

## **What should secular education embrace? / By George Combe.**

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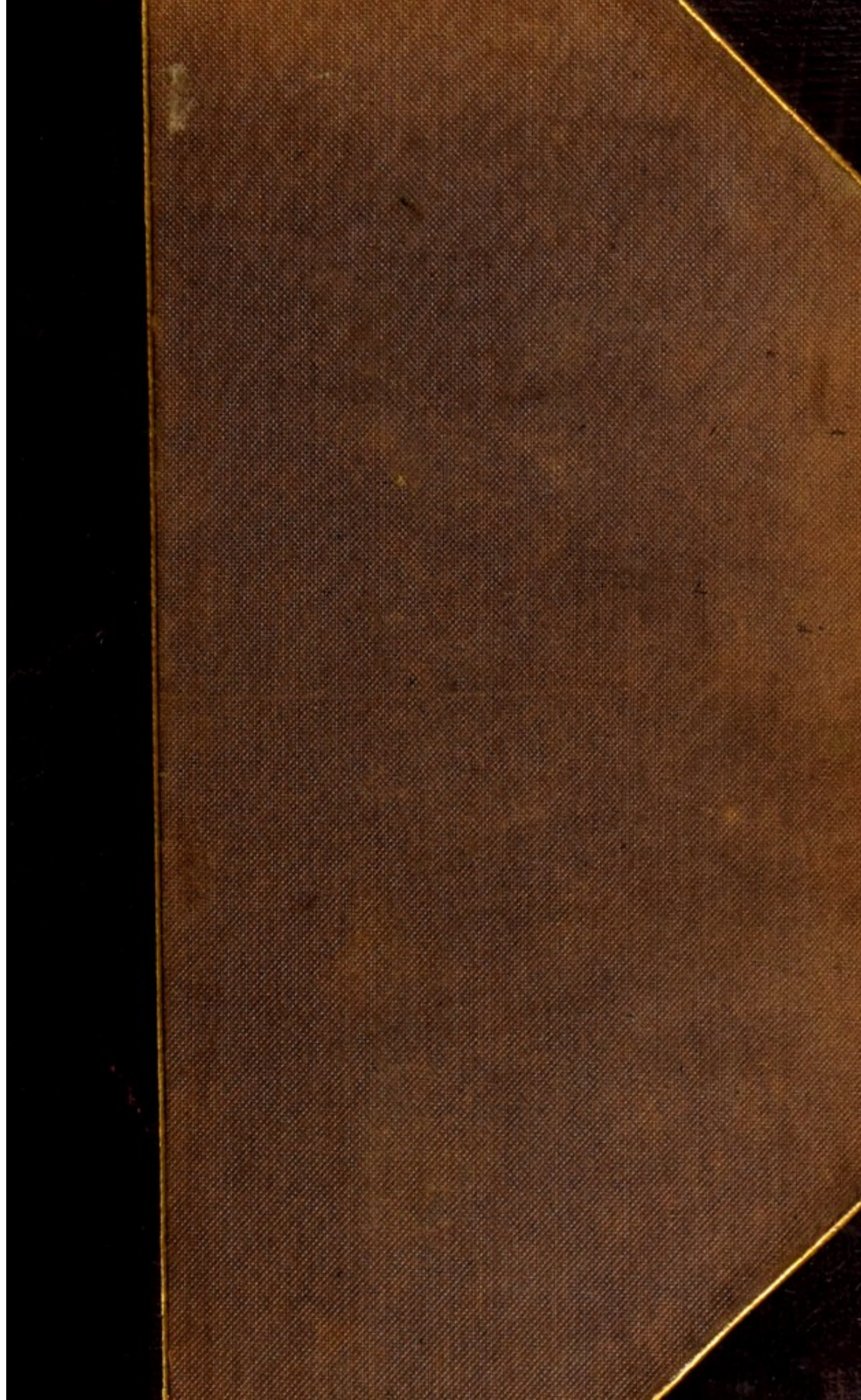
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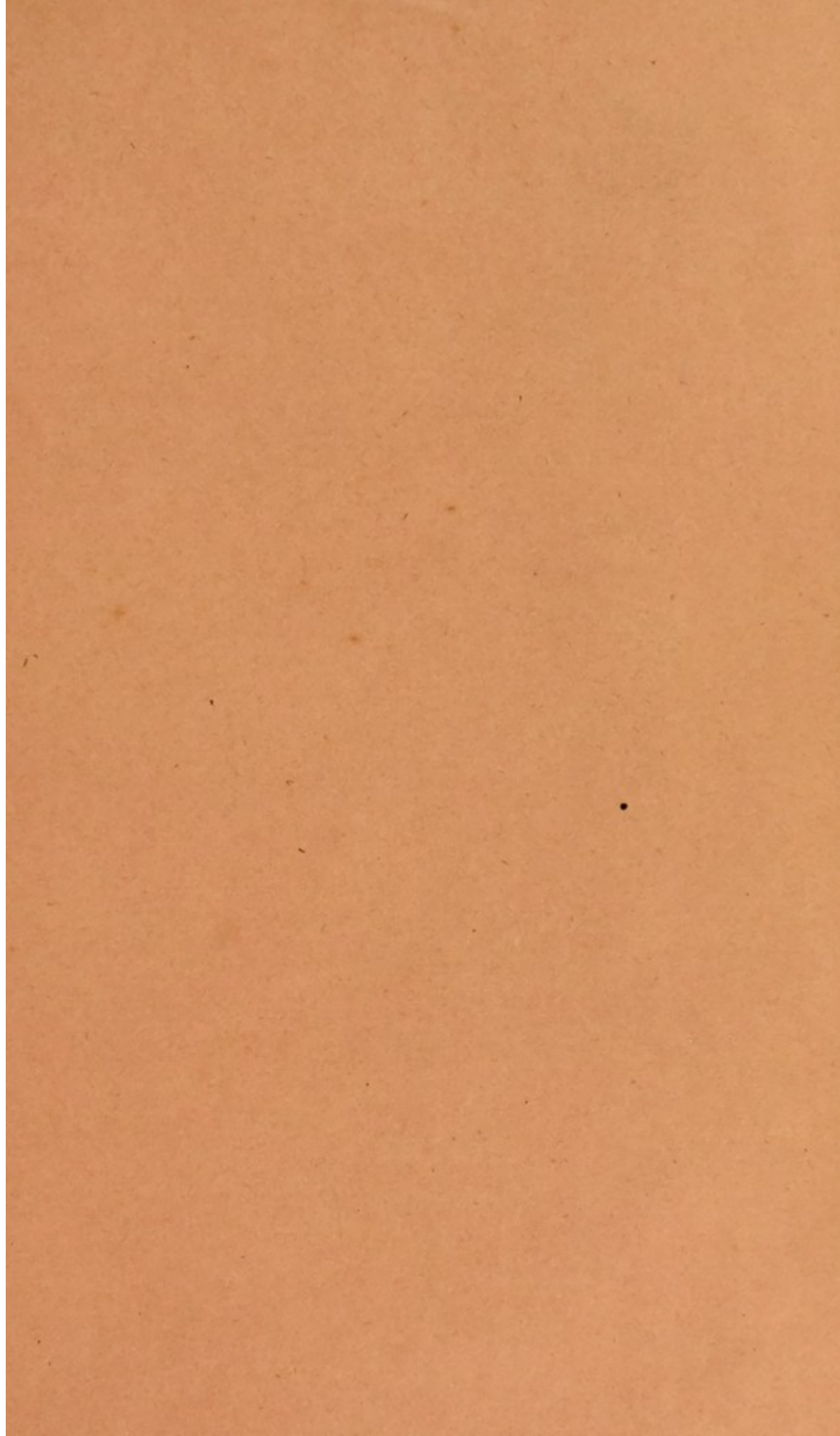


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Dr Charles Mackays poem  
"The Souls of the Children".  
at the end of 4<sup>th</sup> Report of Williams's  
Secular School.

See three other pamphlets by G. Combe  
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To *Thos Horlock Bartard Esq*

*with best regards*

WHAT SHOULD

*from Geo. Combe.*

## SECULAR EDUCATION EMBRACE?

BY

GEORGE COMBE.

SECOND EDITION, CORRECTED AND ENLARGED.

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"Why did the members of the Privy Council take an oath? Why make a reference to a superintending Providence in the Queen's speeches, and in some of their Parliamentary enactments? Was it not perfectly clear that in doing these things they were recognising a moral Providence, a moral Governor of the world, who superintended, directed, and controlled human actions? and, therefore, when they recognised a superintending Governor and a moral Providence, it was perfectly clear that *they also recognised the necessity of knowing and acting upon his will.*"—*Speech of Lord Ashley in the House of Commons on 16th December 1847, reported in the Evening Mail, on the "Removal of Jewish Disabilities."*

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## PREFACE.

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THE following Pamphlet contains a farther elucidation and application of the principles advanced in my two preceding publications, "Remarks on National Education," and on "The Relation between Religion and Science."

The word "secular" signifies "temporal, belonging to this world or life," in contradistinction to "spiritual," which designates things relating chiefly to eternity. Secular education, therefore, should mean education calculated to instruct us in the best means of acting with success the part allotted to us in this world, whatever that may be; and to train us to render that instruction practical. The object of the following pages is not to expound the details of a scheme of secular education, but to inquire into the kind of information which man stands in need of, in order to place him in a condition to act his part in this life with success; and to shew that the communication of that information, whatever it shall prove to be, should form the grand object of secular education. After the *object* of secular education is understood, the *means* of accomplishing it will be more accurately judged of, and more easily realised.

The line of inquiry which I have followed is difficult and comparatively new. If, therefore, I shall succeed in conveying to the mind of the reader a general comprehension of the idea which I advance, I shall hope for his indulgence on account of the imperfections which must necessarily attend an attempt to treat so vast a subject in so brief a compass as a pamphlet. In no other form, unfortunately, could so general a consideration of the topic be expected to be attained.

In the words of the great Reformer, "I think they are extremely mistaken who imagine the knowledge of philosophy and nature to be of no use to religion."—*Luther*, tom. ii., epist. 371.



A great part of this Pamphlet was reproduced in the Introduction to the enlarged book on Science & Religion which Mr Combe published in 1857

## WHAT SHOULD SECULAR EDUCATION EMBRACE?

THE question which at present engages so much public attention, viz., What should Secular Education embrace? appears to me to depend for its solution on the answers to some previous questions; viz., Does God really govern the world? Is the *mode* in which He governs it discoverable? If it be scrutable and intelligible, is it adapted to the nature of man? If man be capable of acting in harmony with it, what will be the consequences of his neglecting to make himself acquainted with it, and to adapt his conduct to its laws?

It will not generally be disputed, 1st, that secular education should include an exposition of everything which is necessary to be known to enable us to act in harmony with the order of God's secular providence, if such an order exist,—be discoverable,—and be designedly adapted to the human faculties; and, 2dly, that it should embrace also such a training of all our powers, physical and mental, as may be necessary to establish in us the disposition to act habitually in harmony with that order.

In the early part of the seventeenth century, religious men believed that the government of the world was then administered by special acts of Divine interference in the affairs of man, in the manner described in the books of the Old and New Testaments. If this opinion was well founded, and if the same system of government is continued in the present day, then instruction in the principles and mode of action of that government should constitute the substance of *secular* as well as of religious instruction; because such knowledge alone would reveal to man the influences by which his condition on earth is determined, and enable him to adapt his conduct to their agency. The curriculum of study in most of our schools and universities was instituted by men who believed not only that this system of government prevailed in their own day, but that it would continually exist; and this opinion influences the judgment of the great majority of religious persons to the present hour.

In a pamphlet on "The Relation between Religion and Science," I endeavoured to shew that this belief is neither



countenanced by science nor warranted by experience, as applicable to the times in which *we* live ; but that, on the contrary, the world is *now* governed by natural laws designedly adapted by the Divine Ruler to the human mind and body, and calculated to serve as guides to human conduct. It is not necessary again to enter into the evidence and train of reasoning by which this conclusion was reached. I proceed, therefore, to remark, that if the scheme of government by special interpositions of Divine power be not now in force, and if human affairs be ruled by God's providence operating through the medium of the constitution and relations of natural objects and beings, then a knowledge of these things and beings, and of their modes of action, will be a key to the knowledge of the order of God's providence in the secular government of the world, and will constitute valuable instruction for the young. It will unfold to their understandings and their consciences the temporal duties which God requires them to discharge, and the mode in which they may most effectually discharge them ; and it will enable them to comprehend the rewards and punishments by means of which He enforces obedience to his requirements in this life.

As few persons doubt that God actually governs the world, we may assume this point to be conceded, and proceed to inquire whether the mode in which his government is maintained be discoverable by human reason. I beg to remind the reader that, if this world be *not* now governed by acts of special interposition of Divine power, and if it be *not* governed by natural laws cognizable by the human understanding and adapted to the nature of man, it must necessarily be a theatre of anarchy, and consequently of atheism ; in other words, a world without the practical manifestation of a God. If, on the other hand, such laws exist (as science proclaims), they must be of Divine institution, and worthy of our most serious consideration.

Accordingly, the profoundest thinkers generally admit that this world *is* governed by natural laws ;\* and hence the chief practical questions that remain to be solved are these :—Can human intelligence discover the means by which God governs the world ? And, if it can do so, is it able to modify the action of those means, or to adapt human conduct to their influence ? These topics, accordingly, shall form the first subjects of the present inquiry.

\* See Note I., in the Appendix to "The Constitution of Man," and pages 5th and 6th of "The Relation between Religion and Science." Also "Answer by G. Combe to the Rev. C. J. Kennedy." I was indebted to Dr Spurzheim's work on the Natural Laws of Man, for my first appreciation of the importance of these laws.



In introducing them to the reader, perhaps I may be excused for stating the circumstances which first awakened in my own mind that deep interest in the subject which has induced me so often to address the public in relation to it.

By pursuing this course, I shall be under the necessity of introducing a portion of my individual history—a perilous thing for a living author to do, and one which naturally exposes him to the imputation of vanity and egotism: but as a counterbalance to this disadvantage, the development of the origin and progress of a writer's convictions may probably, with some readers, invest the abstract questions of which he treats with a greater living interest, while it will afford facilities to all for deciding whether he is labouring under an idiosyncrasy of perception and judgment, or is advocating, however inadequately and imperfectly, really interesting and important truths.

Fortified by these considerations, and soliciting the indulgence of the reader, I beg to mention, that an event so common and trivial as almost to appear ludicrous when introduced into a grave discourse, but which is *real*,—led by insensible degrees to the convictions which I am now endeavouring to diffuse. When a child of six or seven years of age, some benevolent friend bestowed on me a lump of sugar-candy. The nursery-maid desired me to give a share of it to my younger brothers and sisters, and I presented it to her to be disposed of as she recommended. She gave each of them a portion, and when she returned the remainder to me, she said, "That's a good boy—God will reward you for this." These words were uttered by her as a mere form of pious speech, proper to be addressed to a child; but they conveyed to my mind an idea;—they suggested intelligibly and practically, for the first time, the conception of a Divine reward for a kind action; and I instantly put the question to her, "*How* will God reward me?" "He will send you everything that is good." "What do you mean by 'good'—Will he send me more sugar-candy?" "Yes—certainly he will, if you are a good boy." "Will he make this piece of sugar-candy grow bigger?" "Yes—God always rewards those who are kind-hearted."

I could not rest contented with words, but at once proceeded to the verification of the assurance by experiment and observation. I forthwith examined minutely all the edges of the remaining portion of sugar-candy, took an account of its dimensions, and then, wrapping it carefully in paper, put it into a drawer, and waited with anxiety for its increase. I left it in the drawer all night, and next morning examined it



with eager curiosity. I could discover no trace of alteration in its size, either of increase or decrease. I was greatly disappointed ; my faith in the reward of virtue by the Ruler of the world received its first shock, and I feared that God did *not* govern the world in the manner which the nursery-maid had represented.

Several years afterwards, I read in the Grammatical Exercises, an early class-book then used in the High School of Edinburgh, these words : “ *Deus gubernat mundum*,” “ God governs the world.” “ *Mundus gubernatur a Deo*,” “ The world is governed by God.” These sentences were introduced into the book as exercises in Latin grammar ; and our teacher, the late Mr Luke Fraser, dealt with them merely as such, without entering into any consideration of the ideas embodied in them.

This must have occurred about the year 1798, when I was ten years of age ; and the words “ *Deus gubernat mundum—Mundus gubernatur a Deo*,” made an indelible impression, and continued for years and years to haunt my imagination. As a child, I assumed the fact itself to be an indubitable truth, but felt a restless curiosity to discover *how* God exercised his jurisdiction.

In the course of time, I read in the Edinburgh Advertiser, the newspaper taken in by my father, that Napoleon Buonaparte (instigated and assisted, as I used to hear, by the devil) governed France, and governed it very wickedly ; and that King George III., Mr Pitt, and Lord Melville, governed Great Britain and Ireland—not very successfully either, for I read of rebellion, and murders, and burnings, and executions in Ireland ; while in Scotland my father complained of enormous Excise duties which threatened to involve him in ruin. I saw that my father ruled in his trade, and my mother in her household affairs, both pretty well on the whole ; but with such evident marks of shortcoming and imperfection, that it was impossible to trace God’s superintendence or direction in their administration.

In the class in the High School of which I was a member, Mr Luke Fraser seemed to me to reign supreme ; and as I felt his government to be harsh, and often unjust, I could not recognise God in it either. Under his tuition, and that of Dr Adam, the Rector of the High School, and of Dr John Hill, the Professor of Latin in the University of Edinburgh, I became acquainted with the literature, the mythology, and the history of Greece and Rome ; but in these no traces of the Divine government of the world were discernible.

These were the only governments of which I then had



experience, or about which I could obtain any information ; and in none of them could I discover satisfactory evidence of God's interference in the affairs of men. On the contrary, it appeared to me, that one and all of the historical personages now named did just what they pleased, and that God took no account of their actions in this world, however He might deal with them in the next. They all seemed to acknowledge *in words* that God governs the world ; but, nevertheless, they appeared to me to *act* as if they were themselves independent and irresponsible governors, consulting only their own notions of what was right or wrong, and often pursuing what they considered to be their own interests, irrespective of God's asserted supremacy in human affairs. Most of them professed to believe in their accountability in the next world ; but this belief seemed to me like a rope of sand in binding their consciences. They rarely hesitated to encounter all the dangers of that judgment when their worldly interests or passions strongly solicited them to a course of action condemned by their professed creeds.

From infancy I attended regularly an evangelical church, was early instructed in the Bible, and in the Shorter and Larger Catechisms, and the Confession of Faith of the General Assembly of Divines at Westminster, and read orthodox sermons and treatises by various distinguished authors. In the Old Testament I read narratives of God's government of the Jewish nation, by the exercise of special acts of supernatural power, and understood this as a clear and satisfactory exposition of Divine government. In the New Testament, also, certain special acts of Divine interference with the affairs of men were recorded, which likewise gave me great satisfaction, as evidences that God governs the world ; but I never could apply these examples to practical purposes.

I learned, in some way which I do not now recollect, that during many ages after the close of the Scripture records, the Roman Catholic priesthood had asserted that such acts of special supernatural administration continued, and that they themselves were the appointed instruments through whose medium it pleased God thus to manifest his power. But I never *saw* instances of this kind of government in my own sphere of life.

In the course of time I read arguments and criticisms which carried with them an irresistible conviction, that these pretensions of the Roman Catholic priesthood had been pious frauds practised on an ignorant and superstitious people ! Here, then, was another shock to my belief that God go-



verns the world ; and the difficulty was increased by an obscure impression, that notwithstanding this denial by the Protestant divines, of the continuance of a special supernatural Providence acting through the Roman Catholic priesthood, they and their followers seemed to admit something very similar in their own favour.\* As, however, I could not discover by observation, satisfactory evidence of special acts of Divine interference in human affairs, taking place in consequence of *their* solicitations, any more than in consequence of those of the Roman Catholic priesthood, I arrived at the conclusion that all special acts of Divine administration had ceased with the Scripture times ; and thus I was again sent adrift into the great ocean of doubt, and no longer saw traces of the *manner* in which God governs the world in our day, whatever He might have done in the days of the Jewish nation.

As I advanced in understanding, my theological studies rather increased than diminished these perplexities. I read that "not a sparrow falls to the ground without our heavenly Father," and that "the very hairs of our heads are numbered;" which seemed to indicate a very intimate and minute government of the world. But simultaneously with this information, I was taught that God forgives those who offend against his laws, if they have faith in Jesus Christ and repent ; and that He often leaves the wicked to run the course of their sins in this world without punishing them, reserving his retribution for the day of judgment. This seemed to me to imply that God really does not govern the world in any intelligible or practical sense, but merely takes note of men's actions, and commences his actual and efficient government only after the resurrection from the dead.

On the other hand, when still a youth, I read "Ray on the Wisdom of God in Creation," and subsequently "Paley's Natural Theology," and these works confirmed my faith that God does govern the world ; although, owing to my ignorance of science, they rather conveyed an impression of the fact, than enabled me to perceive the *mode* in which He does so. As, however, I never saw any person *acting* on that faith, it maintained itself in my mind chiefly as an impression ; and not only without proof, but often against apparent evidence to the contrary. My course of inquiry, therefore, was still onward ; and with a view to obtaining a solution of the problem, I studied a variety of works on moral and metaphysical subjects ; but from none of them did I re-

\* See examples in point in the pamphlet on "The Relation between Religion and Science," pages 1, 2, 3.



ceive any satisfaction. In point of fact, I reached to man's estate with a firm faith that God governs the world, but utterly baffled in all my attempts to discover *how* this government is effected.

This feeling of disappointment became more intense in proportion as a succession of studies presented to my mind clear and thoroughly convincing evidence, that in certain departments of nature God does unquestionably govern the world. When, for example, I comprehended the laws of the solar system, as elucidated by Copernicus, Galileo, Newton, and Laplace, and perceived the most perfect adaptation, harmony, and regularity pervading the evolutions of the planets and their satellites, the conviction that God governs in that system was at once irresistible, complete, and delightful. But the planets were far away, and I longed to discover the same order and harmony on earth; but in vain.

My next study was Anatomy and Physiology. From this source new light broke in upon my mind. When I saw and understood the mechanisms for the circulation of the blood, the nutrition of the body, the motions of the limbs, and the execution of the functions of vision, hearing, and smelling, again the conviction became intense that in the constitution of the human body also God's agency is clearly discernible: But then came the puzzling question,—Why, if such be the case, does God abandon this mechanism, after He has so exquisitely made it? That He does forego all subsequent care of it, then appeared to me only too obvious; for around me I saw disease, and pain, and death, and multitudinous evils, all arising from this mechanism becoming impaired in its structure or disordered in its functions.

Nevertheless some facts transpired which seemed in contradiction to this supposed abandonment of the machine by its Author. I was told, for example, that every tissue of the body had received a conservative, and also a reparative power; that, in virtue of the former, it resists, up to certain limits, external injurious influences; and that when those limits have been passed, and the structure has actually been invaded, a process of reparation commences, the natural issue of which is restoration of the injured part. The granulation of flesh wounds, and the re-integration of broken bones, afford familiar examples of this process. In these instances, the wisdom, goodness, and power of God appeared actually woven into the texture of our frames. His government of our corporeal structure seemed so complete, that every muscular fibre, and every filament of nerve, obeyed his mandate throughout our lives, and not only when in



health performed precisely the function which He had assigned to it, but, in disease, brought into active play powers which He had provided for the emergency, and which, although incomprehensible to human intelligence, entered on their protective and recuperative functions at the very moment when their agency was wanted.

Clear, however, as this example of Divine government appeared to be, I found no application made of it beyond the domains of surgery. No practical inference was deduced from it, to regulate human conduct in the ordinary circumstances of life. When I left the medical school, all traces of the government of God in the world were lost, and my feeling of disappointment returned.

Chemistry was the next science which engaged my attention, and it presented extraordinary illustrations of Divine government in the qualities and relations of matter. In the revelations made by this science, I discovered powers conferred on matter capable of producing the most stupendous results, yet all regulated in their action with a degree of precision that admitted even of mathematical and arithmetical measurement. In their reciprocal relations, I perceived an extent, variety, and wisdom of adaptation that captivated the understanding, and roused the most vivid emotions, as if of a present Deity. It is difficult to describe the effect which the first scientific demonstration of the chemical law in virtue of which water, when in the act of freezing, loses a portion of its specific gravity, and in its form of ice floats on the surface of the pool, produced on my intellect and moral sentiments. The adaptation of this quality to the preservation of the beings which inhabit the water, and to the due limitation of the influence of frost on the physical creation—the efficacy, simplicity, and unerring certainty of the means, contrasted with the vastness of the end accomplished—appeared irresistibly to proclaim the all-pervading God. Yet when I left the chemical laboratory and returned into the world of business, these delicious visions fled, and I could no longer trace the Divine government in the affairs of men.

In this condition of mind I continued for several years, and recollect meeting with only two works which approached to the solution of any portion of the enigma which puzzled my understanding. These were “*Smith’s Wealth of Nations*,” and “*Malthus on Population*.” The first appeared to me to demonstrate that God actually governs in the relations of commerce ; that He has established certain natural laws which regulate the interests of men in the exchange of commo-



dities and labour; and that those laws are in harmony with the dictates of our moral and intellectual faculties, and wisely related to the natural productions of the different soils and climates of the earth. But in my early days, I found the truth and utility of Smith's doctrines to be stoutly denied by Parliamentary leaders and practical merchants; in short, by everybody except a small number of thinking but uninfluential men. With this exception, our rulers, merchants, manufacturers, and even our divines, concurred in treating Dr Smith's alleged discovery, that the relations of commerce are governed by natural laws instituted by God, as an idle dream; they pursued measures directly opposed to the principles which he taught as characterising that government, and they confidently expected to reap a higher prosperity from following the dictates of their own sagacity than from obedience to that wisdom which Smith represented as Divine. I perceived, indeed, that they were constantly disappointed in their expectations, and that the more they opposed the free intercourse of nations, the more their commercial prosperity was impeded; but all influential men thought otherwise, and these lessons led only to new experiments on their own principles—still avoiding most scrupulously every approach to the views advocated by Dr Smith.

I first read the work of Mr Malthus in 1805, and he appeared to me to prove that God reigned, through the medium of fixed natural laws, in another department of human affairs—namely, in that of population. The facts adduced by Malthus demonstrated to my mind that the Creator has bestowed on mankind a power of increasing their numbers much beyond the ratio of the diminution that, in favourable circumstances, will be caused by death; and, consequently, that they must either, by ever-extending cultivation of the soil, increase their means of subsistence in proportion to their numbers, or expose themselves to the evil of having these restricted by disease and famine, to the amount which the actual production of food will maintain. These propositions, like the doctrines of Adam Smith, met with general rejection; and their author, far from being honoured as a successful expounder of a portion of God's method of governing the world, was assailed with unmitigated abuse, and his views were strenuously resisted in practice. Nevertheless, I saw clearly, as time wheeled its ceaseless course, that the results of human conduct corresponded with Mr Malthus's annunciations; and that his opponents, who governed the United Kingdom according to their own maxims, were never able to screen the inconsiderate poor, who reared families without securing for



them adequate means of subsistence, from the evils which he had pointed out as inseparably connected with their erroneous principles of action.

Bishop Butler also threw a flash of light across the dark horizon ; but it was only a flash. He announced clearly the great principle of a moral government of the world by natural laws ; but he threw little light on the *means* by which it is accomplished. In consequence of his not understanding the means, his views in regard to the Divine government of the world, although in the main sound, are not practical. He was compelled to resort to the world to come, in order to find compensation for what appeared to him to be imperfections in the moral government of this world, in some instances in which a more minute knowledge of the mode of God's present administration would have convinced him that the apparent imperfection is removable on earth.

During the continuance of these perplexities, this consideration presented itself to my mind,—that in every department of nature, *the evidences of Divine government, of the mode in which it is administered, and of the laws by which it is maintained, become more and more clear and comprehensible, in proportion to the exactness of our knowledge of the objects through the instrumentality of which it is accomplished.* Wherever we are altogether ignorant of the causes of phenomena, or where our knowledge of them is vague and general, confusion seems to reign ; while intimate knowledge uniformly reveals order and harmony,—in other words, action characterised by the regularity of law. Moreover, I observed that in the physical creation, order is maintained, and an efficient government realised, by the endowment of every object with certain definite forces, which it displays with undeviating regularity, so long as its circumstances continue the same ; and by the adjustment of the action of each of these forces to that of all the others with which it is connected. The balanced centripetal and centrifugal forces of the planets, for instance, produce their revolutions round the sun, and, at the same time, preserve them in their places. These endowments and adjustments of material substances forcibly convey to the human mind the impression of government and order instituted and maintained by a Being superior to man.

The following questions next presented themselves for solution :—Why should the traces of Divine administration become obscure in the moral department of creation ? Why should we be so deeply in the dark concerning the laws according to which life, health, talents, dispositions, and individual and social happiness, are dispensed to man ? It appeared



to me that these questions might best be answered by asking others. Do we know intimately the causes which produce health and disease? These must regulate the endurance of life. Do we know the causes which give rise to the different dispositions and capacities of men? These must be eminently influential in determining their individual lots. Do we know the precise social effects which these dispositions and capacities are fitted to produce, when permitted, in the case of each person, to act blindly, to act under false or imperfect information, or to act under a clear and correct knowledge of the real nature and relations of things? On the extent of this knowledge will depend our capacity to discern the causes of social happiness or misery. Do we know whether these causes and effects, whatever they may be, are subject to any extent to human control? And if so, *how* we may control them? If they are not subject to man's jurisdiction, do we know whether he has it in his power to modify, in any degree, his own conduct, in relation to their agency, so as to diminish the evil or increase the good which they are calculated to produce?

To nearly all of these questions only a negative answer could be given; and I suspected that in this ignorance lay the grand obstacle to the discovery of the mode in which God governs the organic and moral departments of creation: but time rolled on, and no new light appeared.

Hitherto, probably, I have succeeded in carrying the mind of the reader along with me; for many persons may have experienced doubts and difficulties similar to those now described: but from this point forward I fear that greater differences may arise between him and me. The facts on which the view to be now stated is founded have not hitherto been generally investigated with that seriousness and patience which are indispensable to their successful study; and hence their reality, and the importance of the lessons which they teach, are not appreciated. Nevertheless, long-continued and dispassionate observation having convinced me of their truth, and of the inestimable value of the consequences which flow from them, I proceed to describe, in a few words, the means by which these clouds of darkness were at length partially dispelled from my mind, and the moral horizon of the world, in some degree, cleared up to my mental vision.

In the course of time I became aware of the importance, in relation to this question, of certain facts which were previously generally known, but from which no practical conclusions had been drawn in regard to the mode in which God governs the world. These were, that the Creator has con-



ferred on man a system of organs of respiration; a heart and bloodvessels; a stomach and other organs of nutrition, and so forth; that to each of these He has given a definite constitution; that He has appointed definite relations between each of them and all the others, and between each of them and the objects of external nature; *that life and health accompany the normal and harmonious action of the whole; and that disease, pain, and premature death, are the consequences of their disproportionate and abnormal action.* Moreover, I saw that God had given to man faculties which enable him to observe, understand, and act according to, the laws which regulate the functions of those organs.

From that time the idea began to dawn on my mind that the study of the structure, functions, relations, and laws of these vital parts, *is the true mode of investigating the principles according to which God dispenses life, health, disease, and death in this world; in other words, the mode in which He governs this department of creation.* In maturing this idea, my late brother, Dr A. Combe, was my constant coadjutor and guide.

It is unnecessary to carry the history of these personal difficulties farther. Let us now endeavour to bring this idea itself to the test of observation and reason. With this view we may select the endurance of life as the subject of our consideration.

That the endurance of life is governed by regularly operating laws, becomes obvious from the records of mortality. The records of burials kept in the different countries of Europe present striking examples of uniformity in the number of deaths that occur at the same ages in different years. So constant are these results, while the circumstances of any country continue the same, that it is possible to predict, with nearly absolute certainty, that in England and Wales, of 1000 persons between the ages of 20 and 30, living on the first day of January in any one year, ten will die before the first day of January in the next year.\*

Uniformity in the numbers of events bespeaks uniformity

\* I have selected the example of deaths from ages between 20 and 30, because, as will afterwards be shewn, during this interval the conditions of life seem to be to a great extent under human control. In later periods, from 70 to 80, or 80 to 90, they are not so. The human frame then obeys the law of its constitution—it decays and dies; but it does so under no inscrutable law. The causes of its decay are palpable, and the effects are obviously designed. The individual who suffers has then no duty but submission to the will of the Being who conferred life on him at first as a gratuitous boon, and who is entitled to withdraw it when the objects for which it was given have been accomplished.



in the causes which produce them ; and uniformity in causes and effects constitutes the fundamental idea of government by natural laws. If, then, these deaths do not occur arbitrarily or fortuitously, but result from regularly operating causes, the following questions present themselves for solution:—Are these causes discoverable by human intelligence? If they are so, can that intelligence modify them? If not, can an individual adapt his own conduct to their operation so as to influence their effects? These questions are important equally in a religious and a practical point of view. If the causes are constant and inscrutable, and their effects irresistible, it follows that, in regard to death, we are subject to a sublime and mysterious fatalism ; in short, that the Mahometan doctrine on this subject is true. If, on the 1st day of January in any one year, a thousand youths, in the vigorous period of life, know, with nearly positive certainty, that ere the clock strikes twelve on the night of the 31st of December, ten of their number will be lifeless corpses ; and if, nevertheless, not one of them be able to discover who are to be the victims, or to employ any precautions to avert the blow from himself,—what is this but being subject to a real fatalism?

If, on the other hand, the causes *are* discoverable, and if the individuals subject to their influence possess also the power of modifying them, or of accommodating their own conduct to their action, and of thereby changing their influence on their own condition for good or evil, the Divine government will present a widely different aspect. Instead of a system of mysterious fatalism it will be one of causation, regular in its action, scrutable in its principles, designedly adapted to the physical, moral, and intellectual nature of man, and as such presented to him for the cognizance of his intelligence, the respect of his moral feelings, and the practical guidance of his conduct. In discovering the causes of the ten deaths and their modes of operation, we shall acquire a knowledge of the principles on which God administers life and death to men at the age between 20 and 30. We shall obtain a glimpse of the order of God's secular providence in this department of his kingdom. If this view be erroneous, there appears to be no alternative to the conclusion that, in regard to life and death, we are the subjects of a fatal despotism. Let us inquire, then, whether the causes be scrutable, and whether human power is capable of modifying their influence.

If we desire to know by what laws God governs the sense of hearing,—that is to say, under what conditions He bestows this boon upon us, and continues it with us,—we shall best



succeed by studying the structure and modes of action of the ear, and examining its relations to the air, to the constitution of sonorous bodies, to the brain, and also to the digestive, respiratory, and circulating systems of the body, on the action of which the sense of hearing indirectly depends. It is no abuse of language to say that, in studying those details, we should be studying the conditions under which, within certain limits, we may retain, forfeit, improve, or impair the sense of hearing, pretty much at our discretion. In the structure, the functions, and the relations of the ear, we should discern the manifestations of God's power and goodness, and a clear exposition of the principles on which He administers this sense. In the means by which we are permitted, within certain limits, to destroy or to preserve, to impair or to invigorate our hearing, we should discover the evidence of His government not being a despotism or a fatalism, but a system of regular causation adapted to our constitution and condition, and presented to us for the investigation of our intelligence, and the guidance of our conduct. In the constitution of the sense and the appointment of its relations, which man cannot alter, God's sovereignty is made apparent. By connecting certain beneficial consequences with the actions done in accordance with that constitution and those relations, and certain painful consequences with actions done in discordance with them, which consequences also man cannot alter, the Divine Ruler preserves His own sway over the sense and over all who possess it ; while by endowing man with intellect capable of discovering that constitution and its relations, with religious emotions enabling him to respect it, and with power within certain limits to act in accordance or discordance with it, and thereby to command the favourable or the adverse results at his own pleasure, human freedom is established and guaranteed ; and man appears as a moral, religious, and intelligent being, studying the will of his Creator in His works, worshipping Him by conforming to His laws, and reaping the rich rewards of enjoyment destined to him as the consequences of his fulfilling the objects of his being. By those means the Divine government is maintained simultaneously with man's freedom.

The same propositions may be predicated in regard to all the senses.

The question next occurs, Does this mode of government stop with the senses ? It appears to me not to do so, but to extend to every organ of the human frame. As already observed, God has bestowed on man lungs and other organs of respiration ; a heart and other organs of circulation ; a sto-



mach and other organs of nutrition ; a brain and nervous system, which are the organs of thought, sensation, and will : to each of these He has given a definite constitution, and He has appointed definite relations between each of them and all the others, and between each of them and the objects of external nature. These constitutions and relations have been established with design, viz., the design of conferring on man life and health until he shall reach the age of threescore years and ten. They have been framed and appointed by Divine wisdom and intelligence ; and every part of them operates with undeviating regularity. Life and health, then, are the result of the normal and harmonious action of the whole of them ; disease, pain, and premature death, are the consequences of their disproportionate and abnormal action.

Now, no reasonable doubt can be entertained that man has received from his Creator faculties of observation and reflection, which, when assiduously employed, render him capable, to a constantly increasing extent, of observing, understanding, and acting in conformity with the constitution, functions, and relations of these organs, and thereby securing the enjoyment of life and health ; but, if he choose, he may neglect them, and suffer pain, disease, and premature death. Hence it seems to follow that God has revealed to man the laws according to which He dispenses life and health ; and actually invited him to take a moral and intelligent part in acting out the scheme of His providence for his own advantage.

The practical conclusion which I draw from these considerations is, that an intelligent individual who should know the structure, and functions, and laws of health of the vital organs of the human body,—the quality (*i. e.* whether strong or weak, sound or diseased) of the constitution which each of the thousand persons had inherited from his progenitors,—and the moral and physical influences to which each should be subjected, could predict with a great approximation to accuracy,—*which* of the thousand would die within the year. If this view be correct, the ten deaths in the thousand, which, in the present circumstances of social life, appear like the result of a fatal fiat, would become merely the exponent of the number of individuals in whose persons the conditions of health and life had *de facto* been so far infringed as to produce the result under consideration ; without necessarily implying either that these conditions are in themselves inscrutable, or that the course of action which violates them is unavoidable. The sway of fatalism would



disappear, and in its place a government calculated to serve as a guide to the conduct of moral and intelligent beings would be revealed;—a government of which causation, regular in its action, certain in its effects, and scrutable in its forms, would constitute the foundation.

Moreover, it would follow from this view, that in the administration of God's secular providence in consigning ten individuals out of the thousand to the grave, and leaving nine hundred and ninety alive, as little of favouritism as of fatalism is to be discovered. The only sentence which each individual would find recorded regarding himself would be, that he must either obey the conditions of health, or suffer the consequences of infringing them.

It may be objected that it is impossible for any one individual to acquire all the requisite information; but this objection is foreign to the question. The real point at issue is, whether, if our instruction were directed by a just appreciation of these principles, it would be possible for an intelligent person between 20 and 30 years of age, to acquire from his parents, his teachers, his medical advisers, books, and his own observation and experience, a knowledge of the conditions of life and health *in relation to himself*? and whether, if instructed in them, and trained from infancy to venerate and observe them as Divine institutions, and supported in doing so by social manners and public opinion, he could then, in an adequate degree, comply with the conditions, and escape from the supposed fatal list? I can perceive no reason for answering in the negative. If, in the first hundred years after the members of any community began to act on those principles, one individual in the thousand, could escape from the list, and reduce the mortality to nine, the principle would be established; and the question in subsequent centuries would be only how far this knowledge and obedience could be carried.

In point of fact, the records of mortality *prove* that the view now stated correctly represents the principle on which the continuance of life is administered by the Divine Ruler of the world. When read in connection with history, these records shew that if the intelligence, morality, industry, cleanliness, and orderly habits of a community be improved, the result will be an increase in the duration of life in that people. Thus, in 1786, the yearly rate of mortality for the whole of England and Wales was 1 in 42: or in other words, 1 out of every 42 of the whole inhabitants died annually. In the Seventh Annual Report (p. 19) of the



Registrar-General, it is stated that the rate of mortality for the whole of England, on an average of 7 years, ending in 1844, was 1 in 46. Allowing for some errors in the earlier reports and tables, the substantial fact remains incontestible, that the average duration of human life to each individual is increasing in England and Wales, and from the causes here assigned.

Moreover, Professor Simpson, in a recent pamphlet on the value and necessity of the statistical method of inquiry as applied to various questions in operative surgery, presents direct evidence in support of the proposition which I am now maintaining.

The following table, he says, calculated from the bills of mortality of London, demonstrates statistically, that, in consequence of improvements in the practice of midwifery (and I should say also, in consequence of the improved habits and condition of the people), the number of deaths in childbed in that city in the 19th century was less by one-half than that which occurred in the 17th century. The table is the following:—

*Average number of Mothers dying in childbed in London  
from 1660 to 1820.*

YEARS.	PROPORTION OF MOTHERS LOST.		
For 20 years ending in.....1680.....	1	in every 44 delivered.	
For 20 years ending in.....1700.....	1	... 56	...
For 20 years ending in.....1720.....	1	... 69	...
For 20 years ending in.....1740.....	1	... 71	...
For 20 years ending in.....1760.....	1	... 77	...
For 20 years ending in.....1780.....	1	... 82	...
For 20 years ending in.....1800.....	1	... 110	...
For 20 years ending in.....1820.....	1	... 107	...

It is probable that in the earlier years included in this table the records were more imperfect than they were in the later years, and that the difference of the mortality is in consequence exaggerated; but, again, making every reasonable allowance for errors and omissions, the grand result is still the same, a diminution of deaths from a more rigid conformity to the conditions according to which the Ruler of the world dispenses the boon of life.

Further,—the records of mortality, when arranged according to the different classes of society, and different localities of the same country, indicate the soundness of the same principle. In the pamphlet on the “Relation between Religion and Science,” p. 24, I cited the following results presented by a



report of the mortality in Edinburgh and Leith for the year 1846 :—

The mean age at death of the 1st class, composed of gentry and professional men, was . . . . .	43½ years.
The mean age at death of the 2d class, composed of merchants, master-tradesmen, clerks, &c., was . . . . .	36½ years.
The mean age at death of the 3d class, composed of artizans, labourers, servants, &c., was . . . . .	27½ years.

It is a reasonable inference from, although not necessarily implied in, this table, that the 3d class furnished a larger proportion of the ten deaths in the thousand persons between the ages of 20 and 30 than the 2d, and this class a larger proportion of them than the 1st; and, as God is no respecter of artificial rank, that the differences in the proportions were the result of the individuals of the 1st and 2d classes having fulfilled more perfectly than those in the 3d, the conditions on which He proffers to continue with them His boon of life. Again, Mr Chadwick testifies that “while one child out of every ten dies within the year at Tiverton—and one-tenth is the average of the county,—one in five dies at Exeter,” in consequence of deficient sewerage and improper habits in the people. The reports of the Registrar-General of England afford overwhelming evidence of a similar kind. The same conclusion follows from these facts—that life is administered according to regular laws, which the inhabitants of some localities obey to a greater extent than those of others :—in other words, that a knowledge of the causes which favour the endurance of life, and of those which produce disease and death, is an acquaintance with the order of God’s providence in this grand department of the government of the world. And if this be the case, can we doubt that the relations of cause and effect, in virtue of which life is preserved, and death ensues, were rendered by God cognisable by the human understanding, with the design of serving as guides to human conduct ?

The suggestion here presents itself, that as an intimate knowledge of the structure, functions, and laws of the vital organs of the body, is apparently the true key to the right understanding of the order of God’s secular Providence in dispensing health and life, and disease and death, to individuals,—it is possible that, in like manner, an intimate acquaintance with the functions, relations, and laws of the faculties of the mind, may open the path to the discovery of the mode in which the Divine government of the *moral* world is conducted.

By the moral government of the world, is meant the control and direction maintained by the Divine Ruler over human



actions, by means of which He leads individuals and the race to fulfil the objects for which He instituted them. The problem is to discover the *manner* in which this government is accomplished. As observed in the pamphlet on Religion and Science, our ancestors in the 17th century believed this government to be conducted by special acts of supernatural interference on the part of God with human affairs. Science has banished this idea, and has substituted in its place the notion that the moral world also is governed by natural laws; but it has made small progress in unfolding what these laws are, and how they operate. The consequence is, that, at this moment, even enlightened men have no systematic or self-consistent notions concerning the *mode* in which the Divine government of the moral world is conducted. They acknowledge in words that there is a Divine government in the moral as well as in the physical world, and that it is by natural laws; but here they have stopped, and most of them are silent concerning the *mode* of that government. In consequence of the exclusion, effected by science, of the notion that special acts of Divine interference now take place in human affairs, the religious teaching founded on that principle has become effete. It has not been formally given up, but it is no longer of practical efficacy. Hence, we are at this moment really a people without any acknowledged, self-consistent, satisfactory, or practical notions concerning the moral government of the world; in other words, concerning the order of God's providence in governing the actions of men, and educing from them the results which He designed.

How is this deficiency to be supplied? Apparently in the same manner in which we have supplied our other defects of knowledge of the order of God's providence in the physical and organic kingdoms. Do we know intimately the machinery by means of which the government of the moral world is maintained and conducted? The answer must be in the negative. Have we any science of mind resembling in precision, minuteness, and certainty, the sciences of astronomy and chemistry? Monsieur De Bonald, in words quoted by Mr Dugald Stewart, answers the question. "Diversity of doctrine," says he, "has increased from age to age with the number of masters, and with the progress of knowledge; and Europe, which at present possesses libraries filled with philosophical works, and which reckons up almost as many philosophers as writers; poor in the midst of so much wealth, and uncertain, with the aid of all its guides, which road it should follow;—Europe, the centre and focus of all the



lights of the world, has yet its *philosophy* only in expectation." \*

If the science of mind be as indispensable to our understanding the *manner* in which the Divine government of the moral world is conducted, as is the science of matter to our comprehending the order of that government in the physical world, and if Monsieur De Bonald's description of the condition of mental science be correct, there is no cause for surprise at the darkness which envelopes us in regard to the government of the moral world.

It is too certain that Monsieur De Bonald is in the right; for although man has received a material body, has been placed in a material world, been subjected during his whole life to material influences, and can act on the external world only through the instrumentality of material organs, nevertheless, in the most esteemed treatises on the philosophy of mind, moral and intellectual faculties are described without mention of special organs, or of the influence of these in modifying the manifestations of the faculties; and without taking notice of the relation of each faculty and organ to the other faculties and organs, or to external objects. Here, then, a dark abyss of ignorance, apparently impassable, breaks off all practical knowledge of the connection of the body with the mind, and of the organs by means of which the mind acts, and is acted upon, by the external moral and physical creation. And if our knowledge of the order of God's providence can increase only with our knowledge of the *means* or *instruments* through which He administers it, are we to sit quietly down, and allow this state of ignorance to continue for ever?

The cause why it has continued so long appears to me to be obvious enough. In a state of health, most men have no consciousness of the existence and interposition of material organs in thinking. They are conscious of thoughts and feelings, but not of organs; and people have been taught to ascribe all the phenomena of consciousness to *mind alone*. Consequently, they are offended with those who refer such phenomena in any degree to the influence of organs. Nevertheless, facts which are revealed by the most ordinary *observation*, shew that our mental manifestations are influenced, at every moment of our lives, by the condition of the organs. The question then occurs, May not the key to a knowledge of the manner in which God governs the world of mind be found in the study of these organs, and their laws and relations? One point seems to be clear enough; namely, that if God *has*

\* Stewart's Preliminary Dissertation to the Encyclopædia Britannica, vol. i., p. 230.



instituted mental organs, and ordained their functions, their constitution and laws must be adapted to the constitution and laws of all the other departments of creation; and that, therefore, a correct knowledge of the relations of the world of mind to the world of matter, must be unattainable while we remain in ignorance of the mental organs.

A knowledge of these organs, therefore, and their relations and laws, appears calculated at last to form a bridge across the abyss of ignorance, which has hitherto concealed from our view the manner in which the Divine government of the moral world is conducted.

Let us inquire, then, whether the system of Divine government before described, stops with the inorganic and organic departments of creation; or whether it extends into the domain of mind. One of the most striking anomalies in the moral government of the world consists in the wide-spreading magnitude and frequency of crime. Is it possible to discover whence it arises? Is it a direct result of the institutions of the Creator, or does it spring from abuses of faculties that are in themselves good? Statistical inquiries into human conduct present the same striking indications of uniformity in results as do those into the endurance of life. Mons. Quetelet furnishes us with the following table relative to crime in France:—

YEARS.	Accused and brought personally before the Tribunals.	Condemned.	Number of Inhabitants for each person accused.	Number condemned out of each 100 accused.	Accused of Crime.		Proportion between these classes.
					Against the person.	Against property.	
1826	6988	4348	4457	62	1907	5081	2·7
1827	6929	4236	4593	61	1911	5018	2·6
1828	7396	4551	4307	61	1844	5552	3·0
1829	7373	4475	4321	61	1791	5582	3·1
Total	28,686	17,610	4463	61	7453	21,233	

“Thus,” says Mons. Quetelet, “although we do not yet possess the statistical returns for 1830, it is highly probable that we shall find, for that year also, 1 person accused out of every 4463 inhabitants, and 61 condemned out of each 100 accused. The probability becomes less for 1831, and less for the succeeding years. We are in the same condition for estimating by the results of the past, the facts which we shall see realised in the future. This possibility of assigning be-



forehand the number of the accused and condemned which should occur in a country, is calculated to lead to serious reflections, since it involves the fate of several thousands of human beings, who are impelled, as it were, by an irresistible necessity, to the bars of the tribunals, and towards the sentences of condemnation which there await them. These conclusions flow directly from the principle, already so often stated in this work, that effects are in proportion to their causes, and that the effects remain the same if the causes which have produced them do not vary."\*

The same uniformity is observable in Great Britain. A return to the House of Commons, dated 22d May 1846, shews the number of persons committed to prison for each of seventeen different denominations of offences, including robbery, housebreaking, arson, forgery, rape, and so forth, for two different periods of five years each, one while the offences were capital, and one after they had ceased to be so punished. The result is the following :—

Number of persons committed for the foregoing crimes during the five years immediately preceding the abolition of the punishment of death, . . . . .	7276
Number of ditto during the five years immediately succeeding the abolition of the punishment of death, . . . . .	7120

The first aspect of these facts suggests the idea that fatalism is the principle of government in the moral world also ; and the questions must again be solved—Whether the causes which produce these constant results are scrutable by man ? and if so, whether he is capable of modifying them ; if not, whether he is capable of adapting his conduct to their action in such a manner as beneficially to vary their results ? It is remarkable that in all ages, lawgivers have acted on the principle that human volitions are absolutely free ; for they have directly forbidden certain actions, and enacted punishments against those who committed them, without making any inquiry into the power of their subjects to obey the law. Even in modern times, and in the face of statistical returns such as those now quoted, shewing a constant succession of crimes only partially influenced in amount by the punishments inflicted, and proclaiming, with trumpet tongue, the existence of causes lying deeper than mere punishments can reach, the rulers of nations proceed in their course of assuming absolute freedom. They proclaim the law, and inflict punishment for disobedience, irrespective of the mental condition and physical circumstances of their subjects. They have partially

\* Sur L'Homme, &c., tome ii., p. 168.



succeeded in checking crime, but they must confess also to much failure and disappointment. What, however, is the sound conclusion to be drawn from the facts before us?

The regularity observable in the numbers of criminals indicates the existence of regularly operating causes of crime. The first step in the investigation, therefore, must be to discover these. Several causes are generally recognised by reflecting men, such as, want of education, bad example, destitution, and so forth. These, however, do not serve to account satisfactorily for the phenomena; for out of a thousand persons all equally deficient in education, equally exposed to bad example, and equally destitute, only a definite and constant number (say ten) will become criminals in any one year in which the external circumstances of all continue unchanged. This fact shews that the primitive causes of crime, be they what they may, affect some and not other individuals; and until we discover what these are, we shall never understand whether crime is a direct or a contingent result of the Divine institutions; nor whether human intelligence is capable of modifying these institutions so as to diminish or remove it. Moreover, until we make this discovery, these causes, although removable, must and will produce unvarying and constant results, as if they were the mere instruments of an overwhelming fatalism.

The solution of this problem extends far beyond the department of mere criminal legislation. It involves the whole question of God's government of the moral world; of man's freedom, and of the nature of his responsibility in this world. If the common assumption that the will of man is *absolutely* free were founded in fact, then God could exercise no direct control over the moral world; for the control of a superior necessarily implies limitation of freedom in the servient agent. If, on the other hand, He exercises an inscrutable and irresistible sway, dooming thousands to commit crime, and to become the victims of the tribunals erected and administered by their more favoured brethren, every notion of a moral government of the world must be abandoned. On such a supposition man could enjoy no freedom, and his only duty would be that of submission in despair.

I have already hinted at the causes why this branch of knowledge is involved in such apparently hopeless obscurity. The means by which the Creator conducts the moral administration of the world have been unknown, and hence His scheme of government could not be comprehended. If there be any part of the human system by means of which all the desires, emotions, and intellectual powers of man act, and



are acted upon by external objects and beings, it appears to follow, that by studying its constitution, functions, laws, and relations, in the same spirit and manner as we do those of the ear, or the eyes, or the lungs, and with analogous objects in view, we may be able to discover the mode in which it has pleased God to govern the world of mind; and that then also we may be in a condition to judge whether the causes of moral actions in general are subjected to any natural laws, and whether the moral being himself can exercise any control over those laws, or modify their results by accommodating his conduct to their sway. If there be organs subject to natural laws, which subserve the action of all the mental powers of man, the Divine government may have its foundation in, and maintain its authority by means of, those organs and their relations, just as that government is maintained over health and life through the medium of the laws to which the vital organs have been subjected. If man be capable of discovering those organs, of modifying them, or of accommodating his conduct to their action so as to vary their results, then will he, within certain limits, be a free and intelligent agent; and his responsibility will be established by the fact, that over the constitution, relations, and laws of the organs and faculties themselves, and the consequences of good and evil attached to the use and abuse of them, he will have no command; while, by choosing between obedience and disobedience, he will enjoy that kind of freedom which consists in selecting results.

The constitution of the human mind appears to be adapted to such a system of things as is here supposed. Man has received animal propensities and moral sentiments, every one of which has a legitimate sphere of action, accompanied by enjoyment; while each may be misapplied, and thereby become an instrument of suffering. He has received also intellectual faculties enabling him to observe the qualities of things that exist, and reflecting faculties that enable him to perceive causation. These endowments would be absolutely unsuited to a sphere of being in which there was no fixed order of cause and effect. They presuppose regular causation; and in bestowing them, the Creator has obviously invited us to study the means by which He executes His secular providence and to accommodate our conduct to its laws. In submitting these means to our cognisance, He presents to us a practical revelation of the course of conduct which He desires us to pursue in order to work out our own enjoyment in this world. Is it not true, therefore, that in the endowment of objects and beings with specific qualities and



modes of action, which we cannot alter, God maintains his supremacy; while in enabling us to discover these, and to modify our conduct in relation to them, He bestows on us all the freedom compatible with our subjection to the government of a superior Being?

It is of no consequence to the validity of this argument, in what part of the body the organs of the mind are situated. Their mere existence warrants the inference, that they serve as the media through which God maintains His government in the moral world. The reader, therefore, may, if he please, reject Phrenology as an idle dream, if he only admit that in this life the mind is not a disembodied spirit, but acts and is acted upon through the instrumentality of organs, the condition of which affects its powers of manifestation.

Let us assume, then, but only for the sake of illustration, that the brain is the instrument by means of which the mental faculties act, and are acted upon by the external world, and let us try to solve the problem of the moral government of the world by means of this hypothesis. Suppose that each primitive animal desire, moral emotion, and intellectual faculty, is connected with a certain portion of the brain; and that (age, exercise, health, constitution, and all other things being the same,) each organ acts with a degree of energy corresponding to its size. Suppose farther, that in ten individuals out of a thousand, the size of the animal organs in relation to the moral and intellectual is *plus*, and that in the other 990 the balance of size is equal between these different groups of organs, or that it predominates in favour of the moral and intellectual,—we can easily comprehend that in social circumstances in which stimulants are applied to all the faculties, the animal desires may be prone to attain a criminal ascendancy in the ten individuals in whom their organs are in excess; in other words, that these may be the ten offenders in the thousand.

If all the organs, wherever situated, were instituted by God; if the connection between their size, health, and other conditions, and the energy of their action; and also the subordination in authority of the animal to the moral,—were established by Him; if certain spheres of action were assigned by Him to each of them, and certain consequences attached to under-action, moderate action, and over-action,—also to action in accordance with the constitution of external objects and beings, and other consequences to action in discordance with that constitution;—then it appears to me that a knowledge of these particulars will, to a certain extent, constitute information concerning the means by which God administers the moral and intellectual government of man.



If, farther, we assume that man, without being able to alter the fundamental constitution and relations of any one of these organs, has, nevertheless, received faculties which enable him to observe and comprehend them, and to modify his conduct in relation to the consequences of their action, we should again have an example of human freedom existing within prescribed limits, combined with stable, regular, undeniable Divine government. Suppose, for example, an individual to exist, in whom the size of the animal organs so far predominated over that of the moral and intellectual organs, that, in ordinary circumstances, he could not avoid yielding to external temptation to vicious indulgences; still, if either he, or the society among whom he lived, possessed the knowledge of the cause of his proclivity to fall into crime, he himself, by changing his circumstances, or they, by doing so for him, might avert the crime, by withdrawing him from the temptation.

According to this view, the tables of crime adduced by Mons. Quetelet and others, would indicate only the number of individuals whose mental organization is so deficient, or so unfavourably balanced, that they are unable to resist the external temptations to crime to which they are exposed; but would not warrant the conclusion, that the better constituted members of society, if they knew the peculiarities of that organization, and used all the means which that knowledge would place in their power to rescue the individuals from temptation, might not diminish the number of offenders and offences to an extent as yet unascertained.

The limits of a pamphlet do not allow me to enter on the consideration of acts of mere vice, imprudence, or folly; or to show their causes, and the nature of the consequences by which they are followed. This has, to some extent, been attempted in my other works; and I can now only remark, that the principles here expounded apply to them all.

These illustrations are introduced merely to call attention to the proposition, that if there be now no special interpositions of Divine power in human affairs, it appears to follow, that the Divine Ruler must either govern through the constitution and laws which He has bestowed on the inorganic, organic, and moral elements of creation, or (in so far as man can perceive) not govern at all. Moreover, there appears to be no road open by which human intelligence can discover the principles according to which the Divine government proceeds, in administering the details of secular life, and can learn to act in accordance with them, except that furnished by the study of *the instruments through which it is accomplished*.

If the main idea here insisted on be sound, it will present



secular education in a new light. Instruction concerning the qualities, modes of action, and relations of sublunary things and beings, instead of being godless, will prove to be an exposition of the means by which God's secular providence is administered.

The next question, however, is, Will this knowledge be of itself sufficient to induce and to enable the young to regulate their conduct in accordance with the natural laws? Certainly not. The following desiderata will still need to be supplied.

Knowledge directly addresses the intellect alone; but the intellect is more the regulator than the source of active power. The latter comes chiefly from the propensities and sentiments. We must therefore train *all* the propensities and sentiments, under the direction of the intellect, to act in harmony with the secular arrangements of God's providence. The sentiment of Veneration, for example, must be trained to respect, to hallow, and to obey, the laws prescribed for human conduct in the constitution of nature. This sentiment is distinct from the intellect, and may be led to regard almost any object as sacred. In ancient Egypt, it was trained to venerate reptiles; in ancient Greece and Rome, to reverence images as gods; in modern Roman Catholic Rome, to invest with sanctity the Pope; in Presbyterian Scotland, to venerate the Bible, and the clergy who expound it; but in no country with which I am acquainted, has it been trained to regard as sacred the order of God's secular providence revealed in nature.

The liability of this sentiment to take almost any direction given to it in youth, appears to me to explain the widely different responses which the religious consciences of men differently educated give to the same question. The Roman Catholic religious conscience regards it as sinful to eat flesh on Fridays; while the Protestant religious conscience considers this observance to be superstitious. In Scotland, the Protestant religious conscience considers it sinful to engage in any amusement or recreation on Sunday afternoon; while on the continent of Europe, the religious conscience, both Protestant and Catholic, generally views recreation on the Sunday evening as perfectly permissible.

The inference which I draw from these and similar well-known facts is—that it is possible to invest almost any object or observance with a religious character, provided the sentiment of Veneration be trained in childhood and youth to reverence it, and be supported through life by the sympathy of public opinion in its favour. If this conclusion be sound, and if the secular arrangements by which God exercises His



sovereignty in this world, be worthy of the respect of His rational creatures, then it would be a legitimate and useful practice to present these arrangements to the young as objects of regard. When they had been trained to respect them, perhaps the knowledge thus hallowed might exercise some influence over their practical conduct.

There are other two sentiments belonging to the higher class of faculties which strongly influence conduct, namely, Hope, and Admiration of the wonderful, the great, and the good. These are the fountains of trust, expectation, faith, and joy in believing. Experience proves that they are distinct from the intellect, and that, by early training, they may be directed to very different classes of objects and observances. I should propose, therefore, to present the order of God's secular providence, as revealed in nature, to these sentiments also, as objects worthy of regard, and should train them to see God himself revealed in His works. A child thus reared, might perhaps, when he grew up to man's estate, consider himself as exercising faith, trust, and confidence in God himself, when he yielded obedience to His laws; and he might be led even to believe that God would render the order of His providence conducive to good, however darkly and imperfectly this tendency might be discerned, in some of its parts, by those of His creatures, who continued to be the ignorant slaves of prejudice and passion.

It is impossible in a pamphlet to enter into a full exposition of this subject. Suffice it to observe, that *all* the faculties should be trained in youth to respect and obey God's natural laws; and that I venture to hope for practical results only after this has been accomplished. The reader is requested to aim at grasping the *general idea* which is here expounded, irrespective of the completeness or perfect accuracy of all the details.

It will be objected, perhaps, by some individuals, that such a training of the moral and religious sentiments would be a complete desecration of them; that it would bind the free and immortal spirit in the trammels of material laws; render its actions and aspirations ever subservient to low calculations of secular good and evil; and, in short, put an end to spiritual life, and all those inward communings of the soul with God, which constitute the grand sources of the enjoyment and consolation afforded by religion.

The answer to this objection is easily given. The education and training now proposed, would leave every man free to follow the bent of his own inclinations in regard to the whole spiritual kingdom, and its interests and objects. The



only effect of it would be, to place the religious emotions, and all the other faculties, under the restraints of God's natural laws, when they acted in sublunary scenes and dealt with temporal duties.

Farther, the religious sentiments are not singular in being fountains of inward light. *Every faculty* has its inward lights as well as they. An individual, for example, who has an active temperament and large organs of Acquisitiveness, is inspired by brilliant aspirations after unbounded wealth, and pictures to himself unlimited happiness in its attainment. But the modes of producing and attaining riches are really regulated by natural laws ; and these will, in point of fact, determine his failure or success, whether he believes in their influence or not. To follow the inward lights of his Acquisitiveness, therefore, irrespective of these laws, is not to enjoy a rational freedom, but to yield to the blind impulses of an inferior propensity.

Similar remarks apply to the inspirations of the religious emotions. While their action is confined to the interests of eternity and the spiritual kingdom, the laws of that kingdom are their proper guides ; but when they issue forth into the sphere of temporal objects, they come under the jurisdiction of the laws of God's secular providence as certainly as the animal propensities themselves. They can accomplish no terrestrial good, except by conforming to these laws ; while they must produce unequivocal evil whenever they transgress them. This view of the strict subjection of man to the order of God's secular providence is offensive to many religious persons ; but it is so, in my opinion, only because, owing to the imperfections of their education, they either do not know the laws of that order, or have not been trained to reverence them as sacred.

When the structure and functions of the eye are studied in relation to the qualities and laws of light, an exquisite adaptation of the sense to external luminous bodies is discernible. The same observation applies to the ear and sonorous bodies ; to the lungs and the respirable gases ; in short, to every organ and function of the body, with which we are sufficiently acquainted. No human sagacity, however, can yet predicate the precise use of the spleen, and, in consequence, its adaptation to its objects is a mystery. It appears as an unmeaning mass, amidst objects resplendent with design. Similar remarks apply to the brain. To many who have studied the functions of its different parts, there appears the same admirable adaptation of *them* to the external world, and to the order of providence embodied in the



constitution of that world, as is recognised in the case of the organs before named. We discover organs and faculties of observation directly related to the qualities of external objects and beings; organs and faculties related to their phenomena; organs and faculties related to their agencies, and the consequences which they produce; and organs and faculties related to the interests of man as an individual, and as a social, a moral, and a religious being. On contemplating these endowments and relations, and the order of God's providence administered through them, the intelligent mind thrills with vivid emotions of love, gratitude, and admiration of their Great Author. A "present Deity" is felt to be no longer a figure of speech, or a flight of poetry, but a positive and operating reality. We not only feel that we "live, and move, and have our being" in God, but become acquainted with the means through which His power, wisdom, and goodness affect us, and discover that we are invited, as His moral and intelligent creatures, to co-operate in the fulfilment of His designs. The beautiful exclamations of King David, "If I climb up into heaven, Thou art there; if I go down to hell, Thou art there also: if I take the wings of the morning, and remain in the uttermost parts of the sea; even there also shall Thy hand lead me, and Thy right hand shall hold me," become positive scientific truths; and man takes his true station as the interpreter and administrator of nature under the guidance of nature's God.

In the days of Lord Bacon, philosophers speculated and reasoned concerning the constitution of nature, without sufficiently observing its qualities and phenomena. He recommended to them to observe first, and to reason afterwards; and so thoroughly has this counsel been followed, that in modern times, scientific reputations are built up almost exclusively on observations. Science has, perhaps, to too great an extent, fallen into the hands of men in whom the observing organs predominate over the reflecting; and it is now rather an exception than a rule to see practical conclusions regarding what men should do or abstain from doing, drawn from even the most elaborate expositions of natural science. There is a gulf between science and daily life, and another between science and religion; and the schoolmaster, who, under an enlarged and enlightened view of the order of God's providence, should be the expositor of that order to the young, pursues his daily routine in comparative ignorance of his high vocation, and is humbly estimated and poorly requited by a society nearly as ignorant as himself.

To those who are *not* acquainted with the functions of the



different parts of the brain and their relations, this organ, like the spleen, still appears a mere unmeaning mass of matter lodged in the interior of the skull, and these views of its importance may seem to be a hallucination or a dream. But, as already observed, if they acknowledge the existence of mental organs at all, instituted by God, the conclusion appears to follow that those, wherever situated, are the direct instruments by means of which He exercises His secular dominion in the world of mind; and I hope therefore to be pardoned for the earnestness of this appeal in favour of the study of their functions.

If there be any degree of truth in the views now propounded, the question, "What should secular education embrace?" may be easily answered. It should embrace instruction in the qualities, modes of action, relations, and purposes of the things and beings by means of which the government of the world is maintained; and also *training* of the whole faculties, animal, moral, and intellectual, to *action* in conformity with the order of Providence.

The particular branches of instruction should be the following:—

READING and WRITING as the means of acquiring, recording, and communicating knowledge.

ARITHMETIC, ALGEBRA, and GEOMETRY, as instruments of numeration and calculation.

GEOGRAPHY. The object of this science is to describe the natural and artificial boundaries of the different countries of the world, and their sub-divisions; also to enumerate the towns, rivers, lakes, &c., which they contain. With these should be combined a description of the inhabitants, institutions, soil, climate, and produce of each country, and the relations of these to the objects and beings of other countries. Simple descriptive Geography addresses chiefly the intellectual faculties of Form, Size, and Locality: When enriched by the additions now mentioned, the science would interest the feelings and excite the reflecting powers.

NATURAL HISTORY embraces the description of all the objects of the mineral, vegetable, and animal kingdoms. In teaching it, the young should be trained to accurate observation of objects, and of their qualities, relations, and modes of action.

CHEMISTRY. This science expounds the minute composition of natural objects, and the proportions and laws of combination of their parts, with their modes of action. It affords striking examples of design, order, and invariable sequence,



in the constitution and modes of action of material objects ; and may be used to demonstrate to the young that the material world is actually and practically governed by Divine wisdom.

ANATOMY and PHYSIOLOGY. These sciences unfold the structure, functions, relations, and laws of the different parts of which organized bodies are composed. When to these elements of instruction is added information concerning the external circumstances, and also the modes and degrees of action of the organs, which produce health and disease, and the certain connection between infringements of these conditions, and pain and suffering, and eventually premature death ; the pupil may be led to comprehend that his health and life are, within certain limits, committed to his own discretion, and that the Divine power is constantly operating in and through his organs for his advantage and enjoyment, while he acts in conformity with the laws of his constitution.

NATURAL PHILOSOPHY treats of the qualities, relations, and modes and laws of action of bodies, apart from their chemical and vital phenomena. Like chemistry and physiology, it addresses in an especial manner the reflecting intellect of man, and is calculated to expand his mental powers. By increasing his knowledge of the scheme of creation, it puts it in his power, to a certain extent, to co-operate in the plans of Providence for his own improvement.

THE PHILOSOPHY of MIND. The objects of this science are the external senses, and the internal faculties of emotion, observation, and reflection. It can be studied successfully only by means of reflection on consciousness, and observation of the organs of the several faculties, and the influence of their size, age, health, disease, and training, on the mental manifestations. The mind of man, in so far as he is concerned, forms the centre to which the objects of all the other sciences are related ; and his deepest interest is involved in knowing accurately what these relations are, and how he may regulate his conduct in conformity with them.

LITERATURE, POETRY, PAINTING, SCULPTURE, and all the useful and ornamental arts, find their principles in the constitution of the human faculties, and their relations to the objects of external nature, and cannot be thoroughly and scientifically understood until these are comprehended.

NATURAL RELIGION belongs to Secular Education, and should aim at teaching the young to comprehend that the whole objects and phenomena treated of in the sciences, are the institutions of God ; that the relations of the human mind and body towards them are fixed and unalterable ; that the



whole are, to a certain extent, cognisable by the human faculties ; and that we are bound by duty to God, as well by a regard to our own welfare, reverently and diligently to study these, and to regulate our own conduct in conformity to their modes of action. Above all, the pupil should be *trained habitually to act* on the knowledge thus communicated to him.

I do not mean that all the arts and sciences should be taught to every child, in the manner and to the extent in which they are now expounded in our universities and higher seminaries of education. All I here propose is to unfold principles and views which may form the groundwork, and serve as guides to the practical evolution of a sound system of secular education. The details will be best reached after we have agreed upon the outline. If every teacher will view himself as commissioned to communicate to his pupils practical instruction concerning the order of God's secular Providence, and the *means* by which it is administered, and to train them to act in accordance with it,—the things necessary to be taught, as well as the best mode of teaching them, will speedily be discerned. If the reader will visit our common schools, and estimate the things at present taught and the modes of teaching, with this idea in his mind as his standard, he will speedily be able to judge to what degree they are fulfilling the object of training the young to act in accordance with the order of God's secular Providence. Even our churches may be submitted to the same test with advantage ; for they also profess to shew the way in which man should walk on earth, as well as to point out the gate that leads to heaven. Their *secular* instruction, therefore, must be perfect or imperfect, in proportion to its success in expounding the means by which we may discover and fulfil the requirements of God's natural laws.

The arts of reading and writing have hitherto been considered the chief elements of secular education for the people ; while Bible-precepts and catechisms have been viewed as constituting religious instruction. But, if the principles now expounded be correct, the imperfections of this curriculum will be obvious. Reading implies merely the knowledge of the written or printed artificial signs or words, by means of which any nation or tribe express their thoughts ; and writing is the forming of these signs ourselves. The signs do not convey their own meaning ; they are merely sounds and forms ; and we must be instructed in their meaning before we can derive any substantial benefit from them. Instruction in the objects, qualities, relations, and modes of action of the beings



and things which the words are employed to designate, should, therefore, go hand in hand with the teaching of words themselves.

In regard to religious instruction, again, the Bible constitutes the only directory recognised in Protestant countries concerning the mode of securing everlasting happiness. The object of the school for religion, therefore, may be held to be to unfold the means by which eternal interests may be best secured, and to train the young to practise them.

Although the Bible contains, as subservient to this end, numerous valuable precepts for regulating secular conduct, yet, not being intended to supersede the use of observation and reflection, it embodies no complete exposition of the special natural agencies by means of which the order of God's secular Providence is *now* executed and maintained. Moreover, it does not expound the arrangements in nature by which even its own precepts in regard to the duties and interests of this life are enforced and rendered practical. Hence secular instruction, such as is now recommended, is necessary to render practical the moral precepts even of the Bible itself. Every precept of the Bible, therefore, which has a counterpart in nature, and which is supported and enforced by the order of God's natural Providence, may legitimately be introduced into secular schools.

It is impossible, however, to draw a precise line of demarcation between secular and religious education, because, in point of fact, when we instruct children in the order of nature, and train them to reverence it, we teach them religion as well as science. Those doctrines only which rest exclusively on the authority of supernatural revelation, seem to belong peculiarly to the school for religious teaching.

It appears to me that it would be difficult to exaggerate the beneficial effects that might eventually be elicited from a scheme of secular education founded on these principles. The young—trained to direct their observing faculties to the study of the things and beings which exist, as instruction addressed to them by God, and their reflecting faculties to the study of the causes of natural phenomena ; and taught, moreover, to comprehend, that, to the action of these causes, certain consequences have been attached by Divine intelligence, which, at every moment, affect their own condition, and which they can neither alter nor evade, but to which they may, or may not, as they choose, accommodate their conduct—the young, I say, thus instructed and trained, might, perhaps, at last be enabled to comprehend that they are actually placed under a real and practical Divine government



on earth, and they might be led to feel some disposition to act in harmony with its laws.

The general soundness of the argument now maintained is supported by facts open to the observation of all. What is called the "common sense" of mankind, has induced them in all ages, in spite of the diversities of their religious creeds, to *act* on the foregoing views of the government of the world, so far as they have been able to comprehend them. They have generally believed instinctively in a Divine government, and at the same time in human freedom. They have endeavoured, when sick, to escape from disease and death by removing what they believed to be their causes ; they have pursued happiness by following what they conceived to be the natural roads that led to it ; and they have also acknowledged and approved of the consequences attached by nature to virtue and vice,—however far short they may have fallen, either in successfully warding off disease and death, in attaining temporal felicity, or in avoiding immorality. The doctrine, therefore, which I am advocating, would, if carried into effect, confer on common sense,—in other words, on the operations of our instinctive principles of action,—some degree of the clearness, consistency, fruitfulness, and utility of powers guided by science and religion, instead of leaving them to grope in the dark, and to act at hazard. Farther, many reflecting men are distressed by the discord which reigns between the popular expositions of religion and the obvious dictates of science. But the doctrine now advanced, by opening up comprehensible and practical views of the order of God's providence on earth, would enable them in some degree to establish harmony between their religious and scientific convictions. Again, by investing all God's secular institutions with that character of sacredness which truly belongs to them, it would add a new and an elevated motive to the intellect to discover and apply all natural truth.

I am well aware, however, that some persons may regard these views as doctrinally unsound. But is there no error in the religious opinions of such men themselves ? Must the minds of every succeeding generation in this great country be for ever cribbed and cabined in the dark formulas of the seventeenth century ? Will science not yet assert its own fountain to be in God ? Will man never venture to take his place as the moral and intelligent co-operator with his great Creator, in carrying into effect the secular objects of Divine wisdom and goodness ? If he will do so, let him shake off the trammels of bygone ages, rouse the mighty energies



that have been conferred upon him ; and, with his feet upon the earth, and his whole mind directed to God, intrepidly follow the beacon lights presented by nature to his reason, and fear neither disparagement to his Maker nor peril to himself while he travels in the paths of science, and adopts its revelations as assistant guides to his temporal conduct.

Above all, let not the laity, in their zeal for the holiest of causes, allow themselves to trample science under foot. It comes from God, and is addressed by Him to our intellects and our consciences for the guidance of our secular conduct. Let them not desert the standards of Divine truth unfurled on the fields of nature, in order to prostrate themselves before those raised by fallible men ; but let them embrace and reverence every truth in whatever record it is to be found.



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AND ITS APPLICATIONS  
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To prevent misapprehension, I beg to state that I do not recommend Physiology to be taught in common schools in the form of lectures, but in that of lessons, in which the children themselves shall take a part, and in which there shall be a constant interchange of remarks, question, answer, and inference, between the pupils and their instructor. Moreover, in these lessons no attempt should be made to teach the science or practice of Medicine.

In an ordinary Medical education instruction is given in the following branches:—

1st, Anatomy, or the structure of the human body.—The teaching under this head embraces descriptions of every bone, muscle, nerve, and viscus in the body, with their attachments and connections, so minute that the student may know how to discover their position; and how to recognise abnormal changes in them in living subjects, with a view to medical treatment, or, if necessary, to operate on them.

I do *not* recommend teaching at all approaching to this in detail, nor with a view to these objects.

2dly, Physiology, or a scientific description of the *functions* of every cell, tissue, bone, nerve, muscle, and viscus in the system, according to the profoundest views of the most recent investigators.

I do *not* recommend teaching Physiology in this manner.

3dly, Pathology, or the *diseased structure* of every cell, tissue, bone, and viscus of the body.

I do *not* recommend this instruction to be given.

4thly, The *Practice of Physic*, or the application of all the foregoing branches of knowledge to the diagnosis and cure of disease.

This is *not* recommended to be introduced.

This statement of *negatives* is made because medical men in general, to whom the Directors of Schools naturally look for advice, have these modes of instruction in their minds (few of them having seen any other in operation), when they deliver opinions on the propriety of introducing Physiology into schools.

The kind of instruction recommended, and which has already been successfully taught in some seminaries, may now be mentioned. The plan of it is this:—A description of the various organs of the human body on which health and life depend, is given in simple and popular language, but scientifically correct, so as to avoid sowing error in the mind of the pupils; the use or function of the part is described in the same manner, the exposition being plain



and popular in language, but in principle sound and scientific, challenging the criticism of the highest medical investigators. The influence of the different organs on each other is then explained; and the knowledge thus communicated of the structure, functions, and relations is applied to elucidate the natural conditions on which the healthy and unhealthy action of each vital organ depends; in other words, the causes of good or bad health, and the means that should be used in our daily habits to secure the one and avoid the other. The practical application of this knowledge lies, in a greater or less degree, within the power of every intelligent person, and much disease and suffering in ordinary life may be avoided, and much substantial enjoyment gained by acting on it.

The instruction concerning the use of each organ is founded on its structure and its relations to the other organs; and the structure is described in words, and as far as possible illustrated by preparations and by diagrams. It is generally acknowledged, that not children only, but adults also, more easily and distinctly comprehend, and longer remember, an object after having seen it, and heard it at the same time clearly described, than by merely reading about it. Now, the object in introducing the human skeleton and diagrams of the muscles, lungs, heart, and blood-vessels, and other vital organs, into schools, and giving *viva voce* descriptions of them, is to do effectually what a book is capable of accomplishing only imperfectly, namely, to convey to the pupils correct ideas of the structure, so extensive as to serve as a solid basis for understanding the uses or functions of the parts, and the influence of the vital organs on each other and on the whole corporeal system; in other words, to understand the natural conditions on which health depends, and the causes which produce disease.

The use or function is far better understood when founded on a demonstration of the structure than when communicated merely by verbal description as a general and unsupported fact. Actual knowledge of the structure and functions renders the relations of the vital organs to each other intelligible, and their reciprocal influence highly interesting;—for example, it enables us to comprehend the influence of the digestive organs on the power and activity of the muscles, lungs, and brain; the influence of the brain over the heart, the lungs, and the stomach; the influence of the circulating fluids in forming, supporting, and repairing the waste of all the organs; and so forth. And, as already remarked, this knowledge of the structure, functions, and relations, of



the vital organs all combined, lays the foundation for a clear exposition of the laws of health, by teaching which, we point out the course of action which every individual should habitually observe in order to promote his usefulness and prolong his enjoyment of life.

The sexual organs and functions are omitted in the lessons and diagrams, and it is not found that this omission materially affects the practical value of the instruction given; for these being organs of reproduction, their functions do not directly involve the life of the individual, as those of the vital organs, such as the heart, lungs, stomach, brain, and intestines do. Moreover, the same laws of health which govern the vital organs hold good in the case of the organs of reproduction, and in so far the instruction given is indirectly applicable to them.

As already observed, the instruction given is sound and scientific in its basis and character, although limited in extent and popular in expression.

This is the kind of instruction which has been introduced with advantage into several schools, and a few reasons may be offered why it should be generally adopted.

The deaths that occur throughout England and Wales, and also the causes of them, and the ages of those who die, are reported to the Registrar-General, and by him classified and reduced into tables, which, accompanied by his commentaries, are annually presented to Parliament and published. Soon after this regulation was introduced it was discovered that there were great differences in the rates of mortality in different districts. The excess of death in some localities, amounting to 10, 20, 30, and even 40 per cent. over the number of deaths in other situations, among the same number of people, of the same ages, attracted attention; the causes of the excess were investigated, and found in many instances to be avoidable or removable by application of the natural means of health.

A Sanitary Commission was appointed by Parliament to apply these means, which consist of draining, removing nuisances, ventilating houses, supplying warmth, inducing habits of cleanliness and temperance, and so forth, among the people. This Commission made extensive investigations, and published valuable reports, which were printed by Parliament for general instruction. The burden of these reports year after year was, that their best efforts were obstructed, and often rendered nugatory, by the prevalent ignorance among all classes, of the natural conditions of health, in consequence of which the advantages of the sanitary measures



recommended were neither understood nor appreciated; and even where there was a desire among the people to carry them into effect, their ignorance acted as a formidable obstacle to their doing so.

The Government were informed that the best method of removing this obstruction was, if possible, to instruct the people generally in the natural conditions of health and disease, by teaching them so much of the structure of their own bodies as might enable them to understand the functions of the vital organs, and the influence of damp, dirt, foul air, miasma, intemperance, and other causes which obviously produced the excess of disease and death. Moreover, the Government were convinced of the great importance of introducing Physiology into juvenile schools, and had even taken steps to do so; when, with a view to strengthen their hands, and those of every one interested in improving the sanitary state of the people, the following document was drawn up, and subscribed by sixty-five of the leading physicians and surgeons of London, including the principal teachers of anatomy and physiology, and the practice of medicine and surgery, in the metropolis, and also all the medical officers of the royal household.

“ Medical Opinion on the importance of teaching Physiology and the Laws of Health in Common Schools.

“ Our opinion having been requested as to the advantage of making the Elements of Human Physiology, or a general Knowledge of the Laws of Health, a part of the education of youth, we, the undersigned, have no hesitation in giving it strongly in the affirmative. We are satisfied that much of the sickness from which the working-classes at present suffer might be avoided; and we know that the best-directed efforts to benefit them by medical treatment are often greatly impeded, and sometimes entirely frustrated, by their ignorance and their neglect of the conditions upon which health necessarily depends. We are therefore of opinion that it would greatly tend to prevent sickness, and to promote soundness of body and mind, were the elements of Physiology, in its application to the preservation of health, made a part of general education; and we are convinced that such instruction may be rendered most interesting to the young, and may be communicated to them with the utmost facility and propriety in the ordinary schools by properly-instructed schoolmasters.”

“ *London, March 1853.*”



The original opinion was deposited in the hands of Government, and a large impression of it was printed and circulated. The Government gave effect to it by ordering the preparation of an elementary work on Physiology applied to health, and suitable diagrams to illustrate it, for the use of schools, and by instituting examinations in Physiology, and making a certificate of ability to teach it a title to an increased allowance of pay. These facts have been ascertained by correspondence with Dr Lyon Playfair, of Marlborough House, as falling under his department of the educational measures adopted by the Board of Trade; and he has stated also that the Committee of Council for Education in England, and the Commissioners of Education in Ireland, are co-operating with the Board of Trade in the introduction of Physiology into schools. A series of nine beautifully-executed diagrams have now been published by the Board of Trade for the use of common schools.

The same evils had been felt in the United States of North America, and the Legislature of Massachusetts resorted to similar means of removing them, as appears from the following extract from the General Laws relating to Public Instruction, passed by the Legislature of Massachusetts. Chapter 229 is entitled "An Act requiring Physiology and Hygiene to be taught in the Public Schools;" and it ordains as follows:—

"Sect. 1. Physiology and Hygiene shall hereafter be taught in all the public schools of this commonwealth, in all cases in which the School Committee shall deem it expedient.

"Sect. 2. All school teachers shall hereafter be examined in their knowledge of the elementary principles of Physiology and Hygiene, and their ability to give instructions in the same.

"Sect. 3. This act shall take effect on and after the 1st day of October 1851. (April 24, 1850.)"

Instruction in Physiology and the laws of health is highly beneficial to the children, in reference not only to their future social character, but also to their welfare as individuals. It tends to give them intelligent notions of the means by which disease may be avoided, and health promoted in their own persons; and thereby renders doubly efficacious rules given to them by their teachers regarding their personal habits of cleanliness, temperance, and exercise; the avoidance of foul air, damp clothes, ill-aired rooms, and so forth. It comes home to their minds as having a solid basis in nature, instead of resting solely on the authority of the



teacher. After they understand the natural, and therefore inevitable, consequences of neglecting or infringing the conditions of health, the pupils will become aware that such conduct may bring suffering and premature death upon them, although they may elude the vigilance of their masters, or defy the admonitions of their friends. Moreover, it will enlighten them in the management of their own offspring, should they live to become parents, and will add to their intelligence and usefulness in following medical advice in cases of domestic sickness or of general visitations of epidemic disease.

These lessons are beneficial also as a means of training the mental faculties of the pupils. They teach them to observe accurately things that exist—to study their modes of action—to comprehend their relations and effects, and to draw from them practical conclusions directly involving their own well-being. All the information recommended to be given will be real; and as it will have direct application to the pupils themselves, it will naturally interest them, as well as instruct and discipline their understanding.

The application of Physiology to the elucidation of Social Economy is also an important practical object. This may be shewn by a brief report of a lesson which, in August 1857, I gave to a class of children of the working-classes in the agricultural village of Charlton in Dorsetshire, when on a visit to my friend Mr Bastard, who has done much for the individual and social improvement of the people of that place. The lesson was intended to shew that this kind of instruction is not only intelligible, but interesting and useful to young persons in every rank of life. I was honoured by the attendance of the curate and schoolmaster, the smith and carpenter, and nearly thirty of the adult population of the village. The lesson was *improvised* for the occasion, and assumed the form of a conversation, the questions being put to the pupils in succession. It was repeated, in September, in a school for children of the middle class, kept by the Rev. Mr M'Alester at Holywood, near Belfast. There, several new questions were put, and higher answers elicited than in Charlton, and both lessons are combined in this report. It is proper to add, that to the more difficult questions, the answers were drawn out by suggestions and illustrations, which it would be tedious to detail, and which, in each instance, must be varied to suit the intelligence of the pupils.

QUESTION.—Did you get your breakfast to-day? “Yes,



Sir."—At what hour? "At eight o'clock."—Of what did it consist? "We had bread and milk."

Q. Have you had dinner? "Yes, Sir."—What had you for dinner? Some said bread and cheese, some bread and milk, &c.—At what hour? "At one o'clock."

Q. Why did you eat dinner so soon after breakfast? Here there was a pause; at last a boy said, "Because I was hungry, Sir."

Quite right. Q. But *why* were you hungry so soon? No answer; a pause; still no answer.—Q. Would you like to know *why* you were hungry so soon? All shouted, "Yes, Sir; please tell us."

Q. Have any of you a knife? Here several pocket-knives in various stages of wear were presented. One much worn in the joint, and one not perceptibly worn, were selected.

Q. Do you see any difference in the joints of these two knives? They were handed to each pupil and examined. "Yes, Sir; one is worn round, and the other is quite straight in the joint."—Q. Right: but *what caused* that one to become round? "Much opening and shutting; this wore away the iron of the joint by rubbing against the spring."—Q. Does the axle of a cart-wheel wear away? "Yes, Sir."—Q. Why? "Also by rubbing."—Q. Do they put grease on it? "Yes."—Q. For what purpose? "To make the wheel move easy, and rub less."

Q. Now, does anything resembling this go on in your body? A pause; no answer.—Q. Strip off your jackets. This was instantly done, accompanied by a shout of laughter.—Feel with your left hand the shoulder-joint of the right arm, and swing the right arm, extended at full length, round and round.—Q. What do you feel? "The top of the arm moving at a joint."—A diagram of the human skeleton was here unrolled, and the structure of the ball-and-socket joint of the shoulder explained to them.—Q. Is there anything like this in your arm? "Yes, Sir; it is the same as in the drawing."—Q. Now, suppose that this were a real skeleton of bone, and I should swing its arm round and round for a day, what would ensue? "The motion would wear the bones in the joint."—Here the secretion, in the socket of the joint, of oil to lessen the friction of the cartilages coating the bones, was explained.—Q. Will this altogether prevent the waste? "No; the cart-axle has oil, yet it wears."

The hinge joint of the elbow, and several other joints, were shewn on the diagram, to give them a notion of the extent of surface over which this kind of waste takes place.—Now, with your right hand grasp firm the thick part of the left fore-arm,



and open and shut the hand, and move it forcibly in every way you can: Q. Do you feel anything moving below the skin? "Yes, Sir; something rises and falls." Q. What is it? No answer.—Q. Would you like to know? "Very much."—Another diagram was then unrolled, shewing the superficial layer of muscles stript of the skin.—Q. Do you see here the part of your arm that rises and falls? "Yes, Sir; it is flesh."—The structure and use of the muscles was now explained to them; namely, that each consists of numerous fine fibres, or threads of flesh bound up in a common sheath, that their ends are attached to the bones, and that, by contracting and relaxing, they move the limbs.—Q. If these fibres rub against each other, and contract and relax, during a whole day, as happens when a man digs with a spade, or guides the shafts of a plough, will they wear? "Yes, Sir."

Q. Now suppose this wearing and waste to go on for several days, and not to be repaired, what would happen? "The man would become weaker and weaker, and at last die."—Q. Right. But how is the waste caused by this wearing to be supplied? "By eating."—Q. Does the bread and milk and cheese supply it? "Yes."—Q. How? One said, "They are converted into blood."—A brief explanation of the processes of digestion, assimilation, and absorption of the nutritious elements of the food; of their conversion into blood; and of the deposit by the blood of bony matter to bones, flesh to muscles, nervous substance to nerves, &c., was given. The children listened to these elucidations with eager attention.

Q. When you ate your dinner at one o'clock, did you do so because you understood all these things, and saw that it was time to repair the waste? A laugh—"No, Sir, we were hungry."—Well, then, what made you hungry? All answered, "It was the waste."—Let us attend, then, to the point at which we have arrived. Q. Hunger, you say, is a call to you to eat to repair waste: who made your body to waste away, to require food, and to feel hungry? "God."—Q. Did He make you hungry, to lead you to eat when it was necessary to do so, although you knew nothing concerning the cause of your being hungry? "Yes."—Q. Was this a kind provision for your welfare? "Yes, Sir."—Let us inquire now, whether anything more has been done by God for your preservation and enjoyment.

Q. Where did the bread come from? "From the baker."—Q. Did he make it? "Yes."—Q. Out of what? "Flour and water."—Q. Where did he get the flour? "From the miller."—Q. Where did the miller procure it? "He bought wheat



from the farmer, and made it into flour."—Q. Where did the farmer get the wheat? "It grew on his farm."—Q. Do you mean that the farmer found it all ready-grown in his fields, whenever and in whatever quantity he wished to gather it? "No, he raised it."—Q. What did he do to raise it? "He ploughed the land."—Q. Anything more? "He harrowed it."—Q. Anything farther? "He sowed seed."—Q. Was nothing more necessary? One clever boy, the son of a farmer, said, "He put dung into the ground."—Q. Right. Was anything more done? "In harvest he cut the wheat and thrashed it."—Well said.—Q. But was this all that was needed? A pause ensued; at last a boy answered, "Rain, Sir."—Q. Quite correct; but are you sure that nothing more was required? A pause; then one said, "Heat, Sir."—Q. Well answered; but where did the heat come from? "From the sun, Sir."

You have told me that the farmer, in order to raise wheat, must plough, manure, harrow, and sow seed:—Where did the land and first seed come from? "God provided them."—Right. Who furnishes the rain and the sunshine? "God."—Q. Does God also plough, manure, harrow, and sow the land? "No, Sir, the farmer must do those things."

Let us again consider the point at which we have arrived. You say that God made your bodies liable to waste, that He made you feel hungry when it was necessary to eat in order to repair the waste, and that bread and other articles of food are necessary to this end; and you have traced the history of bread through the baker, the miller, and the farmer, back to God, as the Giver of it. Here, then, we see that God has formed the body, and the ground, the wheat, the rain, and the sunshine, with reference the one to the other:—Q. Why has God provided the rain and the sunshine, the land and the seed, and not also done the ploughing and harrowing? A long pause; and much reflection was expressed in the countenances of the children.—It was necessary to help them, and I said, Every farmer needs land and seed and rain and sunshine; and these he cannot make, and, therefore God provides these things for them all.—Q. Now why does He not do the ploughing and other work also? "The farmer can do all these, and God leaves him to do them."

From what you tell me, then, I understand that before you could enjoy the bread which you ate to your breakfast to-day, it was necessary that the bounty of God, and the labour of the farmer, of the miller, and of the baker, should be combined? "Yes, Sir."—Q. And that in those arrangements God does only what he has not enabled man to do for himself, and



that he has assigned to man the rest of the work? "Yes, Sir."—Q. Well, then, when the farmer ploughs the land, is he doing something which God intended that he should do? "He is."—Q. When you do what God requires you to do, are you doing the will of God? "Yes, Sir."—When a farmer is ploughing all day, is he doing a necessary duty? "Yes, he is."—Q. Is he to be respected or despised for working in this manner. "To be respected; he is doing what is right."—Q. If he had in his mind all the steps which we have followed, would he feel that in ploughing he was doing a religious duty? "Yes."—Q. Why so? "Because he would understand that God had appointed him to do it, that he and others might have bread to enable them to live." Right.

Q. But to enable the farmer to raise wheat in the greatest quantity and of the best quality, is anything more necessary on his part? A pause; then the answer, "Strength."—What gives him strength? "The food that he eats."—Right. Q. Is anything more necessary? A pause; at length a boy said, "Mind," and another said, "Knowledge."—Right again. He requires to know how to plough.—Q. But how does he acquire this knowledge? "Somebody who has learned to plough must shew him the way."—Quite correct; and we call the combination of this acquired knowledge with strength, *skill*.—Has every man equal strength? "No."—Q. Is every man equally clever in learning to do what you teach him? "No."—Then if you were farmers, and were going to hire two men to plough your land, and one were skilful and the other not, would you give them both the same wages? "No."—Q. Why not? "Because the one would plough more and better than the other, and do more to raise wheat."—Right. But would this not be a hardship to the unskilful man? "He should acquire more skill."—Q. But if he is naturally weak and dull? "This would be his misfortune: He should try some easier work."—Right again.

Suppose you were farmers and could not plough all the fields with your own hands, but must hire men to plough for you, would you require anything more in your ploughmen than strength and knowledge? A pause; no answer.—Q. Has the ploughman the care of the horses? "Yes, Sir."—Q. Is it his duty to feed and curry them, make a nice clean bed for them, and keep them dry and warm in the stable? "That is his duty."—Suppose, now, you had two ploughmen, one of whom was a kind-hearted, conscientious man, who was fond of his horses, and did all these things for their welfare punctually and with pleasure; and another who was ill-tem-



pered, careless, and unconscientious, and looked on the care of his horses as a burden, which he shirked whenever his master's eye was off him—Q. Which would you prefer? “The good man.”—Certainly.—Q. But why would you prefer him? “Because his horses, being well fed and cared for, would work better.”—Q. Then you consider good nature and honesty necessary to make a good ploughman, as well as knowledge and strength? “Yes, Sir.”

Let us next suppose that there are two villages like Charlton, each with five hundred inhabitants, who need to be fed with bread, and that each of them depends entirely on three farmers for the wheat with which their bakers must make bread; and that the three farmers who supply one village are skilful, conscientious, active men, and keep only good ploughmen and horses; and that the three farmers who supply the other village are careless, unskilful, and unconscientious persons, who do not look after the conduct of their ploughmen: Q. Which would the lazy and unconscientious ploughmen of the neighbourhood seek out for their masters? “They would go to the careless farmers?”—Q. Which village, then, would be best supplied with wheat and bread? “The one that had good farmers.”—It appears from this that all the people who live in the villages depend, more or less, on the character and skill of the farmers and ploughmen in the neighbourhood for their supply of bread? “They do, Sir.”—Q. But is it not hard that these persons in the villages who have no command over the farmers should suffer by their bad conduct? A pause; no answer.—Let us inquire how this happens.

Q. Do the people of the villages do anything for the farmers in return for the wheat and bread? “Yes, Sir—they make clothes and shoes for them; also carts and ploughs, and the baker bakes bread for them.”—Right.—Q. Does the schoolmaster instruct their children, and the clergyman preach to them on Sundays? “They do.”—Q. Will it make any difference to the farmers if the tradesmen, the schoolmaster, and clergyman who do these things for them, are skilful and conscientious, or slothful, careless, and unconscientious? “It will make all the difference between being well served and ill served.”—And suppose that the prices of the things furnished by these two sets of tradesmen, schoolmaster, and clergyman, were equal, would the farmers prefer the articles made by the one set to those made by the other? “Yes, Sir; they would find the articles made by the good and skilful men the best.”—Q. Would they, on account of their superior quality, be really cheaper than the other, although the price



in money was the same? "Yes; they would serve the farmers better, and also wear longer."—Q. Is it not a hardship on the farmers to depend for good articles on the skill and honesty of these villagers over whom they have no control? A pause; no answer.—Now mark what I am going to say. Q. Do the villagers depend on the sale of their articles to the farmers for obtaining a share of their wheat to make bread? "Yes, Sir."—Q. And if they make bad articles, will the farmers buy them? "No, Sir."—Q. Will the villagers in that case have a supply of bread? "No." Then you see that the farmers have a degree of control over the conduct of the villagers; for if they do not make good articles, they withhold their bread. Let us again turn to the farmers. Which of the two classes of farmers, the skilful and honest, or the unskilful and careless, would produce the best wheat? "The skilful and honest."—Q. Which could afford to sell their wheat cheapest, and yet by their greater crops have enough for themselves and for payment of their rents? "The good and skilful farmers."—Q. Would the villagers prefer buying good wheat of them to inferior wheat from the other class, even if the price were the same? "They would."—Right. But from this it appears that the farmers, in their turn, are dependent on the villagers for the sale of their wheat? "Yes, Sir."

Now, who was it that made the farmers and the villagers, and, by the constitution of their bodies made it necessary for them all to work, and each to do work to supply his neighbours with something that they need, in return for which he gets something that is wanted by himself—who, I ask, established this necessity for working, and this dependence of us all, the one on the other? "It was God."—Right.—Q. When you are told in the Bible that it is your duty to love your neighbour as yourself do you see, in this state of things, any arrangement to lead us to do so? "Yes, Sir; if we should all do our duty in our own lines, we should all benefit ourselves and our neighbours at the same time; for each of us would have more things to sell and of a better quality, and he would get more articles in return."—Well answered.

Q. But let me ask again,—If God has established all this in the framework of our bodies and the endowment of our minds, is he a clever fellow who tries to find a shorter way than by skilful and honest labour, to a supply of bread, who, for example, cheats to get it, or steals it? "No, Sir." Q. Can bread be produced by cheating and stealing? (A laugh). "No, it cannot."—Q. Do the men who try to get bread by these means, take it from some one who has produced it, or has obtained it by giving something valuable in exchange for it?



"Yes."—Q. Then is it the interest of all good, skilful, and honest people to stop these men from eating the bread which they do nothing to produce? "Yes."—Q. If they combine their strength, have they the power to prevent them? "They have, Sir."—Q. If, then, by working skilfully and honestly each of us in our own line, and exchanging our articles, we are all better supplied, and if God has arranged things in this manner, what kind of conduct does He prescribe to us, and approve of? A pause. "God means us to acquire skill, to be kind to each other, and to be honest."—Q. Then, is there any hardship in our being dependent one on the other in this way? "No, Sir."—Q. Do you see in this dependence any sign that God meant us all to be happy together; in short to love our neighbours as ourselves? "Yes, Sir."—Well, then, let us bear these things in mind, and try to do them, in the full conviction that we shall never find shorter, easier, or better ways to our own happiness than those which God has appointed, and that in all of these we must walk side by side with our neighbours to find the surest way to our own enjoyment.

I repeat that this was an improvised lesson, given to illustrate a method of instructing children which at once arouses their intellects, excites their moral faculties, and conveys knowledge of actual things and agencies which directly affect their well-being. It will be observed that in illustrating the waste of the human body, I confined myself to that form of it which could be made intelligible to pupils who had not been instructed in Physiology. Where this subject has been taught to children, impressive lessons may be founded on it, embracing a wide field of practical duties both personal and social. I learned this mode of teaching from my friend Mr William Ellis, of No. 6 Lancaster Terrace, Regent's Park; and beg to recommend to every one who feels an interest in it to visit the schools in London conducted by Mr Runtz in Chancery Lane, and Mr Shields in Peckham. They will there learn that it is capable of extensive and highly beneficial applications. There are six Birkbeck schools in London, which Mr Ellis has been instrumental in establishing on this plan,\* and also similar schools in other parts of the kingdom, a visit to any of which will be found interesting and instructive.

\* See Note A.



## APPENDIX.

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NOTE A.—*Schools referred to on p. 14.*

The Birkbeck Schools at present in existence are,—

1. Southampton Buildings, Chancery Lane (for Boys).
2. Bell-yard, Commercial Place, City Road (for Boys).
3. Cambridge Road, Mile-End (for Boys and Girls).
4. Vincent Square, Westminster (for Boys).
5. Willow Brook Road, near Hill Street, Peckham (for Boys, Girls, and Infants).
6. Robinson's Row, Kingsland.

In Manchester there is a secular school, and one is conducted in the Mechanics' Institute in Salford, by Mr John Angell.

In Leith, there is a school in the premises of the Edinburgh and Leith Ropery Company, instituted by Mr James Hay, and taught by Mr William Ellis.

In Glasgow, there is a secular school in Carlton Place instituted by a number of the inhabitants of that city, among whom Mr James MacClelland and Mr Cunliffe may be mentioned as having devoted much attention to the subject of education. It has 230 scholars on the roll, and in some of the departments additional applicants cannot be received.

There are probably more schools conducted on Mr Ellis's principles than I am acquainted with; I mention only those about which I possess some information.

The following is a list of works on Social Economy, prepared for schools by Mr Ellis, of Lancaster Terrace, Regent's Park :—

1. Outlines of Social Economy. 2d edition, fcap. 8vo, 1s. 6d. half-bound.
2. Outlines of the History and Formation of the Understanding. Fcap. 8vo, 2s. half-bound.



3. Questions and Answers suggested by a Consideration of some of the Arrangements and Relations of Social Life. Fcap. 8vo, 2s. 6d. half-bound.
4. Introduction to the Study of the Social Sciences. Fcap. 8vo, 2s. half-bound.
5. Progressive Lessons in Social Science. Fcap. 8vo, 1s. 6d. half-bound.
6. Education as a Means of Preventing Destitution. Post 8vo, 4s. cloth.
7. Reminiscences and Reflections of an Old Operative. Fcap. 8vo, sewed, 3d.
8. What am I?—Where am I?—What ought I to do?—How am I to become Qualified and Disposed to do what I Ought? Fcap. 8vo, 1s.
9. Where must we Look for the Further Prevention of Crime? Post 8vo, 1s.
10. A Layman's Contribution to the Knowledge and Practice of Religion in Common Life—being the substance of a course of Conversation-lessons introductory to the study of Moral Philosophy. Pp. 470. Price 7s. 6d. boards.

London: Smith, Elder, & Co., 65 Cornhill.

Lessons on the Phenomena of Industrial Life, and the Conditions of Industrial Success. Edited by the Rev. Richard Dawes, M.A., Dean of Hereford. 2d edition, price 2s.

Groombridge & Sons, 5 Paternoster Row.



THE  
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