THE ORIGIN OF MAN.

NATURE OF THE DISCUSSION—CREA TION OR EVOLUTION. QUESTIONS SUGGESTED—DISTINCTIONS BE-

TWEEN MAN AND THE LOWER ANIMALS,
—LANGUAGE—RELIGION—ABSTRACTION,
—THE MORAL SENSE—PROGRESS—COMMUNITY OF NATURE—OPINIONS OF PROF.
TYNDALL—THE DOCTRINE OF EVOLUTION
NOT INCOMPATIBLE WITH RELIGION—
IMPORTANCE OF MR. TYNDALL'S ADDRESS
—ITS RECEPTION IN ENGLAND, AND
COMMENTS OF THE ENGLISH PRESS.
The interest that has been felt in this subject.

The interest that has been felt in this subject, especially since the publication, in 1859, of the first edition of Mr. Darwin's Origin of Species, has suddenly received a new impulse from the remarkable address delivered at Belfast by Prof. Tyndall, in his position as President of the British Association for the Advancement of Science. In noting the salient features of that address we propose to outline some of the most important questions which have to be dealt with in connection with the leading topic, and also to set forth in some measure the present state of opinion as it is to be found among men who have devoted themselves to the consideration. With regard to the general nature of the discussion, it must be remarked that there is no apparent possibility of its ever being finally closed. When Aristotle announced his theory of the universe, and boldly declared all others to be impossible, philosophers could not have been without the hope that the truth or falsity of his opinions must, sooner or later, be absolutely proved. Similarly, there are views entortained at the present day which, complex as they may seem to us now, we may certainly regard as capable of verification in the perhaps not very distant future. the origin of m But theories concerning are not of these. of man the Evidence may be gathered in favor of one or other of them, or even of all, but we cannot hope that the final great question shall be ever solved. We can only deal with hypotheses as they rise before us in the growing light of science, and estimate their probable approach to veracity by accumulated know-ledge and inductive reasoning. Beyond this we cannot go. Yet the limitation thus presented should be in no sense a reason for refusing to grapple with any great subject of deep scientific interest. On the contrary, such questions open out so many others collaterally, which often can be answered, and which in their turn develop still other revelations, that in the progress of the human intellect we dare not pass them by. This suggests the expediency of offering at this, the outset of our remarks, another of proposition, to which, in our judgment, much weight should be attached, but which is too often not entertained even by many who have given some atten-tion to the tendencies of modern thought. There is nothing in the consideration of the origin of man which in any way militates against the fundamental principles of revealed religion. Further than this, and as we hope to be able to explain as we proceed, the extreme views entertained and so ably defined by Prof. Tyndall ought not to be confounded with the teaching of those who deny the existence of a Divine Creator. Mr. Darwin's Origin of Species startled everybody, although the theories there propounded were new only in their elaboration. Few took the trouble to give the book that close and calm and careful examination which it demanded. It was enough that theories were put forth which clashed with preconceived notions and habitual belief, to bring down bitter denunciation. Theologians, especially, attacked the new hypotheses, and denounced the man who had ventured to offer them to the public. But they invariably failed to give an intelligent analysis of Darwin's argument, and were content to brand it as atheistical. Now it need not be accepted in that light. We can comprehend that the fullest belief in Mr. Darwin's theories is quite the fullest belief in Mr. Darwin's theories is quite compatible with the fullest belief also in the Scriptures. It has never been proved to be otherwise, for assertions go for nothing, whereas the truth of our proposition is capable of being distinctly shown. We shall advert, however, to this again.

to them. First, then, we have the suggestion which apparently most accords with the literal interpretation of the Mosaic record, that man was a separate creation, subsequent to and distinct from the creation of all other animals, and that he thereby became endowed with faculties which were in no degree accorded to the brutes. On the other hand stands the theory that man is a development from a lower order of being, not a separate and distinct creation, but the result of a constantly rising excellence in the progress of nature's works, and necessarily the highest of them. It will readily be seen that these two theories involve one grand difference, simple enough when viewed in its integrity, but vastly complex, when examined in all its relations. It is this: If man be a separate creation, he will, in all certainty, have endowments which cannot in any degree be detected in any other animal. If he be a development, from a lower or there his faulties too. sphere, his faculties, too, will be developments of similar faculties existing, though it may be in an infinitesimal degree, in the lower animals. The question then resolves itself into this: What are the distinctions between man and other animals? But it is not easily answered, and the further we distinct in its contemplation the manufacture we But it is not easily answered, and the further we advance in its contemplation the greater our difficulties become. It is worthy of remark that philosophers long ago thought they answered it to their own satisfaction, and it is only as they come to realize its intricacies that the great obstacles to a complete solution of it become apparent. Aristotle defined man to be an animal capable of social organization. Voltaire said that plants possessed defined man to be an animal capable of social organization. Voltaire said that plants possessed organization; animals organization, sentiment, and instinct; and man organization, sentiment, and intelligence. Geoffroy St. Hileire expresses almost a similar idea thus: Plants live; animals live and feel; man lives, feels, and thinks. Buffon held that man is distinguished from the brutes by possessing the faculties of thought and speech. Quintilian says: "Deus ille princeps, parens rerum fabricatorque mundi nullo magis hominem separavit a ceteris qua quidem mortalia sunt animalibus quam dicendi quæ quidem mortalia sunt animalibus quam dicendi facultate." And Max Müller and some other mod-ern writers hold the same views. In De Quincey's essay on Plato's Republic we read: "By two tests is man raised above the brutes. First, as a man capable of religion, (which presupposes him a being endowed with reason;) secondly, as a being capable of marriage." Locke attributed to man exclusively the power of abstraction, and this opinion, too, has had more recent adherents. Some have hoped to make the capability of education a distinction; others have found it in a knowledge of the use of fire or of tools, but it is not necessary to refer to these more especially. It must be remembered, however, that in dealing with any of these points of alleged difference two things have to be proved-first, that

In order to divest our observations, as far as possable, of any complications which may have a tendency to render them less perspicuous, it will be convenient to enunciate in the first place the two principal theories that have led to so much discussion concerning the origin of man, and thence to notice some, at least, of the most difficult problems that are attached

all human beings possess the particular faculty, and, secondly, that no animals possess it in any degree whatever.

A writer in a late number of the Quarterly Review puts the whole proposition in another shape; and as we shall have occasion to make some quotations from the conclusion to which he arrives, in illustration of the condition of one side, at least, of opinion on the subject, we cannot do better than add his form of the problem to our own. He defines the questions to which attention ought to be directed as these:

"1. Can any direct evidence be found of races of men, past or present, existing in a brutal or irra-

"1. Can any direct evidence be found of races of men, past or present, existing in a brutal or irrational condition? 2. Does available evidence clearly point to the past existence of such a condition? 3. Are races anywhere to be found in a condition? which is less remote from mere animal existence than from the highest human development of which we have as yet experience?"

There is some degree of vagueness about these, but in connection with what we have already and, they will serve a useful purpose. The third as-

er of opinion under all probable circumstances. It abstraction, and if that be true then it ceases to be would, for two men of different predilections to gree as to whether the lowest savage more nearly pproximates to the highest of the brutes or to the lighest of his own race. The question can only be ettled by an examination of particular faculties in letail, and that brings us back to the form in which ve preferred to state the proposition. Without entering into anything like a complete xamination of the various details that now come be-

ore us, we shall briefly notice the most important, n order to show some, at least, of the difficulties hat surround them. The faculty of speech seems erhaps to offer a very easy field for inquiry, but in cality it is as complex as any. It must be shown hat all men possess it, and that no animals possess t. We must distinguish, too, between speech and anguage. Language is an intellectual, or, rather. nental activity; speech is the expression of mental conceptions by articulate sounds. Sir John Lubbock dmits that, while discoveries have been reported of aces of men existing entirely without language, by which he seems rather to mean speech, the accounts re not well authenticated. It is also very generally dmitted that all tribes of men have the faculty of anguage, allowing always that they have the power f abstraction. In the case of deaf mutes Mr. E. B. Tylor, the author of Researches into the Early Hisory of Mankind, and himself an advocate of the declopment, or monistic, hypothesis, says:

"Even in a lew state of education the deaf mute eems to conceive general incas, for when he invents sign for anything he applies it to all other things u a certain way, or, at least, he knows that there is quality in which snow and milk agree, and he can to on adding other white things, such as the moon nd whitewash, to his list. He can form a proposi-ien, for he can make us understand, and we can nake him understand, that this man is old, that

The inference, therefore, is that, although the facfity of speech is wanting, that of language is present. If we rest here, as the writer in the Quarterly Review has rested, we avoid much of the difficulty hat is before us. But it is right that that should e mentioned, and it rests upon the stated fact that he lower animals undoubtedly possess that power mental activity which in man is called language, nd they also have the power of communicating the esults of that mental operation—call it thought, or dea, or emotions, or what you will-to their fellows. The evidence that has been accomplated in support of this is very strong, especially that gathered from close examination of the habits of such animals as he dog, elephart, horse, ant, bee, monkey, beaver, cc., and many birds. Archbishop Whately said emchatically: "Man is not the only animal that can pake use of language to express what is passing vithin his mind, and can understand more or less what is expressed by another."

There is, however, another suggestion which bears orcibly upon this question. Was language-and we use the term here in its widest signification where it includes speech—originally an invention of man or a revelation to him? If an invention, then nan once existed without it; and if it were a revslation, then, too, unless it were coincident with reation, there was a time when man had it not. If. lowever, it were a revelation thus coincident, why should we deny a similar revelation to the brutes, specially when we know that they possess the aculty? Max Muller regards it as a "revealed cience." Locke, Adam Smith, and Dugald Stewart re among those who consider it as a human inven-

The possession of the moral sense, or the faculty

of knowing right from wrong, presents to us another mportant phase of this discussion, and in close connection with it is the capability of religion. The writer already referred to adduces a quantity of vidence in favor of the theory that no tribes of nen, however low, have ever been altogether exempt from some kind of moral influence sufficient to nable them to distinguish, within the limits of their experience, right from wrong. But he omits to comoly with the other essential condition under which his inquiry must be conducted. He does not show hat the brutes do not possess a similar faculty, and ne must show that, if it is to be accepted as a disinction between them and man. But most persons marked degree, especially dogs, elephants, apes,

horses, and some others. It is only when we come to the higher development of this moral conscious. ness that any doubt need arise. Before, however, we ask ourselves whether religion is universal throughout mankind, we must first understand what we mean by religion. If it mean all that a Christian anderstands by it, all men, of course, do not possess t. If we go to the other extreme and define it in ts mildest form as a sense only of the appernatural. we must note that many competent authorities have attributed the possession of that sense to some of the brutes. Whether such a view can be sustained is not at all clear. We are not prepared to say that it cannot: but it is quite possible that what may have been considered as indications of such a sense may have been only the operation of some temporary emotion. This, however, is merely suggestion. It is more profitable to see how far the theory can be supported that some tribes of men have no sense of religion, that is, no perception of a future state, or of a Deity. Capt. Perty, in describing the aborigines of Solomon's Archipelago said, "In many of the islands there is no trace of religion." Rev. J. Leichton, writing of the Mpongwes in Africa declared that they had neither religion nor idolatry. Rev. J. Brown, another missionary, says of the Kaffirs; "They have not in their language any word to use as the name or to denote the being of a God-of any God." A Bosjesman, when asked the difference between good and wicked, said it was good to steal another man's wife, and wicked when one's own wife was stolen. Another missionary, Rev. Mr. Scultheiss, writes also of the Kaffirs: "They have no religion, never pray, know nothing of a higher Being, and believe only in the existing life." Of the Equimaux, Whitebourne, writing in 1612, said: "They had no knowledge of a God, and lived under no form

of civil government." Capt. Burton observes of fetishism that "it admits reither God, nor angel, nor devil; it ignores a resurrection, a soul, a spirit, a heaven, or a hell." And Sir J. Emerson Tennant tells us of the Veddahs: "They have no religion of any kind; no knowledge of a God or of a future state; no temples, idols, altars. prayers, or charms." Of the Australians, Mr. Schmidt says: "They have no idea of a Supreme Being;" and Mr. Parkes, Premier of New-South Wales, adds to that, "they have no words for justice or sin." Rev. Dr. Lang, who is generally considered one of the best authorities upon this subject in that country, and one not likely to underrate the qualities of the aborigines, describes them as having "no idea of a Supreme Divinity, no object of worship, no idols, nor temples, nor sacrifices; nothing whatever in the shape of religion to distinguish them from the beasts." Among a few of the tribes there is a belief in the existence of a spirit of evil, a huge black fellow, whose imps people the woods, and whose whole existence is devoted to stealing women and children. But these tribes have no idea whatever of a future state.

How far these facts bear out the theory that religion is not universal throughout mankind it is not our province to determine. Mr. Tylor, mentioning some cases different from those we have given but similar in character, considers that many of them may be regarded as founded upon insufficient data; and the Quarterly Review goes further, and declares that there is no evidence whatever of the existence of any race altogether devoid of religious conceptions. At the same time the possibility of such a race existing is guarded against by the assumption, which, however gratuitous is at least ingenious, that there still is to be tound no reason why such races should not be descended from remote ancestors with a much higher creed.

Another alleged distinction between the brutes

and man is the possession by the latter of the power of aostraction. We find no notice of this in the writing to which we have referred, and the omission is the more curious on account of the great weight that is usually attached to it by adherents of the dualistic hypothesis. A brief exposition will suffice sians or Malays, and therefore it is to be expected to show the position to which this portion of the ar- that some community of nature must exist gument has advanced. A recent French writer, an smong them. Mr. Tylor cites many illusopponent of the Darwinian theories, reminds us that trations in support of this community. He the Principia of Newton, the Paradise Lost of does not think it at all subversive of his Milton, the Orientales of Victor Hugo are among theory. We, too, have already mentioned others the fruits of this power of abstraction, and that as which have a bearing in the same direction. But if these could not have been the work of brutes therefore brutes do not possess that power. But the ar- advocates of the dualistic hypothesis do. They regument is too manifestly fallacions. If it be sound, gard it as strong evidence in favor of a common and steps by which the theory of evolution in the form of gument is too mannestly manner and the form of grant as as strong evaluation in the form of the fine the fine of t

ectally is open to objection on the ground that the much if it prove anything, for it leads to the conpoint at Issue in it must remain more or less a mat- clusion that the majority of men have not the power of is not at all certain that some of the lowest members of the human family do possess this faculty, but that is a point about which more inquiry is necessary. It is a difficult subject for investigation, and sufficient attention has not been given to it. So far, therefore, we must admit that our knowledge is too deficient to enable us to arrive at any conclusion. But, taking the other half of the question, whether animals possess this faculty in any degree, it cannot be denied that there is some evidence in the affirmative. Dogs have been known to distinguish color. The collies in the Highlands of Scotland constantly exhibit actions in the management of flocks which show that they have some conception of number. Either of these faculties is evidence of the power of abstraction inherent in them. When the infant Newton began to count he entered upon the path which led to the Principia. Another question involved in this discussion is. whether savage races have degenerated, or whether they have advanced from a still lower state of social

organization. This again is exceedingly complex and difficult to answer. The point where it bears directly upon the main subject under consi eration is that where it relates to the earliest condition of man. Supporters of the evolution theory must admit that man in his first form was at the lowest stage of his existence. Advocates of a separate creation, on the centrary, may affirm, and they gen-1 erally do, that at that period, that is, at the very moment of his creation man may have enjoyed a comparatively high development-one at any rate that was immensely higher than anything enjoyed by the brutes. Mr. Tylor and Sir John Lubbock, while admitting the extreme difficulty of proving anything here, are both disposed to think that if any retrogression have taken place it is not material nor cry extensive. There is abundant evidence in history, nevertheless, not only that retrogression is possible, but that it is of frequent occurrence. We have it in the records of Central America. We have it in Spain, in Greece, in Persia, and other nations that will readily suggest themselves. Both the authors we have named refer to the evidences supplied by religious ceremonials, but they do not lay as much stress upon them as they might. We know that there are Scriptural traditions, as for example, of the Deluge, first noticed by Humboldt in South America, and since noted by travelers among the aborigines of Australia and elsewhere, which seem to point to a time when the races possessing them occupied a higher place in civilization. Mr. Tylor, however, does not fail to direct attention to the ceremonial purifications practised by the Kaffrs. Of these he says, in the second volume of his work on Primitive Culture :

have come to mean something distinct from mere cleauliness. Kaffrs who will purify themselves from ceremonial nucleanness by washing, are not in the habit of washing themselves or their vessels for ordi-nary purposes, and the dogs and the cockroaches di-vide between them the duty of cleaning out the milk-lackets."

And upon this it has been with much justice renarked that one of two things must be conceded. We have either a case of degradation and degeneration from earlier cleanliness, or else there must have been an original spiritual meaning in certain primitive washings pointing to a higher religious condition than that at present existing among those who practice the ceremonies in question. Admitting that degeneracy is common, it does not cerainly follow that it is universal among aboriginal tribes, but as we have said, the subject is full of perplexities. In the present state of our knowledge it is well summarized by the writer in the Quarterly, who, it may be necessary to say more distinctly, is a supporter of the dualistic hypothesis. From that point of view he remarks:

"There is, then, much reason to think that de-ceneracy may have been both great in degree and wide-spread in its effects, so as to account by degra-dation for the existing state of all the various tribes of savages which discovery has made known to us. But the maintenance of this position is by no means necessary to justify the religious belief of even the nost orthodox Christians. Orthodoxy does not by any means necessarily conflict with such views as se put forward by Messrs. Tylor and Lubbock. All traces now, or to be hereafter, discovered of an cient man, may indicate ascent and prog-ress, and all existing savages may be savazes ascending from still lower levels, and yet the first man may, notwithsteading, have been all that theology asserts that he was. Nay more, his progeny may none the less have preserved for a considerable period a high degree of direct, simple, moral elevation in an age of stone, and yet have been the ancestors of races who fell below the level of any savages now existing on the earth. In theolory Adam stands in a category of his own. According to it he was actually all that it became him as a man to be, having the full and perfect use of reason in the first moment of his existence. But it is impossible to argue from Adam even to his immediate descendants, as the ifference between their states is a difference not of degree but of kind. According to the strictest the clogy, part even of Adam's knowledge was acquired, infused, and, therefore, took time and depended ants were naturally in a state of mere ignorance, to be removed only by education either by way of what is technically called discip ina or else by inventio. Now as regards their degenerate descendants, the Homines sylvatici, these were, by the hypothesis, in position which deprived them of the first of these duences, and circumstances might well have rendered their power of inventio inoperative and practically tutile. Thus some might have remained stationary, or have continued to retrograde till discovered by civilized man, while others more favorably circumstanced might have again sponta cously advanced by their own inventio, and been neously advanced by their own intents, and been found by discoverers in a positively ascending and improving coudition. Nothing, therefore, which ethnology or archæology can demonstrate can conflict with Christian doctrine, since the question as to the mental condition of Adam is one utterly beyond the reach of any physical science, while any facts which science can prove concerning Homo sylvaticus will be welcomed by theologians as tending to throw light upon the condition of his descendants, as to which question there is complete freedom of opinion.
It is physical science, not theology, which inclines us to assign a greater scope to degeneration than that assigned to it by the authors we are reviewing. As has been said, instances of degeneration are before our eyes to-day in Europe. Even the periodical literature of our own country is continually giving vent to opinions which have to spread predominantly to render our degradation

years has been the successful promulgation of the doctrine that purity of intention, and not success, is that which is really deserving of esteem. Yet the essentially cruel heartlessness of paganism is having its intellectual justification prepared for it n the midst of our beneficent, humanitarian activi ies. To show this the more clearly we may quote the words of one who, in so many ways, contrasts favorably with other members of that school of thought which he has not as yet explicitly repudated. The exigencies of his present philosophical position have betrayed even Mr. Herbert Spencer into speaking of the 'Worthy and the 'Unworthy' as synonymous with the 'well' and the 'ill-to-do,' and he does not guard nim self from being understood to call the poor and the unsuccessful, as such, by the opprobrious epithet 'good-for-nothings.' Another triumph of the same Christian period has been the establishment of at least a pure theory of the sexual relations and the protection of the weaker sex against the selfishness of male concupiscence. Now, how-ever, marriage is the constant subject of attack, an l unrestrained licentiousness theoretically justified.
Mr. George Darwin proposes that divorce should be
made consequent on insanity, and coolly remarks
that, should the patient recover, he would suffer in no other respect than does any one that is forced by although, of course, the necessary isolation of parent from the children would be a neculiarly bitter blow.' Elsewhere he speaks in an approving strain of the most oppressive laws, and of the encouragement of vice in order to check population. There is no hideous sexual criminality of Pagan days that might not be derended on the principles anyocated by the school to which this writer belongs. This repulsive phenomenon affords a fresh demonstration of what France of the Regency and Pagan Rome ong ago demonstrated, namely, how easily the most ofound moral corruption can coexist with the most protound moral corruption can coexist with the most varied appliances of a complex civilization. The peasants of the Tyrol, on the other hand, serve equally well to demonstrate how pure and lofty a morality and how really refined a mental civilization

One of the greatest achievements of the last 2,000

The author of this quotation goes on to lay much stress upon what he terms the "community of nature." The objections usually made to bringing any part of the discussion under this head are these: (a) It is indefinite in meaning. (b) It is comprised in other parts of the argument, or it contains those parts. (c) It is irrelevant, because, whatever their origin, men are still men, whether they be Cauca-

may coexist with very great simplicity in the adjuncts and instruments of social life."

munity of nature" has become almost if not miss the opportunity of showing how truth, not quite imperceptible, but it must be re- when it came as an innovation, was ridiculed and night, for example, be impossible, and probably a distinction between man and the lower animals. It marked that this argument, which might be persecuted in past times by the most intelligent of resolved into a very forcible one of its kind, has rarely been taken advantage of by those whose opinions it is calculated to sustain. They are content to rest their case upon other grounds. Their opponents, however, are not slow to avail themselves of what seems to them an advantage, and we cannot better convey an idea of the position now being sustained by the supporters of the dualistic theory than by again quoting from the Quarterly Review the summary which is there offered, as "From the absence of any positive proof as to a brutal condition of mankind, and from the absence of even any transitional stage, a presumption, at the least, arises that no such transition ever took

time so much positive evidence of essential community of nature amongst all men,) clearly three the onus probandi on those who assert the fact of such transition in the past. At the least they must betake themselves to philosophy, which is alone able to decide as to the abstract possibility or impossibility. bility of such a process, and show by it that the asserted transition is not only possible but also probable; and both demonstrations, we are confident, are beyond their power.

It seems, then, that in the sciences we are considering, namely, ethnology and archæology, the most recent researches of the most trustworthy investigators show that the expectations of the surporters of the dualistic hypothesis are fulfilled, while those of the favorers of the monistic view are disap-The final result therefore is that ethnology and archaelogy, though incapable of deciding as to the

possibility of applying the monistic view of evolu-tion to man, yet, as far as they go, oppose that application. Thus the study of man, past and present, by the last-mentioned sciences, when used as a test of the adequacy of the theory of evolution, tends to show (though the ultimate decision, of course, rests with philosophy) that it is inadequate, and that another factor must be introduced of which it declines to take any account—the action, namely, of a divine mind as the direct and immediate originator and ause of the existence of its created image, the mind Such being the result of the inquiry we have un-dertaken, the assertors of man's dignity are clearly under no slight obligations to Sir John Lubbook and

Mr. Tylor for their patient, candid, and laborious toil. But if such is the case with regard to these writers, how much greater must be the obligation due to that author who has so profoundly influenced them, and whose suggestive writings have produced so great an effect on nineteenth century biology? A deep debt of gratitude will indeed be one day due to Mr. Darwin—one difficult to overestimate. This sentiment, however, will be mainly due to him for the indirect result of his labors. It will be due to him for his having in fact become the account. to him for his having, in fact, become the occasion of the reductio ad absurdum of that system which he set out to maintain—namely, the origin of man by natural selection, and the insufficiency of mechanical and sweetness of that teeming would of life of which man is the actual and, we believe, ordained ob-

man is the actual and, we believe, ordained observer, historian, and master.
But the study of savage life has taught us much.
Our poor obscurely thinking, roughly speaking, childishly acting, impulsive cousin of the wilds, the Homo sylvatious, is not a useless tenant of his woods and plains, his rocks and rivers. His humble testimony is of the highest value in supporting the claims of his most civilized brothers to a higher than a merely brutal origin a merely brutal origin. The religion of Abraham and Chrysostom, the intellect of Aristotle and Newton, the art of Raphael, of Shakespeare, of Mozart, have their claims to be no mere bestial developments, supported by that

testimony. Through it these faculties are plainly seen to be different in kind from complex entanglements of merely animal instincts and sensible im-The claims of man as we know him s noblest, to be of a fundamentally different nature from the beasts which perish, become reinforced and reinvigorated in our eyes, when we find the very same moral, intellectual, and artistic nature (though disguised, obscured, and often projoundly misunderstood) present even in the rude, uncultured soul of the lowest of our race, the poor savage-Homo syl-

It will not be necessary to extend this portion of our observations by reference to various questions and suggestions which hold minor places in the chief line of argument. We have advanced sufficient to enable us, with good hope of making the matter clear, to define with some conciseness the general aspect of the subject. It is this The dualistic theory of man's origin long prevailed. It arose, no doubt, out of the popular interpretation of the account of the creation given by Moses. Then came the monistic or evolutionary theory, supported in its beginning by the results of investigation in natural science which seemed to point to the absence in nature of special creations. As, for example, when we find it impossible to draw a line between the animal and vegetable kingdoms; or, when we see a certain uniformity of design among animals, and certain well-marked gradations of development; or, when among plants, very different in structure and property, we meet with points of similarity and bonds that connect them indissolutly together. But the new theory needed confirmation, and the advocates of the old forthwith threw upon its defenders the burden of proof. These at once pointed to the actual resemb'ance in all particulars between man and animals. The difference, it was alleged, being one not of kind but of degree. The dualistic theorists in turn sought to prove that the difference is real and not one of degree only. And they are still engaged in it. Thus the onus probandi has been transferred from one side to the other, and all we can say of the discussion now is that much more evidence is everywhere desirable, and that actual proof is wanting and ever will be wanting, as we stated at the outset. But the evolutionists are not idle. Leaving their opponents behind to search for the evidence that is requisite to maintain their own position, or rather to subvert that of their opponents, the champions of the monistic hypothesis are steadily advancing. Assuming that the theory of evolution cannot be refuted, they are striving to trace it out to its logical end. To do this, they avail themselves of the supposition, to which they are entitled, that the work of creation has been going on through, humanly speaking, unlimited periods of time, and with the aid which this affords they profess to be able to explain every fact which can be brought against them. This represents the juncture at which Prof. Tyndall comes forward and boldly adds the weight of his authority to the cause of evolution. His address is one of the most remarkable that has ever been delivered by a President of the British Association, and ere long it must be expected to bring about a very lively controversy. But at present it is being contemplated with considerable equanimity on all sides. It many respects it was a surprise. It was not anticipated that Mr. Tyndall would have chosen such a subject for so elaborate an analysis, and having chosen it, it was not expected that he would have expressed himself

with so much unreserve upon the doctrine of ma-With an apparent desire to treat his subject as fully as circumstances permitted, he traced back the line of philosophical thought to its earliest historical beginning, and behind that he ventured into the dark region of prehistoric times to draw a fancy picture of the mental operations in primeval man. We shall pass over these to note first the just tribute which he paid to the memory of Democritus, of whom few but Bacon have spoken with becoming respect. He reminded us that this eminent Thracian, to whom the discovery of the atomic theory is due, showed an uncompromising antagonism to those who attributed the phenomena of nature to the caprices of the gods. This was evidenced in the prin-

ciples which he laid down as follows: "1. From nothing comes nothing. Nothing that exists can be destroyed. All changes are due to the combination and separation of molecules. 2. Nothing happens by chance. Every occurrence has its cause, from which it follows by necessity. 3. The only existing things are the atoms and empty space; all else is mere opinion. 4. The atoms are infinite in number, and infinitely various in form; they strike together, and the lateral motions and whirlings which thus arise are the beginnings of worlds. 5. The varieties of all things depend upon the varieties of their atoms, in number, size, and aggregation.
6. The soul consists of free, smooth, round atoms, 6. The soul consists of free, smooth, round atoms, like those of fire. These are the most mobile of all. They interpenetrate the whole body, and in their motions the phenomena of life arise."

"Thus," continues Mr. Tyndall, "the atoms of Democritus are individually without sensation; they combine in obedience to mechanical laws; and not only organic forms, but the phenomena of sensation and thought are also the result of their combination.

and thought, are also the result of their combination. part of an organism to another part, and to the conditions of life, more especially the construction of the human body, Democritus made no attempt to solve. Empedocies, a man of more fiery and poetic nature, introduced the notion of love and hate among the atoms to account for their combination and separation. Noticing this gap in the doctrine of Demo-critus, he struck in with the penetrating thought that it lay in the very nature of those combinations which were suited to their ends to maintain themselves, while unfit combinations, having no proper habitat, must rapidly disappear. Thus, more than 2,000 years ago, the doctrine of the 'survival of the 2,000 years ago, the doctrine of the 'survival of the fictest,' which in our day, not on the basis of vague conjecture, but of positive knowledge, has been raised to such extraordinary significance, had received, at all events, partial enunciation."

Having traced with much minuteness the various steps by which the theory of evolution in the form of fictest. which in our day, not on the basis of vague conjecture, but of positive knowledge, has been raised to such extraordinary significance, had received, at all events, partial enunciation."

powers, and different propensities. In them "com- Arabians and Eastern nations, Mr. Tyndall does the people. He says: "Toward the close of the stationary period a word-weariness, if I may so express it, took more and more possession of men's minds. Christendom had become sick of the school philosophy and its verbal wastes, which led to no issue, but left the intellect instead of the school philosophy and its verbal wastes, which led to no issue, but left the in-

ect in everlasting haze. Here and there was

heard the voice of one impatiently crying in the wilderness, 'Not unto Aristotle, not unto subtle hypotheses, not unto Church, Bible, or blind tradition, must we turn for a knowledge of the universe, but

to the direct investigation of nature by observation and experiment. In 1543 the epochmaking work of Copernicus on the paths of the heavenly bodies appeared. The total crash of Aristotle's closed universe with the earth at its centre followed as a consequence; and 'the earth moves' became a kind of watchword among intellectual freemen. Copernicus was canon of the Church of Fravenburg, in the diocese of Ermeland. For thirty-three years he had with-drawn himself from the world and devoted himself to the consolidation of his great scheme of the solar system. He made its blocks eternal; and even to system. He made its blocks eternal; and even to those who feared it and desired its overthrow it was so obviously strong that they refrained for a time from meadling with it. In the last year of the life of Copernicus his book appeared; it is said that the old man received a copy of it a few days before his death, and then departed in peace. The Italian philosopher Giordano Bruno was one of the earliest converts to the new astronomy. Taking Lucretius as his exemplar, he revived the notion of the infinity of worlds, and combining with it the doctrine of Copernicus, reached the sublime generalization that the fixed stars are suns, scattered numberless through space, and accompanied by satellites, which bear the same relation to them that our earth does to our sun, or our moon to our earth. This was an expansion of transcendent import; but This was an expansion of transcendent import; but Bruno came closer than this to our present line of thought. Struck with the problem of the generation and maintenance of organisms, and duly pondering it, he came to the conclusion that nature in her productions does not imitate the technic of man. Her process is one of unraveling and unfolding. The infinity of forms under which matter appears were transcend thought the conmatter appears were not imposed upon it by an external artificer; by its own intrinsic force and virtue it brings these forms forth. Matter is not the mere naked, empty capacity which philosophers have pictured her to be, but the universal mother, womb. This outspoken man was originally a Dominican monk. He was accused of heresy and had to fly, seeking refuge in Geneva, Paris, England, and Germany. In 1592 he fell into the hands of the Inquisition at Venice. He was imprisoned for many years, tried, degraded, excommunicated, and handed over to the civil power, with the request that he should be treated gently, and 'without the shedding of blood.' This meant that he was to be burned; and burned accordingly he be was to be burned; and burned accordingly he was on the 16th of February, 1600. To escape a simillar fate, Galileo, thirty-three years afterward, abjured, upon his knees and with his hand upon the holy Gospels, the heliocentric doctrine. After Galileo came Kepler, who from his German homeds fied the power beyond the Alps. He fraced out from pre-existing observations the laws of planetary motion. The problem was thus prepared for Newton, who bound those empirical laws together by the principle of gravitation. During the Middle Ages the doctrine of atoms had to all appearance vanished from discussion. In all probability it held its ground among sober-minded and thoughtful men, though neither the Church nor the world was prepared to hear of it with tolerance. Once, in the year 1348, it received distinct expression. But retractation by compulsion immediately followed, and thus discouraged it slumbered till the seventeenth century, when it was revived by a enotemporary of Hobbs and Descartes, the Père Gassendi." As opposed to those who would make materialism and atheism necessarily synonymous terms, the definition of Gassendi's theory is worthy of attention. Gassendi having formally acknowledged God as a great first cause, says the speaker, immediately after drops the idea, applies the whole known laws of mechanics to the atoms, and thence deduces all vital phenomena. But this is what Mr. Tyndal adds directly after:

"God, who, according to Gassendi, created earth and water, plants and animals, produced in the first place a definite number of atoms, which constituted the seed of all things. Then began that series of combinations and decompositions which goes on at the present day, and which will continue in the future. The principle of every change resides in future. The principle of every change resides in matter. In a tificial productions the moving principle is different from the material worked upon: but in nature the agent works within, being the most active and mobile part of the material itself. Thus this boid ecclesiastic, without incurring the msure of the Church or the world, contrives to outstrip Mr. Darwin."

"The atomic doctrine, in whole or in part, was entertained by Bacon, Descartes, Hobbes, Locke, Newton, Boyle, and their successors, until the chemical law of multiple proportions enabled Dalton to confer upon it an entirely new significance. In our day there are secessions from the theory, but it still stands firm. Only a year or two ago Sir William determine the sizes of the atoms, or rather to fix the limits between which their sizes lie: white only last year the discourses of Williamson and Maxwell illustrate the present hold of the doctrine upon the foremost scientific minds. What these atoms, selfmoved and self-posited, can and cannot accomplish in relation to life is at the present moment the subject of profound scientific thought."

Contrasting the doctrines of Lucretius with those of Bishop Butler, Mr. Tyndall takes occasion to criticise not only the views of the latter, but the temperament of the period in which he lived, and he does so with consummate skill to turn the argument toward his own side. Bishop Butler accented with unwavering trust the literal interpretation of the Scriptural record, and, though it may seem strange to many persons, it was this unswerv ing reliance upon the Bible that led him to a dilemma where he must either acknowledge himself at fault or admit that arguments which he applied to man applied with equal force to the brutes. He accepted the latter, and at once declared his conviction that the whole animal world is embraced in the scheme of immortality.

Tyndall, "the doctrine of bodily instruments, as it may be called, assumed immense importance in the hands of Bishop Butler, who, in his famous Analogy of Religion, developed, from his own point of view, and with consummate sagacity, a similar idea. The Bishop still influences superior minds, and it will repay us to dwell for a moment on his views. This s the key of the Bishop's position: Our organized bodies are no more a part of ourselves than any other matter around us. In proof of this he calls ttention to the use of glasses, which 'prepare ob attention to the use of glasses, which prepare objects' for the 'percipient power' exactly as the eyo does. The eye itself is no more percipient than the glass, and is quite as much the instrument of the true self, and also as foreign to the true self, as the glass is. 'And if we see with our eyes only in the same manner as we do with glasses, the like may justly be concluded from analogy of all our senses. Lucretius, as you are aware, reached a precisely opposite conclusion; and it certainly would be inte would or could urge in opposition to the reasoning of the Bishop. As a brief discussion of the point will enable us to see the bearings of an important question, I will here permit a disciple of Lucretius to try the strength of the Bishop's position, and then allow the Bishop to retaliate, with the view of rolling back, if he can, the difficulty upon Lucretius. Each shall state his case fully and frankly, and you shall be umpire between them. The argument might proceed in this fashion:

Subjected to the test of mental presentation, Variationally your rights. (Vorschlung.) your views, most honored prelate, would present to many minds a great if not an unsuperable difficulty. You speak of "living powers," "percipient or perceiving powers," and "ourselves;" but can you form a mental picture of "ourselves;" but can you form a mental picture of any one of these apart from the organism through which it is supposed to act? Test yourself honestly, and see whother you possess any faculty that would enable you to form such a conception. The true self has a local habitation in each of us; thus localized, must it not possess a form? If so, what form? Have you ever for a moment realized it? When a leg is mputated the body is divided into two parts; is the true self in both of them or in one? Thomas Aquinas might say in both; but not you, for you appeal to the consciousness associated with one of the two parts to prove that the other is foreign matter. Is consciousness, then, a necessary element of the true self! If so, what do you say to the case of the whole body being deprived of consciousness? If not, then on what grounds do you deny any portion of the true self to the severed limb? It seems very singular that from the beginning to the end of your admirable book, (and no one admires its sober strength more than I do,) you never once mention the brain or peryons system. the brain or nervous system. You begin at one end of the body, and show that its parts may be removed without prejudice to the perceiving power. What if you begin at the other end, and remove, instead of the leg, the brain? The

and remove, instead of the leg, the brain? The body, as before, is divided into two parts; but both are now in the same predicament, and neither can be appealed to to prove that the other is foreign matter. Or, instead of going so far as to remove the brain itself, let a certain portion of its bony covering be removed, and let a rbythmic series of pressures and relaxation of pressure be applied to the soft substance. At every pressure 'the faculties of perception and of action' vanish; at every relaxation of pressure they are restored. Where, during the intervals of pressure, is the perceiving power I once had the discharge of a large Leyden battery passed unexpectedly through me; I felt nothing, but was simply blotted out of conscious existence for a sensible interval. Where was my true self during that interval? Men who have recovered from lightning-stroke have been much longer in the same state; and, indeed, in cases of ordinary concussion of the brain, days may elapse during which no experience is registered in consciousness. Where is the man himself during the period of insensibility? You may say that I beg the question when I assume the man to have been unconscious, that he was really conscious all the time, and has as a kind of mechanic's bench for the manufacture of new species out of all relation to the old. Biased, however, by their previous education, the great majority of naturalists invoked a special creative act to account for the appearance of each new group of organisms. Doubtless there were numbers who were clear headed enough to see that this was no

ize his needle; by this means you certainly sever his connection with the world; but, inasmuch as these are real instruments, their destruction does not touch the man who uses the n. The operator survives, and he knows that he survives. What is it. I would ask in the human system that answers it, I would ask, in the human system that answers to this conscious survival of the operator when the battery of the brain is so disturbed as to produce insensibility, or when it is destroyed altogether? Another consideration, which you may consider slight, presses upon me with some force. The brain may change from health to disease, and through such a change the most exemplary man may be converted into a dehauchee or a murderer. My very noble and approved good master had, as you know, threatenings of lewdness introduced into his brain by his jealous wife's philter; and sconer than permit himself to run even the risk of yielding to these base promptings he slew himself. How could the hand f Lucretius have been thus turned against himself if the real Lucretius remained as before? Can the brain, or can it not, act in this distempered way without the intervention of immortal reason? If it can, then it is a prime mover which requires only healthy regulation to render it reasonably self-acting, and there is no apparent need of your immortal reason at all. If it cannot, then the immortal real reason, by its mischievous activity in operating upon a broken instrument, must have the credit of committing every imaginable extravagance and crime. I think, if you will allow me to severe that the grayest consequences allow me to say so, that the gravest consequences are likely to flow from your estimate of the body. To regard the brain as you would a staff or an eve-glass—to shut your eyes to all its mystery, to the perfect correlation that reigns between its condition and our consciousness to the fact that a slight excess or defect of blood in it produces that very swoon to which you refer, and that in relation to it our meat and drink and air and exercise have a perfeetly transcendental value and significance-to forgot all this does, I think, open a way to innumera-ble errors in our habits of life, and may possibly in some cases initiate and foster that very disease, and consequent mental rum, which a wiser appreciation of this mysterious organ would have avoided.' I can imagine the Bishop thoughtful after hearing this argument. He was not the man to allow anger to mingle with the consideration of a point of this kind. After due consideration, and having strength ened himself by that honest contemplation of the facts which was habitual with him, and which includes the desire to give even adverse facts their due weight, I can suppose the Bishop to proceed thus: 'You will remember that in the Analogy of Religion, of which you have so kindly spoken, I did not profess to prove anything absolutely, and that I over and over again acknowledged and insisted on the smallness of our knowledge or rether the death of our property. of our knowledge, or rather the depth of our igno-rance, as regards the whole system of the universe. My object was to show my deistical friends, who set forth so elequently the beauty and beneficence of Nature and the Ruler thereof, while they had nothing but scorn for the so-called absurdities of the Christian scheme, that they were in no better condition than we were, and that for every difficulty they found upon our side quite as great a difficulty was to be found upon theirs. I will now, with your permission, adopt a similar line of argument. You are a Lucretian, and from the combination and separation of atoms deduce all terrestrial things, including the state of the ing organic forms and their phenomena. Let me tell you in the first instance how far I am prepared to go with you. I admit that you can build crystal-line forms out of this play of molecular force, that the diamond, amothyst, and snow-star are truly wonderful structures which are thus produced. I will go further and acknowledge that even a tree or can show me an animal without sensation. I will concede to you that it also might be put together by the suitable play of molecular force. Thus far our way is clear, but now comes my difficulty. Your atoms are individually without sensation, much more are they without intelligence. May I ask you, then, to try your hand upon this problem? Take your dead hydrogen atoms, your dead oxygen atoms, your dead carbon atoms, your dead nitrogen atoms, your dead carbon atoms, your dead nitrogen atoms, your dead agine them separate and sensationless: observe om running together and forming all imaginable combinations. This, as a purely mechanical process, is seeable by the mind. But can you see, or dream, or in any way imagine, how out of that me-

chanical act, and from these individually dead You speak of the difficulty of mental presentation in r case; is ft less in yours? I am not at all bereit this Vorstellungs Kraft of which you speak. I can follow a particle of mask until it reaches the olfactory nerve; I can follow the waves of sound until their tremors reach the water of the labyrinth. and set the otoliths and Corti's fibres in motion; I can also visualize the waves of other as they cross the eye and hit the retina. Nay more, I am able to follow up to the central organ the motion thus im parted at the periphery, and to see in idea the very molecules of the brain thrown into trem rs. My insight is not baffled by these physical processes. What baffles me, what I find unimaginable, transcending every faculty I possess—transcending, I humbly submit, every faculty you possess—is the notion that out of those physical tremors you can extract things so utterly incongruous with them as sensation, thought, and emotion. You may say, or think, that this issue of consciousness from the clash of atoms is not more of oxygen and hydrogen. But I beg to say that it is. For such incongruity as the flash possesses is that which I now force upon your attention. The flash is an affair of consciousness, the objective conterpart of which is a vibration. It is a flash only by your interpretation. You are the cause of the apparent incongruity, and you are the thing that puzzles me. I need not remind you that the great Leibnitz felt the difficulty which I feel, and that to get rid of this monstrous deduction of life from death he displaced your atoms by his monads. which were more or less perfect mirrors of the universe, and out of the summation and integration of which he supposed all the phenomena of life—sentient, intellectual, and emotional—to arise. Your difficulty, then, as I see you are ready to admit, s quite as great as mine. You cannot satisfy the human understanding in its demand for logi-cal continuity between molecular processes and the phenomena of consciousness. This is a on which materialism must inevitably split chenever it oretends to be a complete philosoph life. What is the moral, my Lucretian! You and I are not likely to indulge in ill-temper in the discussion of these great topics, where we see so much room for honest differences of opinion. But there are people of less wit, or more bigotry, (I say it with humility,) on both sides, who are ever ready to mindle over and vituoeration with such themselves. gle anger and vituperation with such discussions. There are, for example, writers of note and influence at the present day who are not ashamed to assume the "deep personal sin" of a great logician to be the cause of his unbelif in a theologic dogma. And there are others who hold that we who cherish "Ninety years subsequent to Gassendi," said Mr our noble Bible, wrought as it has been into the constitution of our forefathers and by inherit nee into us, must necessarily be hypocritical and insincere. Let us disavow and discountenance such people, cherishing the unswerving faith that what is good

and true in both our arguments will be preserved for the benefit of humanity, while all that is bad or false will disappear." From this point aptly taken, Mr. Tyndall glides with impressive skill into the more recent consequences of a literal interpretation of the Scriptures. and hence to a demonstration—the first he has ventured upon-of the gradual development theory of nature's operations. The importance of this is great, for from it to evolution the step is not a long one. The insidious nature of the following, therefore,

"Since Bishop Butler's time the domain of the naturalist has been immensely extended—the whole science of geology, with its astounding revelations regarding the like of the ancient earth, having been created. The rigidity of old conceptions has been relaxed, the public mind being rendered gradually tolerant of the idea that not for six thousand, nor for sixty thousand, nor for six thousand thousand, but for periods embracing untold milhons of years this earth has been the theatre of life and death. The earth has been the heatre of the and death. The riddle of the rocks has been read by the geologist and palæontologist, from subcambrian depths to the deposits thickening over the sea-bottoms of to-day. And upon the leaves of that stone book are, as you know, stamped the characters, plainer and surer than those formed by the ink of history, which carry the mind back into abysses of past time compared with which the periods which satisfied Bishop Butler cease to have a visual angle. Everybody now knows this; all men admit t; still when they were first broached these verities of science found loud-tongued denunciators, who proclaimed not only their baselessuess considered scientifically, but their immorality considered as questions of othics and religion. The book of Genesis had stated the question in a different fashion; had stated the question in a different rashion; and science must necessarily go to pieces when it clashed with this authority. And as the seed of the thistle produces a thistle, and nothing clse, so these objectors scatter their germs abroad, and reproduce their kind, ready to play again the part of their intellectual progenitors, to show the same virulence, the same ignorance, to achieve for a time the corne success, and finally to a figure to achieve for a time the same success, and finally to suffer the same inexorable defeat. Surely the time must come at last when human nature in its entirety, whose legitimate demands, it is admitted, science alone cannot satisfy, will find interpreters and expositors of a different stamp from those rash and ill-informed persons who have been hitherto so ready to hurl themselves against every new solonidad. themselves against every new scientific revelation, lest it should endanger what they are pleased to consider theirs. The lode of discovery once struck, those petrified forms in which life was at one time active increased to multitudes, and demanded classification. The general fact soon became evident that none but the simplest forms of life lie lowest down; that as we climb higher and higher among the superimposed strata more perfect forms appear. The change, however, from form to form was not continuous, but by steps, some small, some great.
'A section,' says Mr. Huxley, '100 teet thick will exhibit at different heights a dozen species of ammonite, none of which passes beyond its particular zone of limestone or clay into the group helow it a into the glove it.' In the passes zone below it or into that above it.' In the presence of such facts it was not possible to avoid the question, Have these forms, showing, though in broken stages and with many irregularities, this unmistakable general advance, been subjected to no continuons law of growth or variation? Had our education been purely scientific, or had it been sufficiently de-tached from influences which, however ennobling in another domain, have always proved hindrances and delusions when introduced as factors into the do-main of physics, the scientific mind never could have swerved from the search for a law of growth, or allowed itself to accept the anthro-pomorphism which regarded each successive stratum

naturally and necessarily simmered round the ques-Among the writers who now contributed to throw a light upon the rapidly progressing hypothesis were De Maillet, a contemporary of Newton, Charles

Darwin the elder, Lamark, Wells, the founder of the present theory of dew, Prof. Grant, Von Buch, D'Halley, and others, till in the year 1859 came, as we have said, the first edition of the Origin of Species. "Darwin for twenty-two years pondered the problem of the origin of species, and doubtless he would have continued to do so had he not found Wallace upon his track. A concentrated, but full and powerful epitome of his labors was the consequence. The book was by no means an easy one; and probably not one in every score of those who then attacked it had read its pages through, or were competent to grasp their significance if they had been attacked to grasp their significance if they

had. I do not say this merely to discredit them; for there were in those days some really eminent scientific men, entirely raised above the heat of popular prejudice, willing to accept any conclusion that science had to offer, provided it was duly beared by foot and arranged and who arrived. backed by fact and argument, and who entirely mistook Mr. Darwin's views. In fact, the work needed an expounder; and it found one in Mr. Huxley. I know nothing more admirable in the way of scientific exposition than those early articles of his on the critical seasons. He are at the content of his on the origin of species. He swept the curve of discussion through the really significant points of the subject, enriched his exposition with profound original remarks and reflections, often summing up in a single pi hy sentence an argument which a less compact mind would have spread over pages. But there is one impression made by the book itself which no exposition of it, however luminous, can amount of labor, both of observation and of thought, implied in its production. Let us glance at its principles. It is conceded on all hands that what are called varieties are continually produced. The rule is probably without exception. No chick and no child is in all respects and particulars the counterpart of its brother or sister, and in such differences we have 'variety' incipient. No naturalist could tell how far this variation could be carried; but the great ways of them held that never he ways for great mass of them held that never by any amount of internal or external change, nor by the mixture of both, could the offspring of the same progenitor so far deviate from each other as to constitute different pher is to combine the conditions of nature and to produce her results; and this was the method of Darwin. He made himself, acquainted with what could, without any manner of doubt, be done in the way of producing variation. He associated himself with pigeon-fanciers—bought, begged, kept, and observed every breed that he could obtain. Though derived from a common stock, the diversities of these pigeons were such that 'a score of them might be chosen which, if shown to an ornithologist, and he were told that they were wild birds, would certainly be ranked by him as well-defined species.' The simple principle which guides the pigeon fancier, as it does the cattle-breeder, is the selection of some variety that strikes his fancy, and the propagation of this variety by inheritance. With his eye still upon the articular appearance which he wishes to exselects it as it reappears in successive broods, and thus adds increment to increment until an astonishing amount of divergence from the parent type is effected. Man in this case does not produce the elements of the variation. He simply observes them, and by selection adds them together until the required result has been obtained. 'No man,' save Mr. Darwin, 'would ever try to make a fantail till he saw a pigeon with a tail developed in some slight degree in an unusual manuer, or a pouter until he saw a pigeon with a crop of unusual size. Thus nature gives the bint, man acts upon it, and by the law of inheritance exaggerates the deviation. Having thus satisfied himself by indubitable facts that the organization of an animal or of a plant (for precisely the same treatment applies to plants) is to some extent plastic, he passes from variation under domesticaion to variation under nature. Hitherto we have dealt with the adding together of small changes by the conscious selection of man. Can nature thus select? Mr. Darwin's answer is, 'Assuredly she can.' The number of living things produced is far in excess of the number that can be supported: ience, at some period or other of their lives must be a struggle for existence. And what is the infallible result? If one organism were a perfect copy of the other in regard to strength, perfect copy of the other in regard to strength, skill, and agility, external conditions would decide. But this is not the case. Here we have the fact of variety offering itself to nature, as in the former instance it offered itself to man; and those varieties which are least competent to cope with surrounding conditions will infallibly give way to those that are most competent. To use a familiar property the weakest carees to the well. For the those that are most competent. To use a familiar proverh, the weakest comes to the wall. But the triumphant fraction again breeds to overproduction, transmitting the qualities which secured its maintenance, but transmitting them in different degrees. The struggle for food again supervenes, and those to whom the favorable quality has been transmitted in excess will assuredly triumph. It is easy to see that we have here the addition of increments favorable to the individual still more rigorously carried out than in the case of domestication: for not only are unfavorable specimens not selected by nature, but they are d stroyed. This is what Mr. Darwin cails 'Natural Selection,' which 'acts by the preservation and accumulation of small inherited modifications, each profitable to the preserved being.' With this idea he interpenetrates and eavens the vast store of facts that he and others have collected. We cannot, without shutting our eyes through fear or prejudice, fail to see that Darwin is here dealing, not with imaginary, but with true causes; nor can we fail to discern what vast modifications may be produced by natural selection in periods sufficiently long. Each individual increferential, (a quantity indefinitely small.) but definite and great changes may obviously be produced by the integration of these infinitesimal quantities

through practically infinite time." Prof. Tyndall pays an eloquent tribute to the marvelous powers of observation, the vast accumulation of facts, the determination to overcome all obstacles, and the extraordinary patience and equanimity of temper which Mr. Darwin has brought to the elaboration of his theory:

"He treats every objection with a soberness and thoroughness which even Bishop Butler might be proud to initate, surrounding each fact with its appropriate detail, placing it in its proper relations, and usually giving it a significance which, as long as it was kept isolated, failed to appear. This is done without a trace of ill-temper. He moves over the subject with the passionless strength of a glacier; and the granding of the rocks is not always without a counterpart in the logical pulverization of the objector. But though in handling this mighty theme all passion has been stilled, there is an emotion of the intellect incident to the discernment of new truth which often colors and warms the pages of Mr. Darwin. His suc-cess has been great; and this implies not only the solidity of his work, but the preparedness of the pub-lic mind for such a revelation. On this head a remark of Agassiz impressed me more than anything else. Sprung from a race of theologians, this celebrated man combated to the last the theory of natural selection. One of the many times I had the pleasure of meeting him in the United States was at Mr. Winthrop's beautiful residence at Brookline, near Boston. Rising from luncheon, we all halted as if by a common impulse in tront of a window, and continued there a discussion which had been started at table. The maple was in its Autumn glory; and the exquisire beauty of the scene outside seemed, in my case, to interpenetrate, without disturbance, the intellectual action. Eurnestly, almost sadly, Agassiz turned, and said to the gentlemen standing round, 'I coniess that I was not prepared to see this theory received as it has been by the best intellects of our time. Its

success is greater than I could have thought possi-But Mr. Tyndall does not stop at the doctrines laid down in the Origin of Species. He acknowledges that he does not know how Mr. Darwin would explain the origin of a primordial form, or what he thinks of the introduction of life. He does not. however, hesitate to express his own views. Noting the radical significance of the doctrine of the conservation of energy, "the ultimate philosophical results of are as yet but dimly seen," brings to his aid the philosophy of Mr. Herbert Spencer. Whether he approves the whole of that philosophy unreservedly, we do not know. But he has evidently been largely influenced and fascinated by it, and he uses it to explain to himself the origin of the primordial form which Darwin failed to account for. How came that form there? The answer is not Mr. Spencer's, nor is it all Mr. Tyndall's. It is Mr. Tyndall's, realized through the aid offered by Mr. Spencer. The definitions of matter usually

given are, he considers, insufficient: "Trace the line of life backward, and see it approaching more and more to what we call the purely physical condition. We reach at length those organisms which I have compared to drops of oil suspended in a mixture of alcohol and water. We reach the protogenes of Haeckel, in which we have a type distinguishable from a fragment of albumen only by its finely granular character. Can we pause here? We break a magnet and find two poles in each of its fragments. We continue the process of breaking, but however small the parts, each carries with it, though enfeebled, the polarity of the whole. And when we can break no longer, we prolong the intellectual vision to the polar molecules. Are we not urged to do something similar in the case of life? with Lucretius, when he affirms that 'nature is seen to do all things spontaneously of herself with-out the meddling of the gods? or with Bruno, when out the medding of the goos? or with Bruno, when he declares that matter is not 'that mere empty capacity which philosophers have pictured her to be, but the universal mother who brings forth all things as the fruit of her own womb?' The questions here raised are mevitable. They are approaching us with accelerated speed, and it is not a matter of indifference whether they are introduced with regarging or with irray represe. reverence or with irreverence. Abandoning all disguise, the confession that I feel bound to make before you is that I prolong the vision backward across the boundary of the experimental evidence, and discern in that matter, which we in our ignorance, and not withstanding our professed reverence for its Orea-tor, have hitherto covered with opprobrium, the promise and potency of every form and quality of life."

belief that the acceptance of Mr. Darwin's theories is compatible with an entire acceptance of the Scriptures. We will now go a step beyond, and include in the same proposition Mr. Tyndall's theories, and as the greater includes the less, the whole ground will be covered. If we admit that matter has the power thus attributed to it, whence did it derive that power? To this there can be but one answer, and the existence of a Divine Being is admitted. Or again, assuming that matter has developed into form and life, it regulates its procedure according to certain determined laws. Where did those laws originate, if not with a Divine Being? We are not defending Mr. Tyndali or Mr. Darwin; we purposely abstain from either defending or opposing them. Whatever opinions we may entertain, we have no wish to express them, our purpose being rather to explain the discussion as we find it than to criticise any portion of it in favor of one side or the other. But the tendency to condem such an expression as Mr. Tyndall's, on the ground of its being opposed to a belief in God and in the revelations of religion, is so great that we have deemed it necessary to offer such protest against it. We would even submit whether it is not a higher attribute that we contemplate in the Deity, when we regard the entire universe, from the smallest atom to the mightiest sun, as working out its own destiny according to laws and with an inherent power which have been from the beginning of time given to it by the Creator, than if we regard Him as constantly at work arranging and rearranging the ultimate atoms of matter into new forms, and direct ing each individual particle into some fresh course. Something similar to this idea, though not plainly stated, is perhaps comprised in the following, where

Mr. Tyndall says:

and life. Let us pause for one moment to consider

the full meaning of it. Many persons will, we be-

lieve, be ready at once to denounce it as either

atheistical or pantheistical. We stated before our

Mr. Tyndall says:

"The whole process of evolution is the manifestation of a power absolutely inscrutable to the intellect of man. As little in our days as in the days of Job can man by searching find this power out. Considered fundamentally, it is by the operation of an insoluble mystery that life is evolved, species differentiated, and mind unfolded from their prepotent elements in the immeasurable past. There is, you will observe, no very rank materialism here. The strength of the doctrine of evolution consists, not man experimental demonstration, (for the subject is hardly accessible to this mode of proof.) but in its general harmony with the method of nature as in the increase in the rown. From contrast, moreover, it derives enormous relative strength. On the one side, rives enormous relative strength. On the one sic so called,) derived not from the study of nature, but from the observation of men a theory which converts the power whose garment is seen in the visible universe into an artificer, fashioned after the human model, and acting by broken efforts as man is seen to act. On the other side we have the conception that all we see around us, and all we feel within us-the phenomena of physical nature as well as those of the human mind—have their unsearchable roots in a cosmical life, if I dare apply the term, an infinitesimal span of which only is offered to the investigation of man. And even this span is only knowable in part. We can trace the development of a nervous system and correlate with it the parallel pheno nena of sensation and thought. We see with un doubting certainty that they go hand in hand. But we try to soar in a vacuum the moment we seek to comprehend the connection between."

But whatever differences of sentiment may aris upon this subject and its collateral issues, Mr. Tyndall has full dependence on the irresistible powers of science. If the development theory be sound, as he believes it to be; if man take his origin in a process of evolution, and thus, in fact, must be regarded as the highest attainment of nature progressively advanced from the lower orders of animal life, no power can in his judgment resist the proof which science will be ready to produce. "We fought and won our battle even in the mid-

dle ages; why should we doubt the issue of a comflict now? The impregnable position of science may be described in a few words. All religious theories, schemes, and systems, which embrace notions of cosmogony, or which otherwise reach into its domain must, in so far as they do this, submit to the contro of science, and relinquish all thought of controllin it. Acting otherwise proved disastrous in the past and it is simply fatuous to-day. Every system whi would escape the fate of an organism too rigid to adjust itself to its environment, must be plastic to the extent that the growth of knewledge demands. When this truth has been thoroughly taken in rigidity will be relaxed, exclusiveness diminished, things now deemed essential will be dropped, and elements now rejected will be assimilated. The lifting of the life is the essential point; and as long as dogmatism, fanaticism, and intolerance are kep out, various modes of leverage may be employed to raise life to a higher level. Science itself not unfrequently derives motive power from an ultra-scientific source. Whewell speaks of enthusiasm of temper as a hindrance to science; but he means the enthusiasm of weak heads. There is a stro and resolute enthusiasm in which science finds an ally; and it is to the lowering of this fire, rather than to a diminution of intellectual insight, that the lessening productiveness of men of science in their

All that Mr. Tyndall asks is that science shall have the right to discuss any questions that may come before it, no matter how repulsive they may at first appear. He claims this especially in the concluding portion of his remarks, which, characterized as it is with a steady adherence to his views, and a orilliancy and eloquence that are not often equaled in scient.fic addresses, must have produced an intense appreciation among his audience of the magnitude and dignity of the subject that had been put

"I have touched," he said, "on debatable que tions, and led you over dangerous ground—and this partly with the view of telling you, and through you the world, that as regards these questions science claims unrestricted right of search. It is not to the point to say that the views of Lucretius and Bruno, of Darwin and Spencer, may be wrong. I concede the possibility, deeming it indeed certain that these views will undergo modification. But the point is that, whether right or wrong, we claim the freedon to discuss them. The ground which they cover i scientific ground; and the right claimed is one made good through tribulation and anguish, inflicted and endured in darker times than ours, but resulting i the immortal victories which science has won for the human race. I would set forth equally the in

exorable advance of man's understanding in the path of knowledge, and the unquenchable claims of his emotional nature which the understanding ms emotional nature which the understanding can never satisfy. The world embraces not only a Newton, but a Shakespeare—not only a Boyle, but a Raphael, not only a Kant, but a Beethoven—not only a Darwin, but a Carlisle. Not in each of these, but in all, is human nature whole. They are not opposed, but supplementary, not mutually exclusive, but reconcilable. And if, still un satisfied, the human min I, with the yearning of a pilgrim for his distant home, will turn to the mystery from which it has emerged, seeking so to fashion it as to give unity to thought and faith—so long as this is done, not only without intolerance or bigotry of any kind, but with the enlightened recognition that ultima e fixity of conception is here unattain to tashion the mystery in accordance with its own needs—then, in opposition to all the restrictions of Materialism, I would affirm this to be a field for the noblest exercise of what, in contrast with the knowing faculties, may be called the creative faculties of man. Here, however, I must quit a theme too great for me to handle, but which will be handled by the loctiest minds ages after you and I, like streaks of morning cloud, shall have melted into the infinite

The manner in which this powerful advocacy of a

materialistic doctrine has been received in England is instructive. There is no denying the momentous issues that are involved. If Mr. Tyndall be right the supporters of the dualistic hypothesis are wrong. Man is not a separate creation, but a being sprung from out a process of evolution. He is not distinct and different from the lower animals except in so far as he possesses the highest qualities, which in them are imperceptible or very small, only developed to the full magnitude in which we see them in the no bility of manbood. In other words, if Mr. Typdall be right Prof. Huxley is right, and the close relations which he in less attractive words described not long since as existing between man and the highest o the brutes, are true and real. When viewed in connection with the prevalent impression of ordinary minds, the doctrine is doubtless astounding. But it has not been so received in Europe. There Mr. Tyndall appears to have disturbed nobody's equan imity, and his open avowal and masterly advocacy of what was once, and still is in some places, a very unpopular doctrine, have been accepted with calmness and much approbation. The inference to be grawn from that is simply that the public mind in England is in full state of preparedness to consider it. The doctrine has, indeed, been carefully examined by most thoughtful people for a long time past, and all that strikes them now as new in the discussion is that it should have received the sanction of so eminent an authority as Mr. Tyndall, and in an

The London Times, after giving to the two funda mental doctrines of the indestructibility of matter and the indestructibility of force equal authority, and treating them as incontrovertibly true, adds the following:

beauty.

address of so much ability, boldness, and literary

"Nature always works according to the law of least effort, and the 'survival of the fittest' means only the victory of that organization which attains the maximum result at the smallest expenditure promise and potency of every form and quality of life."

Cost. If with these is also conceded the percentary tradition of the differentiating circumstances of excellence, Professor Tyndall's argument is nearly complete. Teleological teaching is turned back upon inharent within itself the nower of initiating form

framed in order to produce the consequences flowing from their existence, but have fought their way to the front because, among countless competitors, they were best fitted to produce these consequences. Excellences are transmissible and even capable of development, so that subsequent members of a species start with faculties antecedent to experience, to which the common consent of mankind has given the name of instinct.

There is no theological reason for recoiling from the conclusion to which Prof. Tyndall would conduct us. The flight of time is nothing in the contemplation of the Creator; and all that is, and all the perfection that we hope will be, lay hid in the image of the future which was conceived before the foundations of the world were laid. Let it be granted that we can trace our civilization back to a chaos of matter and a burly-burly of elements, and the more severe the reasoning which has constrained us to connect our present with such a past, the more irresistibly are we compelled to admit that the present has been a necessary consequence of the laws laid down from the beginning, and we are thus confronted with the old difficulty of accounting for the origination of these laws which have conducted the world up to this moment. Theology is apparently slain only to revive. Prof. Tyndall does not solve, and it is obvious that his method cannot enable him to solve, the riddle of the universe."

The Standard and Daily News review the address, less closely preferred. The Standard and Daily News review the address, less closely perhaps, but calmly and approvingly.

No exception is taken to any part of it, but the latter paper expressly intimates that none can be taken. "It," it tells us, "the address be read fairly, there will be found in it nothing to which reasonable exception can be taken, while it is tall of lessons which our age much needs to learn." The Daily Telegraph, while admitting the importance and legitimacy of the subject, asks for demonstration before according belief. Demonstration we

know cannot be had, not at least in our present state of knowledge; though when we remember that the chemist can now produce in his laboratory compounds identical with what were a few years ago considered as exclusively the products of organic life; when, too, we remember the marvelous advances that have been made in all the leading branches of science during the last quarter of a century, and the insight which we have obtained into the innermost operations of nature in her grandest as well as in her minutest works, it is hazardous to speculate upon what may or what may not ultimately be attained in the way of demonstrating the The Telegraph thus concludes powers of matter. its observations:

powers of matter. The Telegraph thus concludes its observations:

"Very naturally, the question thus mooted at Befast will receive considerable attention at the hands of scientific men everywhere. Many there are who, with the late Prof. Agassiz, not only refuse to accept the doctrine of evolution, but lament the undoubted progress which it is making with the intellectual and thoughtful. Others, again, while admitting the theory, reject the deductions which are sketched out by Dr. Tyndall and those who think with him, and prefer to believe that, though all the known forms of existence may not have been created, they have yet sprung from certain primordial forms, designed and effected by the direct intervention of an intelligence wholly distinct from any of the properties which are allowed to belong to matter. Subtle the reasoning undoubtedly is which sees in sensitive pigment cells the incipient eye, or in the varied organic adjustment of plants the germs of sense and feeling. And difficult is it to define the exact difference between the granular protogenes and the life-giving albumen.

* * Still there is no reason why materialists should slacken their efforts or discontinue their search; for, as oft-times in the pursuit of a mirage a hidden sprung is discovered, so, in following the theory of 'necessary powers of matter,' great truths may be evolved, which, being-invaluable to the human race, will fully reward the inquirer, although they may, at the same moment, prove the doctrine with which he started to be fallacious and unreal."

The Athenæum expresses a little disappointment in that Mr. Tyndall should have chosen a metunbysical The Athenœum expresses a little disappointment in that Mr. Tyndall should have chosen a metaphysical enbject in place of some one suggested by his own more special branch of science. But it admits that the theme is worthy of a great mind and a great occasion, and the writer further says:

"We go entirely with the speaker in thinking that the principles of the Darwinian theory cannot be too often reiterated, since, from the tone of his antagon-ists, we clearly inter that the very elements of the theory have not yet been as much as understood by them." The Saturday Review notices prominently the tact displayed by Mr. Tyndall in dealing with a controversial question without giving offense to anybody. It partakes somewhat of the disappointment al-

in the materialistic theory. Alluding personally to

luded to in the Athenaum, but is fully prepared for a full discussion of the abstract questions involved

Mr. Tyndall, it says:

in the materialistic theory. Ailuding personally to Mr. Tyndall, it says:

"He has more than once, it is true, incurred great odium by the outspoken way in which he has declared his opinions, and he has been pronounced rash for so doing; but it has required only a few years to see that he had calculated better than his adversaries the amount of popular support that his views would presently obtain. There was just as little doubt that his address would be a success when delivered as there was that it would provoke keen controversy afterward.

In neither respect has his address disappointed expectations. It is somewhat premature to speak of the controversy it will excite, but both the subject and the treatment were such as to render it all too certain that controversy will follow. We confess that we were surprised that the President so wholly abandoned himself to elaborating one idea, and that one so distasteful to a large portion of those interested in science—the idea of the utterly mechanical nature of the universe, animate and inanimate alike. That he would touch on the so-called points at issue between science and religion was to be anticipated, but we expected that past experience would have taught him to content himself with incidental references to them, without taking one for his text. But he has shown himself to be one of those eager champious of science whose zeal will not permit them to allow science to colonize quietly district after district over which of old theology excressed a nominal sway, but who insist on the formal cession of the whole. No doubt theology thought it a neurpation when she was dictated to on the subject of the structure of the solar system. But she soon found that her own ideas were very vague and scant on the subject, and rested on no lasis whatever, while the rival ones were clear in detail, and rested on inderleasible evidence. So she gave up with a tolerably good grace, and subsequently showed that she had so far profited by the lesson as to repeat the process with much grea With regard to Mr. Tyndall's claim for the full freedom of science in all investigations, the Review gces on to admit the satisfaction which this demand will very generally excite among persons interested in such inquiries, but at the same time deplores the

rapidity with which science is already advancing in certain directions:

"Prof. Tyndall confesses, as of course he must, that in deciding that the atoms possess in themselves the potentiality of forming conscious beings he goes beyond evidence, and under such circumstances he cannot claim to have established a right to be followed by others. If the step be a right one, it will be taken in due course of time by mankind in general, and the way to hasten that time is by increasing the evidence on the subject, and not by rousing opposition by confessedly premature manifestoes. The world takes along time to digest new knowledge, but it does inevitably digest it at last. When this is done, its behavior will be affected thereby in the right way, but you cannot antedate that time by preaching what, after all, are only possibilities, not certainties."

The Spectator offers, perhaps, the most philocertain directions:

The Spectator offers, perhaps, the most philosophical analysis of Mr. Tyndall's theory, and, too, in opposition. Hencring him for the courage which has impelled him to tell out his real thought, and to face whatever of obloque attaches to such extremo opinions, it regards them as the "dreary conclusion of a splendid address:"

opinions, it regards them as the "dreary conclusion of a splendid address:"

"That the result of such a philosophy, if universally accepted, would be evil, or rather, to avoid the logical terminology, would be injurious to human progress, we have no doubt; but if it be true, the injury is no argument against its diffusion, for the injury, whatever its amount, is less than that which must proceed from the deliberate lying of the wise, or from the existence of that double creed, an exoteric and an esoteric one, which is the invariable result of their silence, or their limitation of speech to a circle of the initiated. Lucretius denying God and deifying Nature is a safer as well as nobler teacher than the augur chuckling in silent scorn as he amounces to the mob the imaginary will of the gods whom, for him and for them alike, he believes to be non-existent." * * * "It would have been well if Prof. Tyndall had stated frankly what his opponents would consider the great objections to his theory, had removed at least the primary difficulty, that the reference of all thought to motor apart from the independent and conceivably immortal mind in man, does not, like any other scientific assumption, explain the visible phenomena.

The hypothesis does not, for instance, explain in any way the consciousness of free-will, which is as strong as that consciousness of existence without which it is impossible to reason; or the independent influence of will, whether free or not, on the brain itself; or, above all, the existence of conflicting thoughts, going on in the mind at the same indivisible point of time. If a consciousness which is universal and permanent is not to be accepted as existing, why should the evidence of the senses, or the decision of reason, or the conclusions of science be accepted either? If the fact, as we should call it, is mere illusion, why is not the evidence for the conservation of energy mere illusion too? Belief in either can only be the result of experience, and the experience as to the other. Yet as

chinery could not co-exist. The machine may be as fine as the mind can conceive, but still it can only do its natural work—cannot change its routine, cannot, above all, decline to act, as the mind unquestionably often consciously does. Lucretius, who killed himself to avoid corrupt imaginings, could, had his sanity been perfect, have controlled them—that is, could have declined to let the mind act as it was going to act; and in that control is at least an apparent demonstration that he possessed something above the product of any material energies."

From these extracts which must be taken as the

From these extracts, which must be taken as the first expressions of public opinion, not only on the spot where the address was delivered, but in a country where the popular mind is already ripe for entering with vigor into a thorough discussion of the metaphysical problems which have been again brought prominently before them, it may be safe to infer that a warm controversy is at hand. It may or it may not possess the character of publicity, but it will certainly take place. The mere fact that Mr. Tyndall has avowed himself a convert to materialism will probably carry some along with him. But the subject is one of those in which the disputants do not readily yield their opinions. Every point on both sides will, in all probability, be warmly contested, and if so they cannot fail also to be very much elucidated. The only fear for which there is real foundation is that some will rush hotly into the contest under the impulse of prejudice or ignorance. Such persons only do mischief. What is wanted is a calm and careful investigation of the whole subject in all its minutest details, and with accumulated knowledge of facts, by men of science and powerful mental capacity. If such an inquiry should in reality follow as one of the consequences of Mr. Tyndall's address, and we have much hope that it will, no Presidential oration that has yet been delivered before the British Association will have surpassed it in the value and deeply interesting nature of its results.