necessary steps to procure these signals. An arrangement has been made also by which they may be distributed to jewelers and clockmakers, and manufacturing establishments in the larger cities.

THE UNITY OF NATURE.

By the Duke of Argyll.

VII.

ON THE MORAL CHARACTER OF MAN CONSIDERED IN THE LIGHT OF THE UNITY OF NATURE.

(*Continued*).

Of one thing, at least, we may be tolerably certain respecting the causes which have led to this extreme dispersion of Mankind to inhospitable regions, at a vast distance from any possible center of their birth. The first Fuegian was not impelled to Cape Horn by the same motives which impelled Mr. Darwin to visit that country in the *Beagle*. The first Eskimo, who wintered on the shores of Baffin's Bay, was not induced to do so for the same reasons which led to the expeditions of Back, of Franklin, or of Rae. The first inhabitants of Australasia did not voyage there under conditions similar to those which attended the voyages of Tasman or of Cook. We cannot suppose that those distant shores were first colonized by men possessed with the genius, and far advanced in the triumphs, of modern civilization. Still less can we suppose that they went there under the influence of that last development of Man's intellectual nature, which leads him to endure almost any suffering in the cause of purely scientific investigation.

Nor is this the only solution of the difficulty which seems to be absolutely excluded by the circumstances of the case. Within the historical period, and in the dim centuries which lie immediately beyond it, we know that many lands have been occupied by conquering races coming from a distance. Sometimes they came to subdue tribes which had long preceded them in occupation, but which were ruder, as well as weaker, than themselves. Sometimes, as in the case of the northern nations bursting in upon the Roman empire, they came to overthrow a civilization which had once been, and in many ways still was, much higher than their own, but which the progress of development in a wrong direction had sunk in degradation and decay. Sometimes they came simply to colonize new lands, at least as favored, and generally much more favored, than their own—bringing with them all the resources of which they were possessed—their flocks and herds, their women and children, as well as their warriors with chariots and horses. Such was the case with some of those nations which at various times have held their sway from Central Asia into Eastern and Central Europe. They were nations on the march. But no movement of a like kind has taken place for many centuries. Lastly, we have the emigrations of our own day, when civilized men, carrying with them all the knowledge, all the requirements, and all the materials of an advanced civilization, have landed in countries which by means of these could be made fit for settlement, and could be converted into the seats of agriculture and of commerce.

Not one of these cases can reasonably be supposed to have been the case of the first arrival of Man in Australasia. The natural disadvantages of the country, as compared with the richness and abundance of the regions from which he must have come, or which were on his southward line of march, preclude the supposition that men were attracted to it by natural objects of desire. We know by experience that if the first settlers had been in a condition to bring with them the higher animals which abound in Asia, these animals would have flourished in Australia as they now do. And so, also, with reference to the cereals—if these had ever been introduced, the modern Australians would not have been wholly without them, and would not have been compelled to live so much on the lowest kinds of animal and vegetable food—on fish, lizards, grubs, snakes, and the roots of ferns.

There is, however, one answer to Mr. Darwin's question, which satisfies all the conditions of the case. There is one explanation, and only one, of the dispersion of the human race to the uttermost extremities of the habitable globe. The secret lies in that great law which Malthus was the first to observe and to establish—the law, namely, that population is always pressing on the limits of subsistence. There is a constant tendency to multiplication beyond those limits. And, among the many consequences of this tendency, the necessity of dispersion stands first and foremost. It is true, indeed, that under some conditions, such as those which have been already indicated, the most energetic races, or the most energetic individuals, have been those who moved. But under many other conditions the advantage has been in favor of those who staid. Quarrels and wars between tribe and tribe, induced by the mere increase of numbers, and by consequent pressure upon the means of living, have been always, ever since Man existed, driving the weaker individuals and the weaker families farther and farther from the original settlements of Mankind.

Then one great argument remains. In the nature of things the original settlements of Man must of necessity have been the most highly favored in the conditions he requires. If, on the commonly received theory of Development, those conditions produced him, they must have reached at the time when, and in the place where, he arose, the very highest degree of perfect adaptation. He must have been happy in the circumstances in which he found himself placed, and presumably he must have been contented to remain there. Equally on the theory of Man being a special creation, we must suppose that when weakest and most ignorant he must have been placed in what was to him a garden—that is to say, in some region where the fruits of the earth were abundant and easily accessible. Whether this region were wide or narrow, he would not naturally leave it except from necessity. On every possible supposition, therefore, as to the origin of Man, those who in the dispersion of the race were first subjected to hard and unfavorable conditions would naturally be those who had least strength to meet them, and upon whom they would have accordingly the most depressing effect. This is a process of Natural Rejection which is the inseparable correlative of the process of Natural Selection. It tends to development in a wrong direction by the combined action of two different circumstances which are inherent in the nature of the case. First, it must be always the weaker men who are driven out from comfortable homes; and, secondly, it must be always to comparativly unfavorable regions that they are compelled to fly. Under the operation of causes so combined as these, it would be strange, indeed, if the physical and mental condition of the tribes which have been exposed to them should remain unchanged. It is true, indeed, that adverse conditions, if they be not too severe, may develop energy, and result in the establishment of races of special hardihood. And in many cases this has been the actual result. But, on the other hand, if physical conditions be as insuperable as those which prevail in Tierra del Fuego or in Baffin's Bay; or if, though less severe than these, they are nevertheless too hard to be overcome by the resources at the disposal of the men who are driven to encounter them, then the battle of life becomes a losing one. Under such circumstances, degration is unavoidable. As surely as the progress of Man is the result of opportunity, that is to say, as surely as it is due to the working of his faculties under stimulating and favoring conditions, so surely must he descend in the scale of intelligence and culture, when that opportunity is taken from him, and when these faculties are placed under conditions where they have no call to work.

It is, then, easy to see some at least of the external circumstances, which, first, in the natural course of things,

would bring an adverse influence to bear upon Mankind. Here we are on firm ground, because we know the law from which comes the necessity of migrations, and the force which has propelled successive generations of men farther and farther in ever widening circles round the original centre or centres of their birth. Then, as it would be always the feebler tribes which would be driven from the ground which has become overstocked, and as the lands to which they went forth were less and less hospitable in climate and productions, the struggle for life would be alwaye harder. And so it would generally happen, in the natural course of things, that the races which were driven farthest would become the rudest and the most engrossed in the pursuits of mere animal existence.

Accordingly, we find that this key of principle fits into and explains many of those facts in the distribution and condition of Mankind, which, in the case of the Fuegians, excited the wonder and curiosity of Darwin. In the light of this explanation, these facts seem to take form and order. It is a fact that the lowest and rudest tribes in the population of the globe have been found, as we have seen, at the farthest extremities of its larger continents—or in the distant islands of its great oceans, or among the hills and forests which in every land have been the last refuge of the victims of violence and misfortune. These extreme points of land which in both hemispheres extend into severe latitudes are not the only portions of the globe which are highly unfavorable to man. There are other regions quite as bad, if not, in some respects, even worse. In the dense, uniform and gloomy forests of the Amazon and Orinoco there are tribes which seem to be among the lowest in the world. It cannot be unconnected with the savagery of the condition to which they have been reduced that we find the remarkable fact that all those regions of Tropical America are wholly wanting in the animals which are capable of domestication; and which are inseparable from the earliest traces of human culture. The Ox, the Horse, and the Sheep are all absent—even as regards the genera to which they belong. There are indeed the Tapir, the Paca, and the Curassow Turkey, and all these are animals which can be tamed. But none of them will breed in confinement, and the races cannot be established as useful servants of Mankind. In contrast with these and with other insuperable disadvantages of men driven into the forests of Tropical America, it is instructive to observe that the same races, where free from these disadvantages, were never reduced to the same condition. In Peru the Indian races had the Llama, and had also an advanced civilization.[4] In India, too, it is always the Hill Tribes who furnish the least favorable specimens of our race. But in every one of these cases we have the presence of external circumstances and physical conditions which are comparatively unfavorable. It is quite certain that these conditions must have had their own effect. It is equally certain that the races which have been subject to them for a long and indefinite time must have been once under the influence of conditions much more favorable; and the inevitable conclusion follows, that the savagery and degradation of their existing state is to a great extent the result of development in a wrong direction.

There are other arguments all pointing the same way, the force of which cannot be fully estimated, except by those who are familiar with some of the fundamental conceptions which seem to rise unbidden in the mind from the facts which geology has revealed touching the history of Creation. One of these facts is that each new organic Form, or each new variety of birth, seems to have been introduced with a wonderful energy of life. It is needless to repeat that this fact stands in close connection with every possible theory of Evolution. If these new Forms were the product of favoring conditions, the prevalence of these conditions would start them with force upon their way. The initial energy would be great. Where every condition was favorable—so favorable indeed that the new birth is assumed to have been nothing but their natural result—then the newly-born would be strong and lusty. And such, accordingly, is the fact in that record of creation which Palæontology affords. The vigor which prevails in the youth of an individual is but the type of the vigor which has always prevailed in new and rising species. All the complex influences which led to their being born, led also to their being fat and flourishing. That which caused them to arise at all must have had the effect of causing them to prevail. The condition of all the lowest races of men is in absolute contrast with everything which this law demands. Everywhere, and in everything, they exhibit all the characteristics of an energy which is spent—of a force which has declined—of a vitality which has been arrested. In numbers they are stationary, or dwindling; in mind they are feeble and uninventive; in habits they are stupid or positively suicidal.

It is another symptom of a wrong development being the real secret of their condition that the lowest of them seem to have lost even the power to rise.. Though individually capable of learning what civilized men have taught them, yet as races they have been invariably scorched by the light of civilization, and have withered before it like a plant whose roots have failed. The power of assimilation seems to have departed, as it always does depart, from an organism which is worn out. This has not been the result with races which, though very barbarous, have never sunk below the pastoral or the agricultural stage. It is remarkable that the Indian races of North America are perhaps the highest which have exhibited this fatal and irredeemable incapacity to rise; and it is precisely in their case that we have the most direct evidence of degradation by development in a wrong direction. There are abundant remains of a very ancient American civilization, which was marked by the construction of great public works and by the development of an indigenous agriculture founded on the maize, which is a cereal indigenous to the continent of America. This civilization was subsequently destroyed or lost, and then succeeded a period in which Man relapsed into partial barbarism. The spots which had been first forest, then, perhaps, sacred monuments, and thirdly, cultivated ground, relapsed into forest once more.[5] So strong is this evidence of degradation having affected the population of a great part of the American continent, that the distinguished author from whom these words are quoted, and who generally represents the savage as the nearest living representative of primeval man, is obliged to ask, "What fatal cause destroyed this earlier civilization? Why were these fortifications forsaken—these cities in ruins? How were the populous nations which once inhabited the rich American valleys reduced to the poor tribes of savages whom the European found there? Did the North and South once before rise up in arms against one another? Did the terrible appellation, the 'Dark and Bloody Land,' applied to Kentucky, commemorate these ancient wars?"[6] Whatever may have been the original cause, the process of degradation has been going on within the historic period. When Europeans first came in contact with the Indian tribes, there was more agriculture among them then than there is now. They have long descended to the condition of pure hunters. The most fundamental of all the elements of a civilized and settled life—the love and practice of agriculture—has been lost. Development in the wrong direction had done its work. There is no insoluble mystery in this result. It is, in all probability, if indeed it be not certainly,

[4] "Naturalist on the Amazons," Bates, vol. i. p. 191–3.

[5] Lubbock, "Prehistoric Times," p. 234.

[6] *Ibid.*, p. 236.

attributable to one cause, that of internecine and devastating wars. And these again are the result of a natural and universal instinct which has its own legitimate fields of operation, but which like all other human instincts is liable to degenerate into a destructive passion. The love of dominion is strong in all men, and it has ever been strongest in the strongest races. But the love of fighting and of conquest very often does sink into a mere lust of blood. The natural rivalry of different communities may become such implacable hatred as to be satisfied with nothing short of the extermination of an enemy. Inspired by this passion, particular races or tribes have sometimes acquired a power and a ferocity in fighting, against which other tribes of a much higher character and of a much more advanced civilization have been unable to contend.

This is no fancy picture. It is a mistake to suppose that the decline of civilization in the American continent has been due to the invasion of it by Europeans since the discovery of Columbus. Just as the older civilization of that continent was an indigenous civilization founded on the cultivation of a cereal peculiar to the American continent, so also does the decay and loss of this civilization seem to have been a purely indigenous decay. Mr. Wilson, in his very interesting work on "Prehistoric Man," gives an account of the process by which barbarism has been actually seen extending among the Red Indian tribes. When the valley of the St. Lawrence first came under the observation of Europeans, some of those tribes were found to be leading a settled life, practicing agriculture, and constituting communities in possession of all the elements of a civilization fairly begun, or probably long inherited. The destruction of these communities was affected by the savage hostility of one or two particular tribes, such as the Iroquois and the Mohawks. In these tribes the lust of blood had been developed into an absorbing passion, so that their very name became a terror and a scourge, Wholly given up to war as a pursuit, their path was red with blood, and the more peaceful and civilized branches of the same stock were driven, a scanty remnant, into forests and marshes, where their condition was necessarily reduced to that of savages, living wholly by the chase. It is a curious and instructive fact that this sequence of events was so vividly and painfully remembered among some of the Red Indian tribes that it had become embodied in a religious myth. It was said that in old times the Indians were increasing so fast that they were threatened with want, and that the Great Spirit then taught them to make war, and thus to thin one another's numbers.[7] Although this myth stands in very close connection with the universal tradition of a Golden Age, or of a Past in some measure better than the Present, it is remarkable on account of the specific cause which it assigns for deterioration and decay, a cause in respect to which we have historical evidence of its actual effect. When the great French navigator, Cartier, first explored the St. Lawrence in 1534–5, he ascended to that point of its course whence the city of Montreal now looks down upon its vast and splendid prospect of fertile lands and of rushing waters. He found it occupied by the Indian town of Hochelaga—inhabited by a comparatively civilized people, busy not only in fishing or in hunting, but also in a successful husbandry. The town was strongly fortified, and it was surrounded by cultivated ground. Within one hundred and seven years—some time between 1535 and 1642—Hochelaga had utterly disappeared, with all its population, and all its culture. It had been destroyed by wars, and its site had returned to forest or to bush. To this day when men dig the foundations of new houses in Montreal they dig up the flint implements of the Hochelagans, which, although about 350 years old, may now be reckoned by the scientific anthropologist as relics of the "Stone Age,"[8] and of an ancient universal savagery. The same course of things prevailed over the greater part of Canada. During the first half of the seventeenth century a large part of the valley of the St. Lawrence, and vast tracts of country on both shores of the great Lakes, are known to have been devastated by exterminating wars. In 1626 a Jesuit missionary penetrated into the settlement of a tribe called the Attiwenderonks. He found them inhabiting towns and villages, and largely cultivating tobacco, maize and beans. The country inhabited by the tribe which has left its name in Lake Erie, is stated to have been greatly more extensive, and is everywhere covered with the marks of a similar stage of civilization. Within less than thirty years another missionary found the whole of these regions a silent desert. In like manner the country round Lake Huron was, at the same period of time, seen to be full of populous villages defended by walls, and surrounded by cultivated fields. But the same fate befell them.[9] They were extirpated by the Mohawks.

Here then we see in actual operation, within very recent times, a true cause—which is quite capable of producing the effects which, by some means or another, have certainly been produced—and that, too, on the largest scale—upon the American continent. It is a cause arising out of one of the universal instincts of Mankind, developed in such excess as to become a destructive mania. Many nations most highly civilized have been extremely warlike—and the ambition they have cherished of subduing other nations has been the means of extending over the world their own knowledge of the arts of government, and their own high attainments in the science of jurisprudence. But when the same passion takes possession of ruder men, and is directed by irrational antipathies between rival families and rival tribes, it may be, and has often been one of the most desolating scourges of humanity. In itself an abuse and a degradation which none of the lower animals exhibit, it tends always to the evolution of further evils, to the complete destruction of civilized communities or to the reduction of their scanty remnants to the condition and the habits of savage life.

It results from these facts and considerations, gathered over a wide field of observation and experience, that the processes of Evolution and Development as they work in Man, lead to consequences wholly different from those to which they lead in other departments of Creation. There, they tend always in one of two directions, both of which are directions predetermined and in perfect harmony with the unity of Nature. One of these directions is that of perfect success, the other of these directions is that of speedy extinction. Among the lower animals, when a new Form appears, it suits exactly its surrounding conditions; and when it ceases to do so it ceases to survive. Or if it does survive it lives by change, by giving birth to something new, and by ceasing to be identical with its former self. So far as we can actually see the past work of development among the beasts, it is a work which has always led either to rapid multiplication or to rapid extinction, There is no alternative. But in man the processes of Evolution lead in a great variety of directions—some of them tending more or less directly to the elevation of the creature, but others of them tending very speedily and very powerfully to its degradation. In some men they have led to an intellectual and moral standing, of which we can conceive it to be true that it is only a "little lower than the angels." In others they have ended in a condition of which it is too evidently true that it is a great deal lower than the condition of beasts.

We can get, however, a great deal nearer towards the understanding of this anomaly than the mere recognition of it as a fact. Hitherto we have been dealing only with

[7] "Fossil Men," Principal Dawson. p. 47. Montreal, 1880.

[8] "Fossil Men," Principal Dawson, pp. 29–42. Montreal, 1880.

[9] "Prehistoric Man," Dan. Wilson, pp. 359, 60.

one of the two great causes of change,—namely, that of unfavorable external or physical conditions. Let us now look at the other—namely, the internal nature and character of Man. We can see how it is that, when working under certain conditions, the peculiar powers of Man must lead to endless developments in a wrong direction. Foremost among these powers is the gift of Reason. I speak here of Reason not as the word is often used, to express a great variety of powers, but as applied to the logical faculty alone. In this restricted sense, the gift of Reason is nothing more than the gift of seeing the necessity or the natural consequences of things—whether these be things said or things done. It is the faculty by which, consciously or unconsciously, we go through the mental process expressed in the word "therefore." It is the faculty which confers on us a true gift of prophecy—the power of foreseeing that which "must shortly come to pass." In its practical application to conduct, and to the affairs of life, it is the gift by which we see the means which will secure for us certain ends, whether these ends be the getting of that which we desire, or the avoiding of that which we dread. But in its root, and in its essence, as well as in its application to the abstract reasoning of mathematics, it is simply the faculty by which we see one proposition as involving, or as following from another. The power of such a faculty obviously must be, as it actually is, immeasurable and inexhaustible, because there is no limit to this kind of following. That is to say, there is no end to the number of things which are the consequence of each other. Whatever happens in the world is the result of causes, moral or material, which have gone before, and this result again becomes the cause of other consequences, moral or material, which must follow in their turn. It is a necessary result of the unity of nature, and of the continuity of things, that the links of consequence are the links of an endless chain. It is the business of Reason to see these links as they come one by one gradually into view; and it is in the nature of a reasoning creature to be drawn along by them in the line, whatever it may be, which is the line of their direction. The distance which may be traversed in following that direction even for a short time, and by a single mind, is often very great—so great that a man may be, and often is, a different Being from himself, both in opinions and in conduct, at two different epochs of his life. There are, indeed, individuals, and there are times and conditions of society, in which thought is comparatively stagnant, when it travels nowhere, or when its movements are so slow and gradual as to be imperceptible. But, on the other hand, there are times when mind is on the march. And then it travels fast and far. The journey is immense indeed, which may be accomplished by a few successive generations of men following, one after another, the links of consequence. At the end of such a journey, the children may be separated from their fathers by more than the breadth of oceans. They may have passed into new regions of thought and of opinion, of habit and of worship. If the movement has been slow, and if the time occupied has been long, it will be all the more difficult to retrace the steps by which the change has been brought about. It will appear more absolute and complete than it really is—the new regions of thought being in truth connected with the old by a well-beaten and continuous track.

But these endless processes of development arising out of the operation of the reasoning faculty, are consistent with any result—good or bad. Whether the great changes they produce have been for the better or for the worse, must depend, not on the length of the journey, but on the original direction in which it was begun. It depends on whether that direction has been right or wrong—on whether the road taken has been the logical development of a lie. The one has a train of consequences as long and as endless as the other. It is the nature of the reasoning faculty that it works from data. But these data are supplied to it from many different sources. In the processes of reasoning on which the abstract sciences depend, the fundamental data are axioms or self-evident propositions. These may, in a sense, be said to be supplied by the reasoning faculty itself, because the recognition of a truth as self-evident is in itself an exercise of the reasoning faculty. But in all branches of knowledge, other than the abstract sciences, that is to say, in every department of thought which most nearly concerns our conduct and our beliefs, the data on which Reason has to work are supplied to it from sources external to itself. In matters of Belief, they come, for the most part, from Authority, in some one or other of its many forms, or from imagination working according to its own laws upon impressions received from the external world. In matters of conduct, the data supplied to Reason come from all the innumerable motives which are founded on the desires. But in all these different provinces of thought it is the tendency and the work of Reason to follow the proposition, or the belief, or the motive, to all its consequences. Unless, therefore, the proposition is really as true as it seems to be; unless the belief is really according to the fact; unless the motive is really legitimate and good, it is the necessary effect of the logical faculty to carry men farther and farther into the paths of error, until it lands them in depths of degradation and corruption of which unreasoning creatures are incapable. It is astonishing how reasonable—that is to say, how logical—are even the most revolting practices connected, for example, with religious worship or religious customs, provided we accept as true some fundamental conception of which they are the natural result. If it be true that the God we worship is a Being who delights in suffering, and takes pleasure, as it were, in the very smell of blood, then it is not irrational to appease Him with hecatombs of human victims. This is an extreme case. There are, however, such cases, as we know, actually existing in the world. But, short of this, the same principle is illustrated in innumerable cases, where cruel and apparently irrational customs are in reality nothing but the logical consequences of some fundamental belief respecting the nature, the character, and the commands of God. In like manner, in the region of morals and of conduct not directly connected with religious beliefs, Reason may be nothing but the servant of Desire, and in this service may have no other work to do than that of devising means to the most wicked ends. If the doctrine given to Reason be the doctrine that pleasure and self-indulgence, at whatever sacrifice to others, are the great aims and ends of life, then Reason will be busy in seeking out "many inventions" for the attainment of them, each invention being more advanced than another in its defiance of all obligation and in its abandonment of all sense of duty. Thus the development of selfishness under the guidance of faculties which place at its command the great powers of foresight and contrivance, is a kind of development quite as natural and quite as common as that which constitutes the growth of knowledge and of virtue. It is indeed a development which, under the condition supposed—that is to say, the condition of false or erroneous data supplied to the reasoning faculty—is not an accident or a contingency, but a necessary and inevitable result.

And here there is one very curious circumstance to be observed, which brings us still closer to the real seat of the anomaly which makes Man in so many ways the one great exception to the order of Nature. That circumstance is the helplessness of mere Reason to correct the kind of error which is most powerful in vitiating conduct. In those processes of abstract Reason which are the great instruments of work in the exact sciences, the reasoning faculty has the power of very soon detecting any element of error in the data from which it starts. That any given proposition leads to an absurd result is one of the familiar methods of disproof in mathematics.

That one of only two alternatives is proved to be absurd is conclusive demonstration that the other must be true. In this way Reason corrects her own operations, for the faculty which recognizes one proposition as evidently absurd, is the same faculty which recognizes another proposition as evidently true. It is, indeed, because of its contradicting something evidently true, or something which has been already proved to be true, that the absurd result is seen to be absurd. It is in this way that, in the exact sciences, erroneous data are being perpetually detected, and the sources of error are being perpetually eliminated. But reason seems to have no similar power of detecting errors in the data which are supplied to it from other departments of thought. In the developments, for example, of social habits, and of the moral sentiments on which these principally depend, no results, however extravagant or revolting, are at all certain of being rejected because of their absurdity. No practice however cruel, no custom however destructive, is sure on account of its cruelty or of of its destructiveness to be at once detected and rejected as self-evidently wrong. Reason works upon the data supplied to it by superstition, or by selfish passions and desires, apparently without any power of questioning the validity of those data, or, at all events, without any power of immediately recognizing even their most extreme results as evidently false. In Religion, at least, it would almost seem as if there were no axiomatic truths which are universally, constantly, and instinctively present to the mind—none at least, which are incapable of being obscured—and which, therefore, inevitably compel it to revolt against every course or every belief inconsistent with them. It is through this agency of erroneous belief that the very highest of our faculties, the sense of obligation, may and does become itself the most powerful of all agents in the development of evil. It consecrates what is worst in our own nature, or whatever of bad has come to be shown in the multitudinous elements which that nature contains. The consequence is, that the gift of Reason is the very gift by means of which error in belief, and vice in character, are carried from one stage of development to another, until at last they may, and they often do, result in conditions of life and conduct removed by an immeasurable distance from those which are in accordance with the order and with the analogies of Nature.

These are the conditions of life, very much lower, as we have seen, than those which prevail among the brutes, which it is now the fashion to assume to be the nearest type of the conditions from which the human race began its course. They are, in reality and on the contrary, conditions which could not possibly have been reached except after a very long journey. They are the goal at which men have arrived after running for many generations in a wrong direction. They are the result of Evolution—they are the product of Development. But it is the evolution of germs whose growth is noxious. It is the development of passions and desires, some of which are peculiar to himself, but all of which are in him freed from the guiding limitations which in every other department of Nature prevail among the motive forces of the world, and by means of which alone they work to order.

It is in the absence of these limitations that what is called the Free Will of Man consists. It is not a freedom which is absolute and unconditional. It is not a freedom which is without limitations of its own. It is not a freedom which confers on Man the power of acting except on some one or other of the motives which it is in his nature to entertain. But that nature is so infinitely complex, so many-sided, is open to so many influences, and is capable of so many movements, that practically their combinations are almost infinite. His freedom is a freedom to choose among these motives, and to choose what he knows to be the worse instead of the better part. This is the freedom without which there could be no action attaining to the rank of virtue, and this also is the freedom in the wrong exercise of which all vice consists. There is no theoretical necessity that along with this freedom there should be a propensity to use it wrongly. It is perfectly conceivable that such freedom should exist, and that all the desires and dispositions of men should be to use it rightly. Not only is this conceivable, but it is a wonder that it should be otherwise. That a Being with powers of mind and capacities of enjoyment rising high above those which belong to any other creatures, should, alone of all these creatures, have an innate tendency to use his powers, not only to his own detriment, but even to his own self-torture and destruction, is such an exception to all rule, such a departure from all order, and such a violation of all the reasonableness of Nature, that we cannot think too much of the mystery it involves. It is possible that some light may be thrown upon this mystery by following the facts connected with it into one of the principal fields of their display—namely, the History of Religion. But this must form the subject of another chapter.

ASTRONOMY.

DISCOVERY OF A NEW COMET.

Mr. Lewis Swift, of Rochester, N. Y., has announced to the Smithsonian Institution the discovery by himself, on Sunday morning, May 1st, 1881, of a bright comet in Right Ascension $0^h\ 0^m$, Declination 37° North. The comet rises a little before the sun and is moving slowly south.

Professor A. Hall makes the following enquiry in "The Analyst:" "Observations on the motions of the sun-spots have also established the fact that the sun is not strictly a fixed body, around which the earth revolves, but that it has a motion of its own thro' space."—*Physiography*, by T. H. Huxley, F. R. S., 2nd Ed., p. 365. How can the above fact be determined by observations of the sun-spots?

NOTES.

A BILL has been introduced into Parliament for the purpose of authorising the erection of a system of pneumatic clocks in the streets of London.

AUSTRALIAN TELEGRAPHY.—At the close of 1879 some 31,556 miles of telegraph wire were at work on the Australian Continent, and 40,634 miles with Tasmania and New Zealand added.

IT is said that the Telephone Company in Belgium has inaugurated a system by which subscribers leaving word the previous evening may be awakened at any hour in the morning by means of a powerful alarm.

COLONEL PARIS, the head of the Paris fire brigade, has concluded his report on the destruction of the Printemps Establishment by proposing that large warehouses be compelled to light by electricity.—*Nature*.

A FEAT IN NICKEL-PLATING.—The plating company of the Berlopton Lane Works, Stockton-on-Tees, have successfully plated with nickel three large cylinder covers for marine engines, on account of Messrs. Maudslay, Son, and Field, the eminent engineers. The largest cover weighs nearly 1¾ tons, and is 6 ft. 6 in. in diameter. It was plated in the large nickel bath, and polished all over successfully by one of Fenwick's patent portable polishing machines. The same company have also just nickel-plated the whole of the bright parts of Sir James Ramsden's yacht engines, built by the well-known firm, the Barrow Shipbuilding Company (Limited), also, some locomotive domes and safety-valve covers.