

3161. An Act of Parliament in this country would not be able to alter the law of France?—No; but in the same way that French subjects are confined in English asylums, it might be a mutual agreement.

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*Professor Tyndall on Consciousness and Organisation, Free Will, Heredity, Responsibility, &c.*

On the 12th October, Professor Tyndall delivered an address at Birmingham, as President of the Midland Institute, of which the first part was devoted to a popular and most interesting exposition of “the Science of our Time,” of which the following are extracts, the one from near the beginning, and the last is the concluding portion. The whole address was one of the most happy of the recent attempts which we have seen to popularize the scientific results and tendencies of thought of the present time on these subjects.

We may, however, transport ourselves in idea into the future, and thus obtain a grasp, more or less complete, of the science of our time. We sometimes hear it decried and contrasted to its disadvantage with the science of other times. I do not think that this will be the verdict of posterity. I think, on the contrary, that posterity will acknowledge that in the history of science no higher samples of intellectual conquest are recorded than those which this age has made its own. One of the most salient of these I propose, with your permission, to make the subject of our consideration during the coming hour. It is now generally admitted that the man of to-day is the child and product of incalculable antecedent time. His physical and intellectual textures have been woven for him during his passage through phases of history and forms of existence which lead the mind back to an abysmal past. One of the qualities which he has derived from that past is the yearning to let in the light of principles on the otherwise bewildering flux of phenomena. He has been described by the German Lichtenberg as “das rastlose Ursachenthier”—the restless cause-seeking animal—in whom facts excite a kind of hunger to know the sources from which they spring. Never, I venture to say, in the history of the world has this longing been more liberally responded to, both among men of science and the general public, than during the last 30 or 40 years. I say “the general public,” because it is a feature of our time that the man of science no longer limits his labours to the society of his colleagues and his peers, but shares, as far as it is possible to share, with the world at large the fruits of inquiry. The celebrated Robert Boyle regarded the universe as a machine; Mr. Carlyle prefers regarding it as a tree. He loves the image of the umbrageous Iguarasil better than that of

the Strasburg clock. A machine may be defined as an organism with life and direction outside ; a tree may be defined as an organism with life and direction within. In the light of these definitions, I close with the conception of Carlyle. The order and energy of the universe I hold to be inherent, and not imposed from without—the expression of fixed law and not of arbitrary will, exercised by what Carlyle would call an almighty clockmaker. But the two conceptions are not so much opposed to each other after all. In one essential particular they, at all events, agree. They equally imply the interdependence and harmonious interaction of parts, and the subordination of the individual powers of the universal organism to the working of the whole. Never were the harmony and interdependence just referred to so clearly recognised as now. Our insight regarding them is not that vague and general insight to which our fathers had attained, and which, in early times, was more frequently affirmed by the synthetic poet than by the scientific man. The interdependence of our day has become quantitative—expressible by numbers—leading, it must be added, directly into that inexorable reign of law which so many gentle people regard with dread. In the domain now under review, men of science had first to work their way from darkness into twilight, and from twilight into day. There is no solution of continuity in science. It is not given to any man, however endowed, to rise spontaneously into intellectual splendour without the parentage of antecedent thought. Great discoveries grow. Here, as in other cases, we have first the seed, then the ear, then the full corn in the ear, the last member of the series implying the first.

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We all know the effect produced on a “nervous” organisation by a slight sound which causes affright. An aerial wave, the energy of which would not reach a minute fraction of that necessary to raise the thousandth of a grain through the thousandth of an inch, can throw the whole human frame into a powerful mechanical spasm, followed by violent respiration and palpitation. The eye, of course, may be appealed to as well as the ear. Of this the lamented Lange gives the following vivid illustration :—A merchant sits complacently in his easy chair, not knowing whether smoking, sleeping, newspaper reading, or the digestion of food occupies the largest portion of his personality. A servant enters the room with a telegram bearing the words, “Antwerp, &c. . . . Jonas and Co. have failed.” “Tell James to harness the horses!” The servant flies. Up starts the merchant wide-awake, makes a dozen paces through the room, descends to the counting-house, dictates letters, and forwards despatches. He jumps into his carriage, the horses snort, and their driver is immediately at the Bank, on the Bourse, and among his commercial friends. Before an hour has elapsed he is again at home, where he throws himself once more into his easy chair with a deep-

drawn sigh, "Thank God I am protected against the worst, and now for further reflection!" This complex mass of action, emotional, intellectual, and mechanical, is evoked by the impact upon the retina of the infinitesimal waves of light coming from a few pencil marks on a bit of paper. We have, as Lange says, terror, hope, sensation, calculation, possible ruin, and victory compressed into a moment. What caused the merchant to spring out of his chair? The contraction of his muscles. What made his muscles contract? An impulse of the nerves, which lifted the proper latch, and liberated the muscular power. Whence this impulse? From the centre of the nervous system. But how did it originate there? This is the critical question. The aim and effort of science is to explain the unknown in terms of the known. Explanation, therefore, is conditioned by knowledge. You have probably heard the story of the German peasant who, in early railway days, was taken to see the performance of a locomotive. He had never known carriages to be moved except by animal power. Every explanation outside of this conception lay beyond his experience, and could not be invoked. After long reflection, therefore, and seeing no possible escape from the conclusion, he exclaimed confidently to his companion, "Es müssen doch Pferde darin sein"—"There must be horses inside." Amusing as this locomotive theory may seem, it illustrates a deep-lying truth. With reference to our present question, some may be disposed to press upon me such considerations as these:—Your motor nerves are so many speaking-tubes, through which messages are sent from the man to the world; and your sensor nerves are so many conduits through which the whispers of the world are sent back to the man. But you have not told us where is the man. Who or what is it that sends and receives those messages through the bodily organism? Do not the phenomena point to the existence of a self within the self, which acts through the body as through a skilfully constructed instrument? You picture the muscles as hearkening to the commands sent through the motor nerves, and you picture the sensor nerves as the vehicles of incoming intelligence; are you not bound to supplement this mechanism by the assumption of an entity which uses it? In other words, are you not forced by your own exposition into the hypothesis of a free human soul? That hypothesis is offered as an explanation or simplification of a series of phenomena more or less obscure. But adequate reflection shows that instead of introducing light into our minds it increases our darkness. You do not in this case explain the unknown in terms of the known, which, as stated above, is the method of science, but you explain the unknown in terms of the more unknown. The warrant of science extends only to the statement that the terror, hope, sensation, and calculation of Lange's merchant are psychical phenomena produced by, or associated with, the molecular motions set up by the waves of light in a previously prepared brain. But the scientific view is not without its own difficulties.

We here find ourselves face to face with a problem which is the theme, at the present moment, of profound and subtle controversy. What is the causal connexion, if any, between the objective and subjective—between molecular motions and states of consciousness? My answer is, I know not, nor have I as yet met anybody who knows. It is no explanation to say that the objective and subjective effects are two sides of one and the same phenomenon. Why should the phenomenon have two sides? This is the very core of the difficulty. There are plenty of molecular motions which do not exhibit this two-sidedness. Does water think or feel when it runs into frost-ferns upon a window-pane? If not, why should the molecular motion of the brain be yoked to this mysterious companion—consciousness? We can present to our minds a coherent picture of the physical processes—the stirring of the brain, the thrilling of the nerves, the discharging of the muscles, and all the subsequent mechanical motions of the organism. But we can present no picture of the process whereby consciousness emerges, either as a necessary link or as an accidental by-product of this series of actions. Yet it certainly does emerge—molecular motion produces consciousness. The reverse process of the production of motion by consciousness is equally unrepresentable to the mind. We are here, in fact, upon the boundary line of our intellectual powers, where the ordinary canons of science fail to extricate us from our difficulties. If we are true to these canons, we must deny to subjective phenomena all influence on physical processes. The latter must be regarded as complete in themselves. Physical science offers no justification for the notion that molecules can be moved by states of consciousness; and it furnishes just as little countenance to the conclusion that states of consciousness can be generated by molecular motion. Frankly stated, we have here to deal with facts almost as difficult to be seized mentally as the idea of a soul. And if you are content to make your “soul” a poetic rendering of a phenomenon which refuses the yoke of ordinary mechanical laws, I, for one, would not object to this exercise of ideality. Amid all our speculative uncertainty there is one practical point as clear as the day—namely, that the brightness and the usefulness of life, as well as its darkness and disaster, depend to a great extent upon our own use or abuse of this miraculous organ. We now stand face to face with the final problem. It is this. Are the brain, and the moral and intellectual processes known to be associated with the brain—and, as far as our experience goes, indissolubly associated—subject to the laws which we find paramount in physical nature? Is the will of man, in other words, free, or are it and nature equally “bound fast in fate?” From this latter conclusion after he had established it to the entire satisfaction of his understanding, the great German thinker Fichte recoiled. You will find the record of this struggle between head and heart in his book, entitled “*Die Bestimmung des Menschen*”—“The Vocation of Man.”

Fichte was determined at all hazards to maintain his freedom, but the price paid for it indicates the difficulty of the task. To escape from the iron necessity seen everywhere reigning in physical nature, he turned defiantly round upon nature and law, and affirmed both of them to be the products of his own mind. He was not going to be the slave of a thing which he had himself created. There is a good deal to be said in favour of this view, but few of us probably would be able to bring into play the solvent transcendentalism whereby Fichte melted his chains. Why do some of us regard this notion of necessity with terror, while others do not fear it at all? Has not Carlyle somewhere said that a belief in destiny is the bias of all earnest minds? "It is not nature," says Fichte, "it is freedom itself by which the greatest and most terrible disorders incident to our race are produced. Man is the cruellest enemy of man." But the question of moral responsibility here emerges, and it is the possible loosening of this responsibility that so many of us dread. The notion of necessity certainly failed to frighten Bishop Butler. He thought it untrue, but he did not fear its practical consequences. He showed, on the contrary, in the "Analogy," that as far as human conduct is concerned the two theories of free will and necessity come to the same in the end. What is meant by free will? Does it imply the power of producing events without antecedents—of starting as it were upon a creative tour of occurrences without any impulse from within or from without? Let us consider the point. If there be absolutely or relatively no reason why a tree should fall, it will not fall; and if there be absolutely and relatively no reason why a man should act, he will not act. It is true that the united voice of this assembly could not persuade me that I have not, at this moment, the power to lift my arm if I wished to do so. Within this range the conscious freedom of my will cannot be questioned. But what about the origin of the "wish?" Are we, or are we not, complete masters of the circumstances which create our wishes, motives and tendencies to action? Adequate reflection will, I think, prove that we are not. What, for example, have I to do with the generation and development of that which some will consider my total being, and others a most potent factor of my total being—the living, speaking organism which now addresses you? As stated at the beginning of this discourse, my physical and intellectual textures were woven for me, not by me. Processes in the conduct or regulation of which I had no share have made me what I am. Here, surely, if anywhere, we are as clay in the hands of the potter. It is the greatest of delusions to suppose that we come into this world as sheets of white paper on which the age can write what it likes, making us good or bad, noble or mean, as the age pleases. The age can stunt, promote, or pervert pre-existent capacities, but it cannot create them. The worthy Robert Owen, who saw in external circumstances the great moulders of human character, was obliged to supplement his doctrine by making the man himself one of the circumstances. It is

as fatal as it is cowardly to blink facts because they are not to our taste. How many disorders, ghostly and bodily, are transmitted to us by inheritance? In our courts of law, whenever it is a question whether a crime has been committed under the influence of insanity, the best guidance the judge and jury can have is derived from the parental antecedents of the accused. If among these insanity be exhibited in any marked degree, the presumption in the prisoner's favour is enormously enhanced, because the experience of life has taught both judge and jury that insanity is frequently transmitted from parent to child. I met some years ago in a railway carriage the governor of one of our largest prisons. He was evidently an observant and reflective man, possessed of wide experience gathered in various parts of the world, and a thorough student of the duties of his vocation. He told me that the prisoners in his charge might be divided into three distinct classes. The first class consisted of persons who ought never to have been in prison. External accident, and not internal taint, had brought them within the grasp of the law, and what had happened to them might happen to most of us. They were essentially men of sound moral stamina, though wearing the prison garb. Then came the largest class, formed of individuals possessing no strong bias, moral or immoral, plastic to the touch of circumstances which would mould them into either good or evil members of society. Thirdly came a class—happily not a large one—whom no kindness could conciliate and no discipline tame. They were sent into this world labelled "incorrigible," wickedness being stamped, as it were, upon their organisations. It was an unpleasant truth, but as a truth it ought to be faced. For such criminals the prison over which he ruled was certainly not the proper place. If confined at all, their prison should be on a desert island where the deadly contagium of their example could not taint the moral air. But the sea itself he was disposed to regard as a cheap and appropriate substitute for the island. It seemed to him evident that the State would benefit if prisoners of the first class were liberated; prisoners of the second class educated; and prisoners of the third class put commendously under water. It is not, however, from the observation of individuals that the argument against "free will," as commonly understood, derives its principal force. It is, as already hinted, indefinitely strengthened when extended to the race. Most of you have been forced to listen to the outcries and denunciations which rung discordant through the land for some years after the publication of Mr. Darwin's "Origin of Species." Well, the world—even the clerical world—has for the most part settled down in the belief that Mr. Darwin's book simply reflects the truth of nature; that we who are now "foremost in the files of time" have come to the front through almost endless stages of promotion from lower to higher forms of life. If any one of us were given the privilege of looking back through the eons across which life has crept towards its present outcome, his vision would ultimately reach a point when the progenitors of this assembly

could not be called human. From that humble society, through the interaction of its members and the storing up of their best qualities, a better one emerged; from this again a better still, until at length, by the integration of infinitesimals through ages of amelioration, we came to be what we are to-day. We of this generation had no conscious share in the production of this grand and beneficent result. Any and every generation which preceded us had just a little share. The favoured organisms whose garnered excellence constitutes our present store owed their advantage, first, to what we in our ignorance are obliged to call "accidental variation;" and, secondly, to a law of heredity in the passing of which our suffrages were not collected. With characteristic felicity and precision Mr. Matthew Arnold lifts this question into the free air of poetry, but not out of the atmosphere of truth, when he ascribes the process of amelioration to "a power not ourselves which makes for righteousness." If, then, our organisms, with all their tendencies and capacities, are given to us without our being consulted, and if, while capable of acting within certain limits in accordance with our wishes, we are not masters of the circumstances in which motives and wishes originate; if, finally, our motives and wishes determine our actions, in what sense can these actions be said to be the result of free will? Here again, we are confronted with the question of moral responsibility which it is desirable to meet in its rudest form and in the most uncompromising way. "If," says the robber, the ravisher, or the murderer, "I act because I must act, what right have you to hold me responsible for my deeds!" The reply is, "the right of society to protect itself against aggressive and injurious forces, whether they be bond or free, forces of nature or forces of man." "Then," retorts the criminal, "you punish me for what I cannot help." "Granted," says society, "but had you known that the treadmill or the gallows was certainly in store for you, you might have 'helped.' Let us reason the matter fully and frankly out. We entertain no malice or hatred against you, but simply with a view to our own safety and purification we are determined that you and such as you shall not enjoy liberty of evil action in our midst. You, who have behaved as a wild beast, we claim the right to cage or kill as we should a wild beast. The public safety is a matter of more importance than the very limited chance of your moral renovation, while the knowledge that you have been hanged by the neck may furnish to others about to do as you have done the precise motive which will hold them back. If your act be such as to invoke a minor penalty, then not only others, but yourself may profit by the punishment which we inflict. On the homely principle 'that a burnt child dreads the fire,' it will make you think twice before venturing on a repetition of your crime. Observe, finally, the consistency of our conduct. You offend because you cannot help offending, to the public detriment. We punish, because we cannot help punishing, for the public good. Practically, then, as Bishop Butler predicted, we act as the world acted when it supposed

the evil deeds of its criminals to be the products of free will.' "What," I have heard it argued, "is the use of preaching about duty if man's predetermined position in the moral world renders him incapable of profiting by advice?" Who knows that he is incapable? The preacher's last word enters as a factor into the man's conduct; and it may be a most important factor, unlocking moral energies which might otherwise remain imprisoned and unused. If the preacher feel that words of enlightenment, courage, and admonition enter into the list of forces employed by Nature for man's amelioration since she gifted man with speech, he will suffer no paralysis to fall upon his tongue. Dangle the fig-tree hopefully, and not until its barrenness has been demonstrated beyond a doubt let the sentence go forth, "Cut it down, why cumbereth it the ground?" I remember when a youth in the town of Halifax, some 32 years ago, attending a lecture given by a young man to a small but select audience. The aspect of the lecturer was earnest and practical, and his voice soon riveted attention. He spoke of duty, defining it as a debt owed, and there was a kindling vigour in his words which must have strengthened the sense of duty in the minds of those who heard him. No speculations regarding the freedom of the will could alter the fact that the words of that young man did me good. His name was George Dawson. He also spoke, if you will allow me to allude to it, of a social subject much discussed at the time, the Chartist subject of "levelling." "Suppose," he said, "two men to be equal at night, and that one rises at six, while the other sleeps till nine next morning, what becomes of your levelling?" And in so speaking he made himself the mouthpiece of Nature, which as we have seen, secures advance, not by the reduction of all to a common level, but by the encouragement and conservation of what is best. It may be urged that, in dealing as above with my hypothetical criminal, I am assuming a state of things brought about by the influence of religions which include the dogmas of theology and the belief in free will—a state namely, in which a moral majority control and keep in awe an immoral minority. The heart of man is "deceitful above all things, and desperately wicked." Withdraw, then, our theologic sanctions, including the belief in free will, and the condition of the race will be typified by the samples of individual wickedness which have been adduced. We shall all, that is, become robbers, and ravishers, and murderers. From much that has been written of late it would seem that this astounding inference finds house-room in many minds. Possibly, the people who hold such views might be able to illustrate them by individual instances.

"The fear of hell's a hangman's whip  
To keep the wretch in order."

Remove the fear, and the wretch following his natural instinct may become disorderly; but I refuse to accept him as a sample of humanity. "Let us eat and drink, for to-morrow we die" is by no means the

ethical consequence of free thought. To many of you the name of George Jacob Holyoake is doubtless familiar, and you are probably aware that at no man in England has the term Atheist been more frequently pelted. There are, moreover, really few who have more completely liberated themselves from theological notions. Among working-class politicians Mr. Holyoake is a leader. Does he exhort his followers to "eat and drink, for to-morrow we die?" Not so. In the August number of the 19th Century you will find these words from his pen:—"The gospel of dirt is bad enough, but the gospel of mere material comfort is much worse." He contemptuously calls the Comtist championship of the working man "the championship of the trencher." He would place "the leanest liberty which brought with it the dignity and power of self help" higher than "any prospect of a full plate without it." Such is the doctrine taught by this "Atheistic" leader; and no Christian, I apprehend, need be ashamed of it. Not in the way assumed by our dogmatic teachers has the morality of human nature been propped up. The power which has moulded us thus far has worked with stern tools upon a very rigid stuff. What it has done cannot be so readily undone; and it has endowed us with moral constitutions which take pleasure in the noble, the beautiful, and the true, just as surely as it has endowed us with sentient organisms which find aloes bitter and sugar sweet. That power did not work with delusions, nor will it stay its hand when such are removed. Facts rather than dogmas have been its ministers—hunger and thirst, heat and cold, pleasure and pain, sympathy, shame, pride, love, hate, terror, awe—such were the forces the interaction and adjustment of which during the immeasurable ages of his development wove the triplex web of man's physical, intellectual, and moral nature, and such are the forces that will be effectual to the end. Some may retort that even on my own showing "the power which makes for righteousness" has dealt in delusions; for it cannot be denied that the beliefs of religion, including the dogmas of theology and the freedom of the will, have had some effect in moulding the moral world. Granted; but I do not think that this goes to the root of the matter. Are you quite sure that those beliefs and dogmas are primary and not derived—that they are not the products, instead of being the creators, of man's moral nature? I think it is in one of the "Latter Day Pamphlets" that Carlyle corrects a reasoner, who deduced the nobility of man from a belief in heaven, by telling him that he puts the cart before the horse, the real truth being that the belief in heaven is derived from the nobility of man. The bird's instinct to weave its nest is referred to by Emerson as typical of the force which built cathedrals, temples, and pyramids:—

"Knowest thou what wove yon woodbird's nest  
Of leaves and feathers from her breast,  
Or how the fish outbuilt its shell,  
Painting with morn each annual cell?"

Such and so grew these holy piles  
 While love and terror laid the tiles ;  
 Earth proudly wears the Parthenon  
 As the best gem upon her zone ;  
 And Morning opes with haste her lids  
 To gaze upon the Pyramids ;  
 Oe'r England's abbeys bends the sky  
 As on its friends with kindred eye ;  
 For out of Thought's interior sphere  
 These wonders rose to upper air,  
 And nature gladly gave them place,  
 Adopted them unto her race,  
 And granted them an equal date  
 With Andes and with Ararat."

Surely many of the utterances which have been accepted as descriptions ought to be interpreted as aspirations ; or as having their roots in aspiration, instead of objective knowledge. Does the song of the herald angels, "Glory to God in the highest, and on earth peace, goodwill toward men," express the exaltation and the yearning of a human soul, or does it describe an optical and acoustical fact—a visible host and an audible song ? If the former, the exaltation and the yearning are man's imperishable possession—a ferment long confined to individuals, but which may by and by become the leaven of the race. If the latter, then belief in the entire transaction is wrecked by non-fulfilment. Look to the East at the present moment as a comment on the promise of peace on earth and goodwill toward men. That promise is a dream dissolved by the experience of 18 centuries. But though the mechanical theory of a vocal heavenly multitude proves untenable, the immortal song and the feelings it expresses are still ours, to be incorporated, let us hope, in purer and less shadowy forms in the poetry, philosophy, and practice of the future. Thus, following the lead of physical science, we are brought from the solution of continuity into the presence of problems which usually classified, lie entirely outside the domain of physics. To these problems thoughtful and penetrative minds are now applying those methods of research which in physical science has proved their truth by their fruits. There is on all hands a growing repugnance to invoke the supernatural in accounting for the phenomena of human life. And the thoughtful minds just referred to, finding no trace of evidence in favour of any other origin are driven to seek in the interaction of social forces the genesis and development of man's moral nature. If they succeed in their search—and I think they are sure to succeed—social duty would be raised to a higher level of significance, and the deepening sense of social duty would, it is to be hoped, lessen, if not obliterate, the strife and heartburnings which now beset and disguise our social life. Towards this great end it behoves us one and all to work.