised parts of the earth the full advantages he has gained by long residence in

advantages he has gained by long residence in cultivated and civilised regions. The animal and vegetable train of life which he cannot help drawing after him wherever he goes, the old grasses and weeds and flowers, the old insects and beasts, as well as those more valuable plants and domestic animals which he takes pains to carry with him, have all gained by their conditions of life in the Old World that hardiness which fits them to colonise as well as man himself, and to force their way into his new home without asking his consent, at the expense of the native flora and fauna. Everything not only that man intentionally brings with him, but that crawls after him almost by accident, spreads as he spreads. A moving atmosphere of power clings to his steps, so that even the lowest creatures which he has found useful or even but supportable for centuries in one place, will drive out, without giving him any trouble, the creatures which he would find comparatively useless or even insupportable in another. The clover driving the fern and even the sword-flax before it, and so preparing a rich pasture for the sheep,—the little house-fly, transported in boxes and bottles, and then left to supplant the disgusting native blue-bottle by its own energies, are but special illustrations of the general law that all that man has found on the whole—very often unconsciously, as in the case of the fly—suitable and, comparatively speaking, advantageous to him in ages of civilisation, has during those ages been acquiring, without knowing it, the power to follow him successfully into other regions, where the conditions of animal and vegetable life would otherwise be much less favourable to his existence, and so to share the charmed life of civilisation without being the objects of his intentional protection. Naturally one would have supposed that by the law of the "conflict for existence," the lush tropical forests of South America, the sworded flax tree and thick ferns of New Zealand, would have struggled with the most tremendous advantages against the foreign growths which civilised man brings with him, and which are so essential to his progress. And so it would be certainly, if art alone were his only dependence; if every animal and vegetable inconsistent with his comfort and safety had to be industriously exterminated, instead of retreating almost as if by magic, before him. But the fact is quite otherwise. The wild animals and wild growths even of the tropical forests yield easily before the weakest invader that has gone through the selecting process inseparable from civilisation. The clover follows man into the heart even of South American jungles, displacing the rank grasses it finds there. The horse and the

sheep and the pig multiply in these new wastes of vegetation with infinitely more rapidity than the wild animals which are native there. Man, of course, takes his arts with him, but where he might expect to have to fight Nature hardest with his most marvellous efforts, nature seems to acknowledge the mere magic of his preparations, and to yield to him without insisting on any laborious application of them. Even the tangled forests of the Amazon will probably yield to the first air-borne effort at immigration with infinitely less difficulty than we expect. Rich, wild, and virgin soils nourish weak and comparatively untenacious forms of life, both animal and vegetable. The very luxuriance of growth is perhaps a sign of this weakness. The harder and subtler vitality of "selected,"—i. e., civilised,—nature,

soon beats the luxuriance of wild nature in the race.

And we must remember that this process of "natural" selection—selection with respect merely to weakness and strength—is arrested directly we reach man, directly we reach a being endowed with a character which can see that there is a weakness stronger than strength, indeed a strength in weakness itself, when that weakness is the weakness of reverence, self-denial, and love. Our poor-laws, our hospitals, our healing art, our charities, are all so many agencies for counteracting the process of "natural selection" so soon as we arrive at a stage of culture when we can see that mere strength, mere tenacity of life, is not itself divine. Natural selection stops, or begins to stop, with the very race for whom it has hitherto worked with so beneficial an effect. It prepares a region suitable for civilised man, and enables him to conquer with infinitely greater ease other regions not thus suitable for him, and then the being for whom all this has been done is taught that, after all, his highest duty and noblest function in relation to his own race lies in reversing the process, in protecting the weak, in lifting up the hands that hang down, in strengthening the feeble knees, in guarding with the tenderest care every spark of human reason and human love. How should a being placed in the position which man holds on the earth by long ages of merely "natural selection," of struggle for existence, have learned that this very process, this fierce competitive strife, is one of the very lowest of his functions,—the one, indeed, which he shares with the lower order of plants and animals,—if the Providence which had watched over the one process had not been waiting to give the corrective and the great supplement to His own teaching, the moment He had at last prepared for Himself a being worthy of it? To our

for Himself a being worthy of it? To our minds the most wonderful side of the Darwinian theory is, that it shows us, in such strong contrast, what God has really done to perfect our physical and animal nature, and that the being for whom He has done all this, and who is the first to know it, is the first also to know that the law of conflict and competition is the lowest of the laws of human nature, and is recognized by us only in learning to keep it well under us. It would be the strangest of all paradoxes if a universe really accounted for by the law of competition, was crowned by the one being who, in his highest moments, reverses and repudiates that law.
