

# THE HARVEIAN ORATION

1865.

BY

HENRY W. ACLAND,

M.D. OXON., LL.D. CANTAB., F.R.S.,

REGIUS PROFESSOR OF MEDICINE IN THE UNIVERSITY OF OXFORD,

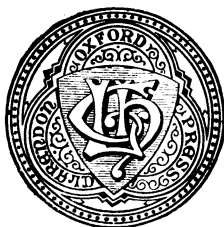
AND

HON. PHYSICIAN TO H. R. H. THE PRINCE OF WALES.

London:

MACMILLAN AND CO.

1865.



**Oxford:**

**BY T. COMBE, M.A., E. PICKARD HALL, AND H. LATHAM, M.A.**

**PRINTERS TO THE UNIVERSITY.**



TO  
THOMAS WATSON, M.D., F.R.S., D.C.L.,  
PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS  
OF ENGLAND,  
THE FOLLOWING ORATION,  
DELIVERED AND PRINTED BY HIS DESIRE,  
IS NOW GRATEFULLY  
DEDICATED.

OXFORD, 1865.



## THE HARVEIAN ORATION,

1865.

WE celebrate once more the memory of those who in past times have brought honour to the College of Physicians of England; the memory also of those who have recently gone, of Kirkes, whose learning and skill were appreciated, and whose loss is lamented, wherever medical literature is known, of Turner, of the worthy brother of noble-hearted Southey, of Bird, and Duke, of one not yet laid in his grave, whose strong nature brought great fruit to others, to us, to himself—Ferguson; but above all of HARVEY, Founder of this commemorative Holyday. Happy we whom custom and his direction withdraw for a brief hour from the din and care of life to this peaceful task!

The occasion is singular. It might have been better if, when for the first time in History, HARVEY is discussed in his native tongue before the College he loved so well, the Cicero of English Medicine, as our

B

President has been justly called, had inaugurated this new series of discourses.

With combined authority and skill, Dr. Watson might have sketched with his strong yet pleasant touch the personal character of our Master; and would have drawn the old familiar man, keen of eye, small of stature, and gentle of mien. He might have set him before us a young and eager student with hair as black as raven, intent on his knife, or expounding its teachings; he might have shewn him later a peaceful contemplative man, now with head like snow, seated under a hedge with the Prince of Wales and his brother the Duke of York by his side<sup>a</sup>, reading with them, till dislodged by a cannon ball, near the inn called Sun Rising, (even now standing on the glorious slope of Edge Hill,) whence he could see the battle raging at his feet below. Or, pursuing another course, our President might have shewn in long array what consequences have followed, and what may yet follow, from the accurate study of the laws which regulate the circulation of the blood in the animal kingdom; and have

<sup>a</sup> Letters of John Aubrey, vol. ii. part ii. p. 379.

given us his matured views of the relations of the vital fluid to the organism in health, and to the organism in disease; expounding principles for the philosophy, and deducing rules for the practice, of Medicine; telling us of disease averted, of health maintained, or of health restored.

Called upon this day to perform, with unequal power, the task which I wish had fallen into worthier hands, I propose to treat of one general topic; viz. how far some points in Harvey's Methods of Discovery are in accordance with the ideas which the experience of advancing Science has taught. If it can be shewn that, after the lapse of two centuries, not only his discoveries were valuable but his methods were correct, we may with renewed confidence begin a fresh series of annual Scientific Essays, which the College has wisely decided to ask from its working and zealous Fellows.

HARVEY is popularly known by only one of his works, that no doubt which has been most fruitful, but not that probably which caused him most labour. The studies which

led to the discovery of the Circulation of the Blood could not have cost him more research than he expended on investigating, with the princely aid of his Royal Master's park at Windsor, the Generation of Animals.

But also he is familiarly known, because historians quote him as a notable instance of a Philosopher, who studied Nature under the conviction that every arrangement in the Natural World is the result of *Design*—that every effect is *intended and has a Purpose*. It is this persuasion, says Whewell<sup>b</sup>, “which directed the researches, and led to the discoveries of Harvey.”

Harvey is on this account more often referred to by Theologians than any other Biological discoverer. Success does not always explain or justify the means, and therefore it is, at the present day, a matter of extreme interest to know whether he did so make his discovery: and, if he was in a great measure guided in his researches by the idea of Final Causes, whether he followed a safe and proper scientific method.

The last of these questions must be con-

<sup>b</sup> Whewell's *Indications of a Creator*, p. 119.



sidered before the first; and among men of mark whose opinions are entitled to weight, this question would now be answered in opposite ways, as the two following quotations will incontestably shew.

1. The great English Historian of Science, besides elaborate disquisitions in favour of the study of Final Causes, gives his deliberate opinion in his most matured work<sup>c</sup>, that “the idea of a Final Cause is an indispensable guide in Biology.”

2. On the other side, his French rival, whose genius, industry, and learning cannot be spoken of but with respect, and who is held up by some as the most advanced Philosopher of our time, says<sup>d</sup>, with regard to one department of modern science<sup>e</sup>, “that it represents the order of the world as the necessary and spontaneous result of the mutual action of the principal masses of which it is composed, at the same time that it ruins with irresistible evidence the hypothesis of Final Causes, and of all Providential Government.”

<sup>c</sup> Whewell, *Novum Organon renovatum*, 1858, p. 138.

<sup>d</sup> Comte, *Cours de philosophie positive*. Ed. Littré, 1864, vol. iii. p. 321.

<sup>e</sup> Astronomy.

By selecting the opinions of two recent authors of undisputed learning and power, we are able to dismiss from consideration a mass of writers of older date or of inferior calibre, and at once to mark the issue of a question which is now agitating deeply, though often silently, the minds of men who think, either in Science or in Theology.

The idea of Final Cause is essential as a guide in the progress of Biology, says Whewell.

The idea of Final Cause and Providential Government is ruined by the irresistible evidence of Modern Science, says Comte.

There is one fundamental error, as seems to me, (and it may as well be pointed out at once,) in Comte's statement of the case. The doctrine of Final Causes, so far as it involves the idea that we *are able to state the object* for which things exist, may be ruined; but it does not follow that the belief in a Providential Government of the universe may not remain. The two things are quite different, and they are not necessarily related. We may be satisfied on the whole that there is, behind all the efficient causes which we can

see, a First Cause, which we believe (on whatever ground) to be a Supreme Will and Intelligence, and yet we may be quite unable to trace the intermediate steps by which that Will operates, or even to prove its operation. And if we cannot trace the intermediate steps, or their mutual connexion, we cannot safely apply the idea of Final Cause as a certain means of scientific investigation, especially as there may be several Final Causes for the same condition. We may therefore discard the *use* of Final Causes in Science and yet not necessarily infer, as Comte did, the absence of Providential Government. This was the conclusion, for instance, of one of Harvey's greatest admirers, the famous René Descartes.

Descartes says<sup>f</sup>,—

“Nullas unquam rationes circa res naturales, a fine, quem Deus aut natura in iis faciendis sibi proposuit, desumemus; quia non tantum debemus nobis arrogare, ut ejus consiliorum participes nos esse putemus.”

And again, in the *Meditations*,—

“Non enim absque temeritate me puto posse investigare fines Dei g.”

<sup>f</sup> Principia Philosophiæ, I. § 28.

<sup>g</sup> Medit. IV.

In a different way, but somewhat to the same effect, Kant, while fully admitting the beauty and order of the Universe, refuses to acknowledge this beauty and order as amounting to scientific proof of the existence of a Supreme Will.

“The right contemplation,” he says, “of a well-meaning mind on so much casual beauty, and so much combination answering the end, as the order of nature displays, finds proofs enough to gather from them a Will accompanied with great wisdom and great power; and the common conceptions of the understanding are sufficient to this conviction, so far as it shall suffice for a virtuous conduct, that is, be morally certain. . . . .”

“The principal characteristic of the physicotheological method hitherto used is this, that the perfection and the regularity are first properly comprehended as to their casualty, then the artificial order is shewn according to all its references answerable to the end in order thence to conclude a wise and a good will, and the conception of the immense power of the Author is, by the superadded consideration of the magnitude of the work, afterward united with it.

“This method is excellent: in the first place, because the conviction is sensual, and consequently lively and engaging, easy and comprehensible to the most common intellect; because it, in the second place, is more natural than any other, as there is no doubt but everybody makes the beginning with it; and because it, in the third place, affords a conception, accompanied with much intuition, of great wisdom, care, or even potency of the adorable Being which fills the soul, and has the greatest power of raising astonishment, humility, and awe. This mode of proof is more practical than any other, even with regard to the philosopher. For though he does not find in it the determinate abstract idea of the Godhead for his searching understanding, and the certainty itself is not mathematical, but moral, so many proofs, every one of them of so great energy, take possession of his soul, and speculation follows quietly with a certain confidence and conviction which had previously taken place. One would hardly risk his whole happiness on the pretended rightness of a metaphysical proof, particularly if lively sensual persuasions stood in its way. But the force of conviction which springs from this argument is, just by reason of its being so sensual, so

great, that the physicotheologist is apprehensive of no danger from syllogisms and distinctions, and far above minding the power of subtile objections<sup>h</sup>."

Lastly, on this point I may cite the opinion of a great anatomist of our own. Professor Owen rejects the idea of Final Cause in the ordinary acceptation of Purpose or Design with a view to Use, and yet strongly maintains the doctrine of a Supreme Intelligence. He supports the hypothesis that complex arrangements in the organic world are expanded from a simple form, according to a pre-ordained plan.

"The attempt to explain" (he says in his work on the Homologies of the Vertebrate Skeleton) "by the Cuvierian principles the facts of special homology on the hypothesis of the subserviency of the parts so determined to similar ends in different animals—to say that the same or answerable bones occur in them because they have to perform similar functions—involve many difficulties, and are opposed by numerous phænomena<sup>i</sup>."

<sup>h</sup> Kant's *Physiotheology*, translated by Richardson, p. 134. See also Appendix, Note A.

<sup>i</sup> Owen's *Homologies of the Vertebrate Skeleton*, p. 73.

After giving illustrations from the development of the skull of Vertebrates, he proceeds:—

“These and a hundred such facts force upon the contemplative anatomist the inadequacy of the teleological hypothesis to account for the acknowledged concordances expressed in this work by the term ‘special homology.’ If, therefore, the attempt to explain them as the results of the similarity of the functions to be performed by such homologous parts, entirely fails to satisfy the conditions of the problem; and if, nevertheless, we are, with Cuvier, to reject the idea of their being manifestations of some higher type of organic conformity, on which it has pleased the divine Architect to build up certain of his diversified living works, there then remains only the alternative that special homologies are matters of chance.

“This conclusion, I apprehend, will be entertained by no reasonable mind; and reverting, therefore, to the more probable hypothesis of the dependence of the special resemblances upon a more general law of conformity, we have next to inquire, What is the vertebrate archetype?”

Here it is to be observed that the idea of contrivance for the sake of utility (ordinarily so called) is pronounced inadequate. The far more subtle suggestion is supported, that of a Creator working on a plan within self-imposed limits. Owen's archetype is not, however, an archetype in Plato's sense. Plato's ideal was the absolute form of every species, which existed only as a divine perfection, and expressed itself more or less imperfectly in each individual of the species. Owen's archetype is the abstraction which can be made from all complex organisms of the same kind. But though the Professor in this work, (of which it may be said that it spread in this country a profound interest in the minutest details of osseous structure in vertebrate animals, and therefore constitutes a veritable epoch in the annals of British Philosophic Anatomy,) relinquishes the common hypothesis of Final Causes, he yet advocates, though in a particular form no doubt, the idea of comprehensive plan or unity of design as well as mechanical skill in the works of nature. And this idea is one with which, in



some form or other, the philosophic observer of Nature cannot safely dispense, without sacrificing all hope of attaining any conception at all of nature as a whole. For it is involved in the notion of Art, as a thing distinct from mere mechanical adaptation; and it is only from considering the operation of the Artist's mind that our limited faculties can derive any conception of the work of Creation. Indeed, Art in its highest sense is Creation. It may, and often does, consist of an unexpressed subjective image—mechanical, or pictorial, or poetical. Tennyson's burning thoughts not yet rendered into musical verse, Raffaele's sense of beauty not yet embodied in a picture, Babbage's wheel and cog still existing only in his own ingenious mind, have each a subtle Being, though not objectively expressed. Each gives a faint reflexion of what we dimly, and perhaps incorrectly, conceive, by analogy, of the Ideas existing in the Supreme Mind with respect to Its works and operations.

The illustration of the watch, so quaintly employed by Nieuwentijt<sup>j</sup>, and so entirely

<sup>j</sup> See Appendix, Note B.

appropriated by Paley, only in a coarse way suggests the parallel between Infinite Art and common Mechanical Skill. It has done some mischief to the cause it advocates, by making familiar a rude illustration, which minds without imagination, or devoid of constructive power, have accepted as a recognized explanation of the method of operation by an Infinite Creative Will.

Such persons, then, as Descartes, Kant, and Owen, while disavowing on various grounds the adequacy of the argument from Final Causes, or from intended and recognizable purpose, admit, indeed require, the presence of a superior operating Will, *of which we recognize the results while we cannot divine the motive.*

Even Mr. Herbert Spencer, who in one place argues elaborately against all notion of Design, in another expresses the necessity of acknowledging a Creator, or at least a First Cause. On the one hand, in one of the chapters in the "Principles of Biology," he takes the instance of human Entozoa to prove that either the system of things is not

specially ordered by a Supreme Will, or that if ordered it is ordered amiss<sup>k</sup>. On the other hand, he writes thus:—

“Either the multitudinous kinds of organisms that now exist, and the still more multitudinous kinds that have existed during past geologic eras, have been from time to time separately made, or they have arisen by insensible steps, through actions such as we see habitually going on. *Both hypotheses imply a Cause. The last, certainly as much as the first, recognizes this Cause as inscrutable. The point at issue is, how this inscrutable Cause has worked in the production*

<sup>k</sup> Great stress is laid by Mr. Spencer on the presence of Entozoa in Man. He implies that if Design is predicated of the natural world, then there is the dilemma of want of skill, or want of power to hinder evil, on the part of the Designer. This is one instance, no doubt, of the existence of evil in the world which we cannot explain. We know of no adequate end to be obtained through the agency of tapeworm, or other parasites. Man is not exempt from these evils. Nor is he exempt from other diseases. Tubercle, inflammation, cancer, are in some respects as inexplicable as are parasites. Care and the observance of the laws of health lessen these visitations, and these strange and loathsome parasites among the rest. But the subject is far too complex to be treated in a note.

*of living forms.* This point, if it is to be decided at all, is to be decided only by examination of evidence<sup>1</sup>."

These writers, then, all acknowledge something like a Creating Cause, and none of them (save the last) disavow Design, though they doubt their own powers of reading it. Their authority may dispense us from the necessity of further considering M. Comte's denial of Providential Government. But in respect to the argument from Design, these authors to a certain extent agree with him. M. Comte, however, goes further than any other opponent of Final Causes whom I have yet met with. He declares all argument from Design in the Universe to be worthless as argument, and he takes a crucial instance to prove that the Design, if it exist, is bad.

Now Comte's crucial instance is as follows. He is speaking of the education proper for fitting men rightly to pursue scientific studies. He says that in Biology the scientific spirit leads us to the conviction that *there can be no organ without function, nor*

<sup>1</sup> Principles of Biology, vol. i. p. 332.

*functions without organ.* This conviction, he says, is eminently philosophic; but he proceeds:—

“ Il faut convenir que cette tendance systématique à regarder tout organe quelconque comme exerçant nécessairement une certaine action, dégénère encore très-fréquemment en une aveugle admiration antiscientifique du mode effectif d’accomplissement des divers phénomènes vitaux. Une semblable disposition, émanation évidente de l’ancienne suprématie théologique, est en opposition directe avec toute saine interprétation du principe des conditions d’existence, d’après lequel, quand nous avons observé une fonction quelconque, nous ne saurions être surpris que l’analyse anatomique vienne réellement dévoiler, dans l’organisme, un mode statique propre à permettre l’accomplissement de cette fonction<sup>m</sup>.”

[“It must be admitted that such a systematic tendency to consider any organ whatever as exercising necessarily a certain action, very frequently degenerates also into a blind antiscientific admiration for the actual method of accomplishment of the divers vital

<sup>m</sup> Cours de Philosophie Positive, vol. iii. p. 321.

phenomena. Such a disposition—an evident emanation of the old theological supremacy—is in direct opposition to sound interpretation of the principle of the conditions of existence, according to which, after observing any function whatsoever, we cannot be surprised that anatomical analysis should indeed discover in the organism means calculated to allow that function to be performed.”]

On this passage it need only be remarked negatively, that admiration may exist without blindness; and positively, that it may coexist with the most critical investigation and the most accurate estimate of the object of it. But it is important to Comte’s argument to make love of Nature—one of the simple, joyous, and pure pleasures of the noblest minds—appear antiscientific and mischievous. Having, therefore, coupled the quality of blindness with that of admiration, he proceeds,—

“Cette admiration irrationnelle et stérile, en nous persuadant que tous les actes organiques s’opèrent aussi parfaitement que nous puissions l’imaginer, tend immédiate-

ment à comprimer l'essor général de nos spéculations biologiques: elle conduit souvent à s'émerveiller sur des complications évidemment nuisibles."

[“ This irrational and barren admiration, by persuading us that all organic actions are effected as perfectly as we can imagine, tends immediately to press down by force the spring from which all our biological speculations receive their impulse: it leads us frequently to marvel over complications evidently detrimental.”]

Admiration of Nature then is blind; it is also irrational, and barren: for it would persuade us that every organic act is executed as perfectly as is possible, and thus restrain the flight of our speculations on subjects which we admire and love. “Admiration indeed often delights itself with complexities which are hurtful.”

Having thus sketched the frame of mind of lovers of Nature, he produces the crucial example of which I spoke to prove the absurdity of their condition.

“ On peut, à ce sujet, indiquer, comme un

exemple frappant de cette absurde disposition, la puérile affectation de certains philosophes à vanter la prétendue sagesse de la nature dans la structure de l'œil, particulièrement en ce qui concerne le rôle du cristallin, dont ils sont allés jusqu'à admirer l'inutilité fondamentale, comme s'il pouvait y avoir beaucoup de sagesse à introduire aussi intempestivement une pièce, viz. qui n'est point indispensable au phénomène, et qui néanmoins devient, en certains cas, capable de l'empêcher entièrement."

[“One may mention, on this subject, as a striking instance of this absurd tendency, the puerile affectation of certain philosophers in commending the pretended wisdom of nature as shewn in the structure of the eye, particularly in reference to the action of the crystalline lens, the fundamental uselessness of which they have gone so far as to admire : just as if there could be much wisdom in the inopportune introduction of a part which is not indispensable to the phenomenon, and which may nevertheless in certain cases prevent it entirely.”]

Some apology may seem needed for occupying the College in the discussion of this



passage; but the time is gone by, if it ever existed, when it is justifiable to meet the deliberate criticisms of able men by neglect. For my own part, recognizing the skill, industry, and genius of M. Comte, and the esteem in which parts of his literary labours are very properly held, I am grateful that he should have thrown down the gauntlet in a manner so unmistakeable, for the acceptance of those who believe themselves to be able to criticise, to love, and to revere the manifestation of Order, and of what they take to be Design in the Universe.

But it must here be said, that these opinions are not new. Hear Lucretius on the same point:—

“*Illud in his rebus vitium vementer avessis  
Effugere, errorem vitareque præmetuenter,  
Lumina ne facias oculorum clara creata,  
Prospicere ut possemus; et ut proferre que-  
amus*

*Proceros passus, ideo fastigia posse  
Surarum ac feminum pedibus fundata plicari;  
Bracchia tum porro validis ex apta lacertis  
Esse manusque datas utraque ex parte min-  
istras,*

Ut facere ad vitam possemus quæ foret usus.  
Cetera de genere hoc inter quæcumque pre-  
tantur,

Omnia perversa præpostera sunt ratione,  
Nil ideo quoniam natumst in corpore ut uti  
Possemus, sed quod natumst id procreat  
usum.

Nec fuit ante videre oculorum lumina nata  
Nec dictis orare prius quam lingua creatast,  
Sed potius longe linguæ præcessit origo  
Sermonem multoque creatæ sunt prius aures  
Quam sonus est auditus, et omnia denique  
membra

Ante fuere, ut opinor, eorum quam foret  
usus;

Haud igitur potuere utendi crescere causa.  
At contra conferre manu certamina pugnæ  
Et lacerare artus fœdareque membra cruore  
Ante fuit multo quam lucida tela volarent,  
Et volnus vitare prius natura coegit  
Quam daret objectum parmai læva per artem.  
Scilicet et fessum corpus mandare quieti  
Multo antiquius est quam lecti mollia strata,  
Et sedare sitim prius est quam pocula natum.  
Hæc igitur possent utendi cognita causa  
Credier, ex usu quæ sunt vitæque reperta.  
Illa quidem seorsum sunt omnia quæ prius  
ipsa

Nata dedere suæ post notitiam utilitatis.

Quo genere in primis sensus et membra  
videmus;

Quare etiam atque etiam procul est ut cre-  
dere possis

Utilitatis ob officium potuisse creari <sup>n</sup>."

<sup>n</sup> " And herein you should desire with all your might to shun the weakness, and with a lively apprehension to avoid the mistake of supposing that the bright lights of the eyes were made in order that we might see; and that the tapering ends of the shanks and hams are attached to the feet as a base, in order to enable us to step out with long strides; or again, that the fore-arms were slung to the stout upper-arms, and ministering hands given us on each side, that we might be able to discharge the needful duties of life. Other explanations of like sort which men give, one and all put effect for cause through wrongheaded reasoning; since nothing was born in the body that we might use it, but that which is born begets for itself a use: thus seeing did not exist before the eyes were born, nor the employment of speech ere the tongue was made; but rather the birth of the tongue was long anterior to language, and the ears were made long before sound was heard; and all the limbs, I trow, existed before there was any employment for them: they could not therefore have grown for the purpose of being used. But on the other hand, engaging in the strife of battle, and mangling the body and staining the limbs with gore, were in vogue long before glittering darts ever flew; and nature prompted to shun a wound, or ever the left arm by the help of art held up before the person the defence of a shield. Yes, and

Nothing can be more clearly or tersely put. There is no intention in the Eye, no Design. Use is the consequence of existence. Existence came by chance. All the fine mechanical contrivance by which light, the subtlest of known matter, becomes a source of knowledge to the higher animals, happened to exist; light happened to enter, and we see—and seeing, know. Oh! creed hard to believe! Design is barred to me. Chance is left. And this fruit of chance is beneficially, but without intention, transmitted with precision from generation to generation.

We have indeed lately seen a remarkable

consigning the tired body to rest, is much older than a soft-cushioned bed, and the slaking of thirst had birth before cups. These things therefore which have been invented in accordance with the uses and wants of life, may well be believed to have been discovered for the purpose of being used. Far otherwise is it with all those things which first were born, then afterwards made known the purposes to which they might be put; at the head of which class we see the senses and the limbs. Wherefore again and again I repeat, it is quite impossible to believe that they could have been made for the duties which they discharge.” —*Lucretius*, b. iv. l. 823–857. Ed. Munro, 1864, vol. i. p. 189.

attempt to reduce the doctrine of what used to be called Chance to an orderly philosophic system. Mr. Darwin accounts for the structure of the Eye not by Chance but by Natural Selection.

“To suppose,” he says, “that the eye, with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest possible degree. Yet reason tells me, that if numerous gradations from a perfect and complex eye to one very imperfect and simple, each grade being useful to its possessor, can be shewn to exist; if, further, the eye does vary ever so slightly, and the variations be inherited, which is certainly the case; and if any variation or modification in the organ be ever useful to an animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection, though insuperable by our imagination, can hardly be considered real<sup>o</sup>.”

<sup>o</sup> Darwin, *Origin of Species*, p. 186.

This passage makes it plain that M. Comte cannot count Mr. Darwin among his followers, since the latter philosopher in no way derogates from the splendour of the instrument, but only attempts to account for the mode of its construction. M. Comte, on the other hand, seems not only to follow Lucretius in attributing the Eye to Chance, but holds, as one might expect, that the result is bad,—bad in two ways :—

1st. In that the crystalline lens is not indispensable for the purpose of vision.

2nd. In that, though not necessary for vision, it becomes in certain cases capable of impeding it altogether.

Nor is this all. For a conclusion follows which must not be unnoticed—that the course of nature as it is, is inferior to what it might have been if under the control of human intelligence.

“ Quoique notre imagination reste nécessairement circonscrite, en tous genres, dans la seule sphère de nos observations effectives, et que, par suite, il nous soit surtout impossible d’imaginer des organismes radicalement nouveaux, on ne saurait douter,

néanmoins, ce me semble, que le génie scientifique ne soit aujourd'hui, même en biologie, assez développé et assez émancipé pour que nous puissions directement concevoir, d'après l'ensemble de nos lois biologiques, des organisations qui diffèrent notablement de toutes celles que nous connaissons, et qui leur seraient incontestablement supérieures sous tel point de vue déterminé<sup>p</sup>, sans que ces améliorations fussent inévitablement compensées, à d'autres égards, par des imperfections équivalentes<sup>q</sup>.

[“ Although our imagination remains necessarily circumscribed in all respects within the sphere of actual observation, and, in consequence, it is impossible for us to imagine organisms radically new, we cannot doubt, as appears to me, that the genius of science is now sufficiently developed and sufficiently free for us to be able directly to conceive, in conformity with the aggregate of our biological laws, organisms which differ notably from all that we know, and which would be incontestably superior to them under a definite point of view, while

<sup>p</sup> Compare the more modest opinion of the great practical Naturalist just quoted, below at p. 40.

<sup>q</sup> Comte, Cours de Philosophie Positive, vol. iii. p. 322.

these ameliorations might not be inevitably balanced, in other respects, by equivalent imperfections.”]

In weighing arguments of this kind, we must not be slow to admit, first, that our faculties are so far limited that we are not able to discover with certainty all the conditions necessary for producing a structure so complicated as the Eye; and secondly, that such structure, when made, is still within the range of action of the more general laws which regulate matter on the earth.

For, of the cause of the origin of any given structure, as the Eye, no more is known than of that of any other organic structure. The whole process is not within the range of the human mind to comprehend. We can only predicate of it, with Comte, the *phænomena* which we are able to investigate.

An Eye, considered philosophically, is the connecting machinery between light and a recipient consciousness.

As an instrument, it fails in its purpose<sup>r</sup>,

<sup>r</sup> No excuse is made for the assumption, in this part of the argument, of purpose and adaptation. To avoid it



if it be not adapted to the laws of light on the one hand, and to the psychological capacities of the animal on the other.

When objection is taken to it, it has to be shewn,

either, that it does not transmit light in a suitable manner;—

or, that while it transmits light correctly, the mode of transmitting the impression to the consciousness is faulty;—

or, that being constructed reasonably in these particulars, it is liable to derangement beyond that which belongs proportionably to it as a delicate organic structure in a world where existence implies change;—

or, that being delicate, and reasonably maintained in existence, it is liable to an extraordinary amount of risk from accidents which might have been guarded against.

Now, it may be answered categorically to each and all of these,

would require an amount of periphrasis which were intolerable. Moreover, it is necessary in a brief summary to speak of the Eye as a whole,—as though there were one kind of eye, whereas there are many kinds, acting in different ways, and imparting knowledge different in amount and in quality.

that the eye does transmit light with marvellous precision, so as to produce of necessity a certain result; constructed as it is it can produce no other, unless disarranged in some part;—

that as a fact it does through impression on the retina convey knowledge adapted to the capacities of animals generally, and man in particular, of the most amazing kind;—

that it is, all things considered, liable to exceptionally few derangements: those incident, as one may say, to a structure which is part of the whole organic system of things in this planet;—

that, being in the nature of the case delicate in an extreme degree, there are an unusual number of complex arrangements which do preserve it, whether they were designed to preserve it or no.

These assertions require no proof for the expert, and to prove them as for the animal kingdom in general, to the uninstructed would require a very elaborate treatise\*, as

\* There is a most elaborate literature on the Eye, for which see Helmholtz, *Physiologische Optik*, in "Karsten's Encyclopædie," and Kölliker, "Microscopic Anatomy,"

any one may see for himself by referring to the work of Donders "On the Accommodation of the Eye alone." The present discussion must be therefore strictly confined to what is requisite for appreciating the value of the lens, the special object of M. Comte's animadversions.

The crystalline lens, he says, is unnecessary, and by its diseases destroys the eye.

First of all, it is unnecessary.

This allegation is true. Though we could not see quite as well without it, still we could see. The crystalline lens is not an essential part of an eye, abstractedly considered. It does not therefore exist in every case where there is an Eye. Accordingly a person who believes that the order of things is on the whole governed by a purpose, inclines to the supposition, that when it is absent, it is unnecessary, and that, when it

p. 583. Notwithstanding this, I cannot but think that it would be a fit work for some wealthy person or society to prepare an elaborately illustrated Monograph on this organ of organs, treated psychologically and anatomically through the animal series, adding from time to time such knowledge as is obtained of its refinements, even now not completely understood.

is present, it is requisite, or at least very useful. To discuss on this occasion all the cases where it is present, and all where it is absent, is impossible. But, in order to understand the value of any one lens in an instrument, we must take into account the character of that instrument as a whole. And, bearing this in mind, it is not difficult to demonstrate the relation between the presence or absence of this lens and the circumstances of the creature in which it is present or absent.

It may be laid down as an axiom that there is no structure, which throughout the whole animal kingdom is more conformable to the general conditions of the individual, than the eye, and that without any regard to the place of that individual in the supposed scale of beings. It has, that is, exact relation to the physical habits and mental capacity of the animal, within the mechanical limits of the plan or type of the division in which the animal exists; of which only these two illustrations can here be given.

1. In animals of low nervous organization, and, as we infer, possessing little or no con-

sciousness, and few, if any, mental qualities, the lens proper is absent, and a cup-shaped spot of pigment terminates a nerve which becomes then the recipient of impressions from calorific rays. The direction of the light is made known as we suppose, and some pleasure perhaps imparted; but no accurate optical image can be formed, as far at least as we may argue from the laws of the formation of images on the retina of more complete eyes. The lens here can do, and does, neither harm nor good; for it is absent. This seems to be the case among *Acalephæ*, for instance, and in *Pecten*. The general character of such animals justify the deficiency.

2. In the higher animals generally, and in some of the lower, the eye is constructed on the type in which a lens is present.

This type, briefly stated, consists of a transparent refracting cornea, having a curve or facets varying according to the conditions of life; of a refracting medium anterior to a lens, which varies from a low degree of convexity, equal or different on either surface, to that of a sphere, this lens

D

being imbedded on the face of a fourth refracting medium (the vitreous humour). This optical apparatus has a moveable diaphragm in the more perfect eyes (by which spherical aberration is corrected). It brings rays of light to a focus on the termination of the optic nerve.

The nerve structures (*bacilli*, *cones*) on which these impressions are made, are, according to Kölliker, in man not more than 0,008''' broad. Now it is true, as Comte alleges, that the lens is not necessary for the transmission of light nor for the bringing it to a focus, if the focus be at a fixed point; or in other words, for objects at one distance. It is also true that an eye may be constructed with a simple refracting medium without a lens for viewing objects at one distance. Such seems to be the case with many insects; and truly their immoveable eyes constructed on this plan, with many thousand corneal facets, each having an elongated refracting medium, surrounded by delicate non-reflecting pigment, and corresponding nerve-fibrils of great tenuity, are very masterpieces of fine mechanism

among the finer mechanisms of life. Though they have no moveable lens, it cannot be said they do not ensure acute powers of vision. The rapid motions of the common dragon-fly, for instance, must satisfy any one as to the fact. But these eyes are not always the sole-imparters of the lessons from light. For in many insects, as for example the bee, there are additional eyes with a refracting medium arranged in the manner of a large biconvex lens. These eyes seem to be useful for seeing near objects, as the larger are for distant ones. To say that either separately or the two together are better instruments than those that have a lens, is to assert what I suppose is not the case: and at all events it cannot be proved<sup>t</sup>. But the fact is, that in the complexity of nature, such discussions become trifling to the serious student, who recognizes in every direction amid many things that are difficult to explain, and some things that cannot be explained, an adaptation of means to ends

<sup>t</sup> For most beautiful dissections of the eyes of the Bee, and of *Dytiscus*, see *Tafeln zur Vergleichenden Anatomie*, von Dr. Franz Leydig, Pl. 8 und 9.

to a degree and in a kind which is overwhelming from its beauty and diversity; and who, at all events, takes pleasure in seeing variations, resemblances, correlations and adaptations, and in learning what he can of cause of origin, of mode of development, and of decay; seeking for a knowledge of what is, and not cavilling, or dreaming what might have been.

To explain this, one quotation shall be made from John Hunter, as illustrating the many circumstances, which have to be taken into account in considering the fitness of any eye.

“An elephant has a smaller eye,” he says, “than a horse; a squirrel and a rat have much larger eyes than a mole; although the progressive motion of a mole may be nearly as great as either; but it has no occasion for immediate extent of sight; it wants to see objects near, but must have a succession of them, because his food has but little motion, therefore it seldom comes to him; and for these his progressive motion is adapted.

“An eagle has nearly as large an eye as an elephant, perhaps the largest eye of any bird in proportion to size. An eagle does



not want a succession of sight, for his food is not stationary; he therefore wants at once to take in a large sphere of vision, that he may have a better chance to discover his prey; for this is such as has, in general, a good deal of progressive motion; therefore if he were short-sighted, he might as well be stationary, and the food would in its course come within his sphere of vision; but by a large eye, he has two advantages, viz. that of its coming in his way, and his seeing it at a considerable distance.

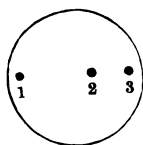
“The eyes of animals which see in the dark, and are also to see objects at some distance, are large, as much on account of the darkness as the distance of the object.

“The eye of an animal which can see an object at a mile’s distance in the middle of the day, ought to be much larger to see the same object at the twentieth part of that distance at night; but as a substitute for the want of size, the motion of the iris and the white pigment or background assists<sup>u</sup>.”

The whole argument shews that some vision is attainable without a lens, as many

<sup>u</sup> Hunterian Catalogue, by Owen; vol. iii. part i. p. 137.

seeing species have it not. The question of its exact use in man (as type of the highest sort) has been settled in an unanswerable manner. The lens, by alteration in form, adjusts the eye to distinct vision at varying distances. The fact suspected by Dr. Young has been proved by Cramer and Helmholtz. The proof depends on an observation of a very delicate nature, viz. on the position of images reflected from the cornea, and from the anterior and posterior surfaces of the lens. The images, except that on the cornea, are seen with difficulty, but by aid of Helmholtz's Ophthalmometer or Donders' Phacoidoscope, or other instruments, with precision<sup>v</sup>. The three images may be rudely



represented thus: 1 is the image on the cornea, 2 that on the anterior surface of the lens, 3 that on its posterior surface. On accommodating the eye to near objects, 2 approximates to 1; and 3 is nearly stationary. Therefore the front of the lens has approached the cornea: the back of the lens has remained at the same distance as before,

<sup>v</sup> See Appendix, Note C.

therefore the antero-posterior axis of the lens has lengthened, and the lens has become more convex.

That some adjustment is physically necessary in the human eye has been admitted ever since the eye has been philosophically studied. The only mode of adjustment certainly known in the animal series is by the lens. It follows that Comte's attack is at best relative, and not absolute. Adjustment for distances is necessary. It is executed by the lens, which obeys the intention of mind without effort on the part of those who use it. And here it is not unworthy of note, that the state of rest in the lens is adapted to distant objects.

Two questions remain: first, whether the admitted want would have been better supplied, as is suggested by M. Comte, by human contrivance. It is unnecessary to enter on this speculation till a better method is actually before us for examination; and meanwhile the following grave judgment recently expressed by Darwin, as the result of his most matured reflection, is of as great weight as any other opinion that could be

adduced, and all the more because his knowledge of fact in Natural History, quite apart from interpretation, must be allowed far to exceed that of M. Comte :—

“The more I study nature, the more I become impressed with ever-increasing force with the conclusion, that the contrivances and beautiful adaptations....<sup>w</sup> transcend in an incomparable degree the contrivances and adaptations which the most fertile imagination of the most imaginative man could suggest with unlimited time at his disposal<sup>x</sup>.”

Still there remains the second point, viz. that this lens, supposed by Comte to be so useless, and proved by Helmholtz to be so tenderly adapted to our necessities corporeal and psychical, is at all events calculated by its diseases to destroy altogether the action of the whole eye.

It is obvious that this attack is deprived of its sting if the organ be necessary. The sting is that a structure, which, at best, is useless, is placed in the middle of a delicate

<sup>w</sup> Some words, expressing his theory of natural selection and perpetual variation, are omitted.

<sup>x</sup> Darwin's Fertilisation of Orchids, p. 351.

instrument; that when itself is injured, it destroys the operation of the necessary portion: and that it is often injured.

To this the answer is, that in certain types of the finer kinds of vision the lens is, so far as we can see, necessary; and this is proved by the fact that, though, when it is removed, its loss may be to some extent compensated, yet the power of internal adjustment for distance is absolutely destroyed. It only therefore remains to discuss the diseases of it. The diseases are due to one of two causes: either to the general laws of change which in our world belong to all organic things, or else to evils incident to this structure and peculiar to it. It would not be sufficient, however, to shew that peculiar evils exist. For this is an exceptional structure for an altogether exceptional purpose, namely, the transmission of light through an organic whole; and requiring mathematical precision in respect of form, specific gravity, and refractive power generally. It must be shewn that the peculiar evils exist *per incuriam*, as it were. And this is presumably

the allegation of M. Comte. For the force of the charge is, as was said above, that the arrangement might altogether have been better. In reply to this, we can only repeat that the better way must be stated before it can be considered. Meanwhile we can discuss only the actual and existing way.

The real attack is, then, that the lens becomes diseased. It must be briefly but emphatically asserted in answer, that more arrangements exist for the protection of the eye (the lens included, of course) than for any other structure in the body; that the structure of the lens is almost exceptionally complicated; that it is altogether beyond human skill to imitate its minute structure; and that, considered as a whole and as it is, it suggests in a marked degree the feeling so prevalent among thinking persons of all ages,—a feeling increased by every modern research,—of helpless wonder that it can either be made at all, or, when made, that it can be maintained.

But still the lens does become diseased. It is almost pitiful to have to say that this is only one of the absolutely inscrutable

circumstances attending our whole condition. Why there is Physical Evil — Why there is Moral Evil, are questions, if not unanswerable, at least not yet answered. All we can say is, for us evil in all its forms, physical or moral, is but that, “against which the whole preventive force of our nature” may be and ought to be unceasingly exerted. The case therefore of the eye differs not from other cases: the only question should be, Is there more disease and failure in this beautiful structure than elsewhere? Of kindred non-vascular structures, certainly not. Statistics on such a point are at present impossible, but ordinary experience will shew that there is a vast preponderance of persons who have, at the worst, useful working power of vision, over those who have not.

Then for those who have not this working power (as far as the lens is concerned) their disorders resolve themselves, speaking generally and excluding heterologous deposits or traumatic injury, into disorders of the two elements, speaking histologically, of which

<sup>y</sup> Boole, *Laws of Thought*, p. 418.

the lens is composed. But the arrangement of these elements must be known before we can properly understand the abnormality<sup>z</sup>.

The arrangements of the lens are simple: it is enclosed, as all know, in a delicate capsule. This membrane or capsule—perfectly transparent, bounded by a layer of transparent cells—allows transmission of nutrient plasma to the lens within. The lens itself is composed of tubes, placed in close apposition, more firm in the centre than towards the surface, and about .0025" to .005" broad<sup>a</sup>. These tubes are arranged in regular lamellæ; and these are united in such a way as to constitute the well-known stellate figure, which is shewn by preparation in the lens removed from the body, in the infant, and in early cataract.

In many animals the tubes or fibres are minutely denticulated at the edges. Sir David Brewster calculated that in each lens of the

<sup>z</sup> It has been lately described in detail, both in respect of its normal and abnormal structure, by Warlomont and Testelin, the able French translators of Mackenzie on the Eye.

<sup>a</sup> These are Kölliker's measurements. See *Manual of Human Microscopic Anatomy*, p. 568, ed. 1860.



codfish there are five million fibres, and sixty-two thousand five hundred million lateral dentations<sup>b</sup>.

These structures—(1) the fibrous structure, and (2) the capsule—are liable to disorder. The lens is occasionally inaccurately placed; and is in its original formation, or congenitally, sometimes diseased, that is to say, not correctly made *ab initio*.

The alterations are chemical or mechanical, or both. That is to say, the chemical constituents of the lens either in their original affinities or in the progress of their interchange in life, acquire combinations unfavourable to the normal properties of the lens. Fat, cholesterine, or earthy salts become deposited, and the changes produce opacity, fluidity, hardness, change of form, and partial or total loss of the correct performance of the astonishing mechanism.

But now, the qualities necessary for the lens—preservation of an exact mathematical figure, perfect transparency, power of growth and of nutrition after formation, and alteration of figure for accommodation—are,

<sup>b</sup> Phil. Trans., 1833, p. 329.

and have been for untold ages, secured by the contrivances just described in millions on millions of individuals at every moment of time. Loss of figure, loss of power of nutrition alone would impair, in the nature of the case, the perfection of the quality in such a structure. Alter transparency, index of refraction, elasticity, in ever so small a degree, and the instrument is *destroyed*, or, short of that, *impaired*. Let us ask calmly, Is it *possible* in the existing order of the universe, where certain chemical elements by perpetual change of combination, so-called organic combination, endure for a while, pass off to enter into new combinations, and in the case of animals subject to conditions ever varying, whether of heat, moisture, position, or facility of access to fresh elements,—Is it possible, I say, that these combinations can go on in these myriads on myriads of organisms without occasional disturbances, as we call it—but, in truth, in general obedience to a *higher law of order than the condition of the individual*? Is it not rather a matter of extreme astonishment that the disorders of the lens are so infrequent, especially in the case

of civilized man, whose life is so artificial, and so unfavourable to rude health?

This then is the fact, that upon the whole and in the vast majority of instances an instrument is made, and maintained for some scores of years, by which with the help of contrivances adapted to it, we men (let alone the endless diversity of purposes in animals) are able to determine with the utmost precision, on the one hand, facts of position and colour in bodies at distances, if not infinite; yet beyond the power of measurement with the earth's orbit as the base, and on the other, to appreciate with the most perfect distinctness dimensions of even much less than the twenty-five millionth's of a square inch in area.

And, further, this instrument which has these optical and mechanical capabilities stands in exact relation to the mental powers in man, which enable him to profit by its provision, to use its revelations, to speculate on its teachings, to learn its lessons, and to analyze its nature.

Some apology should here be made both for the brevity and for the length of these

remarks upon the lens. For the brevity, to those who are not intimately acquainted with it; for the length, to those who are. They have been confined, it will be noticed, purely to the lens in its most restricted sense; and with regard to it they are of the most scanty kind. But the lens is not really more remarkable than other structures of the eye, and not so complicated by much as the retina. Had another part been selected by M. Comte for his crucial instance, nearly the same lesson would have been learnt, though we are not able now to appreciate and prove with as great exactness the properties of all its parts alike. Sufficient must have been said to enlist the sympathy of philosophic minds with members of an Institution such as is this, who, while themselves engaged in the serious study of the material world *as it is*, are compelled to see passing current among teachers of men, such as M. Comte assumes to be, sharp criticisms on what they admire and love—criticisms made apparently in great ignorance of facts. If the present occasion may be the means of awaking any such teachers of men

to the stern necessity of seriously looking into the actual structure of the material world, into what is its Order, and what are the facts of its apparent and inscrutable Evil, before dogmatically pronouncing upon the lessons it inculcates, then this discussion, however incomplete, will not have been in vain.

The consideration of Comte's attack on Final Causes, and specially on the Eye, may now be dismissed. The attempt of the Reformer of Philosophy appears to me to fail absolutely and hopelessly; and to give no support to the doctrine in behalf of which it is made. Yet the most remarkable answer to it has been withheld,—remarkable as coming from M. Comte himself, after the completion of his work on Positive Philosophy.

“The order of nature,” says M. Comte, “is doubtless very imperfect in every respect; but its production is far more compatible with the hypothesis of an intelligent Will, than with that of a blind mechanism<sup>c</sup>.”

<sup>c</sup> This passage is referred to by Mr. Mill in the “Westminster Review” for April, 1865. Mr. Mill was so good

It is unnecessary to add another word. No student of Nature worthy the name looks on the problem of this world as other than vast and inexplicable. He pretends no more than to see as by an image, darkly, and to bend before the Cause of all, which is by us unattainable, by us only mediately comprehensible.

---

We therefore part from the instance adduced by M. Comte, and return to weigh in a direct manner the influence of the notion of Final Cause on the minds of those who, like Harvey and Boyle, neither abuse it on the one hand nor reject it on the other.

In the first place, it may be said that if a man believes on the whole that behind all which we see and know there has ever been a Supreme Intelligence, and if he accept this interpretation in preference to that of fatal

as to refer me to the work where it is to be found. The words I have quoted from the English version by Dr. Bridges. See "A General View of Positivism," p. 50. (London, Trübner and Co., 1865.)

necessity or blind chance, then all contrivance becomes harmonious and probable. The Being of God accepted, the study of all things becomes a work of love, as it is a study of fact. When men are seen to dread the effect of Physical Science, it is not unreasonable to mistrust either the extent of their Culture or the strength of their Faith. But as without doubt there is an ignorant and superstitious, as well as cultivated and rational belief, the question remains to be answered, Did Harvey ignorantly and blindly hold dogmas in this matter which modern Science repudiates? There is no sign of it.

Harvey did, no doubt, believe in a Supreme Intelligence and Will. Modern Science has no proof against the soundness of this belief. An objection such as Comte's is an instance of a dogmatic assertion as arrogant as any ever made by religionists. All science goes to prove the existence of Order; and in Order<sup>d</sup> there is nothing that we *know* to exclude Design. Science is only the collection of what is proved in a certain

<sup>d</sup> See Appendix, 'Note D.

way, and arranged in a certain order. All questions not so arranged are, as far as Science is concerned, open. Science is only true in respect to the data discovered at a given epoch. Other data arise, and Science alters.

There are in Science three phases markedly distinct :

1. Mathematical and Arithmetical Truths, which are called *necessary*, i.e. which could not, so far as we know, be or have been otherwise: (as two straight lines cannot enclose a space).

2. Physical Truth, or uniform Laws of Nature, which, so far as we know, never vary, but which, so far as we know, might have been otherwise: (as organic types and their modifications).

3. Hypothetical Laws, which seem indeed to bind phænomena together, but which are not yet proved to be the true account of the matter, or may not be true: (as doctrines of Special Creations or of Natural Selection).

Not one of the bundles of real or supposed Truths contained in these divisions militates against the idea of a Supreme Intelligence. But Science as it advances has a tendency



to relegate the third into the second, and to confound the second with the first. Without attempting here to examine the metaphysical character of the first phase, it is plain that there is no colour for the assumption that the second is of that absolute and unchangeable character which would justify a philosopher in rejecting the notion of a Wise Creator and Governor of the Universe. Certainly this was not the tendency of Harvey's mind. His education and his epoch made him, as a believer, reverential: he was by nature modest, and being a sound observer he was neither superstitious nor illogical. The enquiry into what he did and believed will bring us to the correct understanding of what seems to be reasonable and what unreasonable in the belief in Final Cause.

Harvey was not guided in his discovery of the Circulation of the Blood by any metaphysical speculation or religious dogma whatsoever. He was learned in the learning of his age, and preeminently in that which was required from a Physician of that age, a knowledge of Hippocrates, Aristotle, Galen, and their followers. As he was well

acquainted with their writings, so their views doubtless gave colour to his mind. But far above all he was taught by Nature. A contemporary of Lord Bacon, he was not his disciple, though he was his Physician. Indeed Bacon's rash assertions in Natural Philosophy were offensive to him. He had the intellectual constitution of the great Reformer of Philosophy, with, as events shewed, a more practical power of applying it to the study of Nature. Without detailing all the steps by which he pursued his enquiry, it is thus he argues :—

“ Thus far I have spoken of the passage of the blood from the veins into the arteries, and of the manner in which it is transmitted by the action of the heart; points to which some, moved either by the authority of Galen or Columbus, or the reasonings of others, will give in their adhesion. But what remains to be said upon the quantity and source of the blood which thus passes, is of so novel and unheard-of character, that I not only fear injury to myself from the envy of a few, but I tremble lest I have mankind at large for my enemies, so much doth wont and custom, that become as an-

other nature, and doctrine once sown and that hath struck deep root, and respect for antiquity, influence all men. Still the die is cast, and my trust is in my love of truth, and the candour that inheres in cultivated minds. And sooth to say, when I surveyed my mass of evidence, whether derived from vivisections, and my various reflections on them, or from the ventricles of the heart and the vessels that enter into and issue from them, the symmetry and size of these conduits—for nature, doing nothing in vain, would never have given them so large a relative size without a purpose—or from the arrangement and intimate structure of the valves in particular, and of the other parts of the heart in general, with many things besides, I frequently and seriously bethought me, and long revolved in my mind, what might be the quantity of blood which was transmitted, in how short a time its passage might be effected, and the like ; and not finding it possible that this could be supplied by the juices of the ingested aliment without the veins on the one hand becoming drained, and the arteries on the other getting ruptured through the excessive charge of blood, unless the blood should

somehow find its way from the arteries into the veins, and so return to the right side of the heart; I began to think whether there might not be A MOTION, AS IT WERE, IN A CIRCLE. Now this I afterwards found to be true; and I finally saw that the blood, forced by the action of the left ventricle into the arteries, was distributed to the body at large and its several parts in the same manner as it is sent through the lungs, impelled by the right ventricle into the pulmonary artery, and that it then passed through the veins and along the vena cava, and so round to the left ventricle in the manner already indicated<sup>e</sup>."

"But, lest any one should say that we give them words only, and make mere specious assertions without any foundation, and desire to innovate without sufficient cause, three points present themselves for confirmation, which being stated, I conceive that the truth I contend for will follow necessarily, and appear as a thing obvious to all. First—the blood is incessantly transmitted by the action of the heart from the vena cava to the arteries, in such quantity that

<sup>e</sup> Harvey's Works,<sup>1</sup> translated by Willis, pp. 45, 46. Lond. 1847.

it cannot be supplied from the ingesta, and in such wise that the whole mass must very quickly pass through the organ; second—the blood, under the influence of the arterial pulse, enters and is impelled in a continuous, equable, and incessant stream through every part and member of the body, in much larger quantity than were sufficient for nutrition, or than the whole mass of fluids could supply; third—the veins in like manner return this blood incessantly to the heart from all parts and members of the body. These points proved, I conceive it will be manifest that the blood circulates, revolves, propelled and then returning, from the heart to the extremities, from the extremities to the heart, and thus that it performs a kind of circular motion<sup>f</sup>.”

“To those who repudiate the circulation because they neither see the efficient nor final cause of it, and who exclaim *Cui bono?* I have yet to reply, having hitherto taken no note of the ground of objection which they take up. And, first, I own I am of opinion that our first duty is to enquire whether the thing be or not, before asking wherefore it is; for from the facts and

<sup>f</sup> Harvey's Works, translated by Willis, p. 48.

circumstances which meet us in the circulation admitted, established, the ends and objects of its institution are especially to be sought g.”

“Whoever, therefore, sets himself in opposition to the circulation, because, if it be acknowledged, he cannot account for a variety of medical problems, nor in the treatment of diseases and the administration of medicines give satisfactory reasons for the phænomena that appear; or who will not see that the precepts he has received from his teachers are false; or who thinks it unseemly to give up accredited opinions; or who regards it as in some sort criminal to call in question doctrines that have descended through a long succession of ages, and carry the authority of the ancients;—to all of these I reply: that the facts cognizable by the senses wait upon no opinions, and that the works of Nature bow to no antiquity; for indeed there is nothing either more ancient or of higher authority than nature h.”

And again:—

“That all this is so, sense assures us; and

g Harvey's Works, translated by Willis, p. 122.

h Ibid. p. 123.

necessary inference from the perceptions of sense takes away all occasion for doubt. Lastly, this is what I have striven, by my observations and experiments, to illustrate and make known; I have not endeavoured from causes and probable principles to demonstrate my propositions, but, as of higher authority, to establish them by appeals to sense and experiment, after the manner of anatomists<sup>i</sup>."

Harvey's own words, therefore, demonstrate how entirely he ranked observation above reasoning, and yet how he asserted the supreme force of correct reasoning upon fact, whether ascertained by simple observation of Nature or by experiment. How widely he, the first great English Comparative Anatomist, did observe and experiment, the list of animals of which he speaks (not, however, always correctly) will testify.

Here the matter might rest, were it not that Harvey is sometimes censured for his allusion to Aristotelic Causes in his discussions on the generation of animals. Critics who misunderstand the bearing of the

<sup>i</sup> Harvey's Works, translated by Willis, p. 134.

famous passage of Lord Bacon, "*Causarum finalium inquisitio sterilis est; et tanquam Virgo Deo consecrata, nihil parit,*" may well be supposed to misunderstand Harvey's modest though too metaphysical disquisition on the Final Cause of an egg.

Aristotle distinguished four kinds of Cause, viz. Formal, Material, Efficient, Final<sup>k</sup>. The notions attached to these terms ruled all thought. Of these, the only one to which in modern science the name of Cause is given, is the Efficient. To call Matter a Cause of existence is use of words which no one would now adopt. But the most favourite of Aristotle's Causes, was the Form or Real Nature of the thing, which he proceeds to identify with both the Final and the Efficient Cause; the Real Nature or Essence of a thing being the End which is to be wrought out, and also the agent which works it out. And the same metaphysical refinement had overpowering attractions for

<sup>k</sup> For a brief analysis of these see Lewes' Aristotle, pp. 129, and sqq.; a book of great interest for any one who desires to see the present general relations and combinations of questions in which ancient and modern thought in physical science, metaphysics, and theology are concerned.



the mediæval minds. To them, nursed on the milk of Aristotle, the Form or Real Essence of things, and the Purpose for which any change takes place or any being exists, were the most interesting. But it is clear, for the reason already quoted from Descartes, that the purpose cannot be certainly known. Therefore, as Science is a methodized collection of what is certainly known, Final Causes (as they are still unfortunately called) or the investigation of the Divine purposes, however fascinating, however ennobling, must be simply speculative, and not cumulative of fact. There may be always purposes; we may be sure that often there are purposes beyond what we can see, if there be any purposes at all. Whether there be any is the object of Theological and Metaphysical, but not of Physical enquiry. As a man, the Physicist may suspect their existence, delight in their contemplation, provisionally employ them for hypothesis, but he may not use them as scientific data. When Harvey told Boyle<sup>1</sup>

<sup>1</sup> "Robert Boyle was much interested in this question. The elaborate treatise which he wrote on Final Causes, is

“that when he took notice, that the valves in the veins of so many parts of the body were so placed, that they gave free passage to the blood towards the heart, but opposed the passage of the venal blood the contrary way; he was invited to imagine, that so provident a cause as nature had not so placed so many valves without design; and no design seemed more probable, than that, since the blood could not well, because of the interposing valves, be sent by the veins to the limbs, it should be sent through the arteries, and return through the veins, whose valves did not oppose its course that way<sup>m</sup>,” he in fact only used that common sense without which no investigation is possible. A bar that cannot pass through a ring, *could* not have been intended, by a skilful workman, to go through it. A bar

even now worth perusal for his good sense and fairness. See vol. v. of his Works in 4to. 1772. Dugald Stewart, in an equal dispassionate Essay, quotes him with much respect. Even now, these authors could not much alter conclusions, in which there is strong faith with no fanaticism.” Boyle’s conclusions are printed in the Appendix, Note E.

<sup>m</sup> Boyle’s Works, ed. 1772, vol. v. p. 427.

that could enter *might* have been so intended. But after all such observations prove no more than that a fact or phænomenon is so, not that it was intended to be so. The evidence of intention is metaphysical, and depends on probabilities. It is not positive. It is inferential, from many considerations. Harvey does not, in speaking of the heart, enter into speculations. He adduces proof. But it must be acknowledged, that when Harvey speculates on the Final Cause of a chick, he confessedly and designedly deserts physical enquiry for metaphysical speculation. But even here, where we see his mind struggling in the meshes of the Aristotelic Causes, and labouring to identify the Form or Idea of the chick with its End or Purpose, there break through the cloud gleams of good sense and wisdom, such as might be expected from so practical an anatomist and experimenter. But he was not a man who would readily lay stress on data which were not proper as such ; and his discussion on the Final Cause of the chick is wholly apologetic, so far as anatomical enquiry is concerned.

He has been adducing arguments to shew how ideas formed in the brain produce material results:—

“We, from the conception of the ‘form’ or ‘idea’ in the brain, fashion in our works a form resembling it;” i. e. the formal or generative Idea becomes the End which we aim at producing. . . . “The painter, by means of conception, pictures to himself a face, and by imitating this internal conception of the brain, carries it out into act; so also the builder constructs his house according to previous conception. The same thing takes place in every other action and artificial production.”

“In truth, there is no proposition more magnificent to investigate or more useful to ascertain than this: How are all things formed by an ‘univocal’ agent? How does the like ever generate the like? And this not only in productions of art (for so house builds house, face designs face, and image forms image), but also in things relating to the mind, for mind begets mind, opinion is the source of opinion. Democritus with his atoms, and Eudoxus with his chief good, which he placed in pleasure, impregnated

Epicurus; the four elements of Empedocles, Aristotle; the doctrines of the ancient Thebans, Pythagoras and Plato; Geometry, Euclid. By this same law the son is born like his parents, and virtues which ennoble and vices which degrade a race are sometimes passed on to descendants through a long series of years. Some diseases propagate their kind, as lepra, gout, syphilis, and others. But why do I speak of diseases, when the moles, warts, and cicatrices of the progenitor are sometimes repeated in the descendant after many generations<sup>n</sup>? ‘Every fourth birth,’ says Pliny<sup>o</sup>, ‘the mark of the origin of the Dacian family is repeated on the arm.’ Why may not the thoughts, opinions, and manners now prevalent, many years hence return again, after an intermediate period of neglect? For the divine mind of the Eternal Creator, which is impressed on all things, creates the image of itself in human conceptions.

“ To illustrate the matter, let A stand for the fecundated egg (the ‘matter’ that is of the future chick), which is alterable or

<sup>n</sup> Arist. Hist. Animal. lib. vii. cap. 6; et De Gen. Anim. lib. i. cap. 17.

<sup>o</sup> Lib. vii. cap. 11.

convertible into the chick, and is in fact the chicken *in posse*. Let B be that which fecundates the egg, and thus distinguishes it from an unfruitful egg, *i.e.* the 'efficient cause' of the chick, or that which puts the egg in motion, and converts it into a chick. And let C be the chick, or 'final cause,' for the sake of which both the egg and that which fecundates the egg exist, the actual chick, namely, or 'reason' why the chick is.

" Now we take for granted, as demonstrated by Aristotle<sup>p</sup>, that every prime mover is 'combined with' that which is moved by it. And these things are more particularly said by him to be 'together' which are generated or produced at the same moment of time: thus that which moves and that which is moved are actually together, and where one is there the other is also; for it is evident that when the effect is present the cause must be so too.

" Whenever, then, A (*i.e.* the fecundated egg) is actually in being, B (*i.e.* the internal moving and 'efficient' or fecundating cause) is also actually in being. But when B is actually in being, C also (*i.e.* the immaterial

<sup>p</sup> Physiologia, lib. vii. cap. 3.

‘form’ of the chick) must, at least in some sort, be existing too. For B is the internal efficient cause of the chick, that, namely, which alters A (the egg) into C (the ‘reason’ why the chick is). Since, then, everything which moves coexists with that which is moved by it, and every cause with its effect, it follows that C coexists with B; for the ‘final cause,’ both in nature and art, is primary to all other causes, since it moves, and is not itself moved; but the ‘efficient’ moves, because it is impelled by the ‘final cause.’ There inheres, in some way or other, in every ‘efficient cause’ a *ratio finis* (a final cause), and by this the efficient cooperating with Providence is moved<sup>1</sup>.”

The whole discussion is interesting and well worth the attention of philosophic thinkers, as revealing the mental working of an eminent man in what in Art is called a Transition period—when two good styles are mingled, the advancing and the retreating tide exhibiting temporary forms. It is strange to find a man so practical as Harvey, so careful in observation, so exact in experiment, yet involved in these speculative doc-

<sup>1</sup> Harvey's Works, translated by Willis, pp. 582, 583.

trines of the Aristotelic school. It is strange to reflect that Bacon should have indignantly thrown aside these doctrines, but yet should have indulged in particular speculations in Physics, as unfounded as any that can come from the ancient school; and that Harvey, who in his investigation of the Circulation of the Blood gave a model of sound scientific procedure, should yet hold by the speculative doctrine of Causation, which Bacon had rejected. It is an instructive thing for us, who are living in an epoch as transitional and far more critical than that of Harvey. Calm judicial qualities are rare. The mass of scientific details which a man must master, the impatience of old notions, the dread of theological interference with progress on the one hand, and the just fear that man is to be in future allowed to hope for nothing that he cannot scientifically prove, make any general survey of metaphysical, religious, and scientific combinations, mistrusted or suspected by all parties. Yet this is to be deplored. Though one philosopher on behalf of Science may seek to eject from rational belief all that cannot be



proved, and though the logic of another may urge us to renounce on behalf of Theology such trust in the Infinite as is mainly supported by analogy with the Finite, yet assuredly this state is essentially transitional. If the disciples of Aristotle followed one part of their great Master's teaching to the neglect of the other, and were consequently chastised in epigram by Bacon's satire, we need not be guilty of similar excess, and seizing on Bacon's stricture on the ABUSE of Final Causes forget his exposition of their USE.

“The second part of *Metaphysics*,” he says, “is the enquiry of Final Causes; which we note not as omitted, but as misplaced: for the enquiry of them usually is made amongst the *Physiques*, and not in the *Metaphysiques*. .... And yet if this were a fault in order only, I should not much stand upon it, for order is a matter of illustration, and pertains not to the substance of Sciences; but this inversion of order hath caused a notable deficiency, and brought a great decay upon Philosophy. For the handling of Final Causes in the *Physiques*, hath intercepted and banished the enquiry of Physical

Causes; and hath given men occasion to rest satisfied in such specious and umbratulous causes; and not thoroughly to urge and press the enquiry of Real and truly Physical Causes. For this I find done not only by Plato, who ever ancreth upon that shore; but also by Aristotle, Galen, and others, who usually likewise fall upon these flats. For to say, That the eye-lids furnisht with hairs are for a quick-set and fence to fortify the sight: or that the firmness of skins, and hides of living Creatures, is to repel the extremities of heat and cold: or that Bones are ordained by Nature for Columns and Beams whereupon the frame of the Body is to be built: or that trees shoot forth leaves to shadow and protect the fruit from the sun and the wind: or that the Clouds are engendered above, to water the earth below: or that the earth is close-compact and solid, that it may be a Station and Mansion for living Creatures, is properly enquired in Metaphysique; but in Physique they are impertinent<sup>r</sup>.”

And further on he writes:—

“Aristotle is more to blame than Plato,

<sup>r</sup> Advancement of Learning, lib. iii. cap. 4.

seeing he hath omitted the fountaine of all finall causes, God; and in the place of God substituted Nature; and hath embraced Final Causes rather as a lover of Logique, than an adorer of Divinity. Nor do we therefore speak thus much, because those Final Causes are not true and very worthy the enquiry in Metaphysique Speculations; but because while they sally out, and break in upon the Possessions of Physical Causes, they do unhappily depopulate and waste that Province. For otherwise if they keep themselves within their precincts and borders, they are extremely deceived who ever think that there is an enmity or repugnancy between them and Physical Causes. For the Cause rendered, That the hairs about the eye-lids are for the safeguard of the sight, doth not indeed impugn that other Cause; that pilositie is incident to Orifices of Moisture, (*Muscoli Fontes, &c.*) . . . . Nor the Cause rendered, that the firmness of Hides in Beasts is for armour against the injuries of extreme weather, doth impugn that other Cause; That that firmness is caused by the contraction of Pores, in the outward parts of the body, through cold and depredation of ayre; and

so of the rest: both causes excellently conspiring, save that, the one declares an intention, the other a consequence only. Neither does this call in question, or derogate from Divine Providence; but rather wonderfully confirms and exalts it<sup>s</sup>."

Here we pause, and sum up the whole as regards the character of Harvey. HARVEY, believing in God, believed that there is purpose as well as harmony in the material world. He acted in this faith, and, using his reason aright, he made a mighty discovery which has influenced every biological student to this day, and will influence them to the end of time. COMTE, believing that theological tendencies are mischievous, and that the idea that the course of "NATURE is the ART of God" is mistaken and absurd, attacked one of the chiefest of these artistic works with sarcasm, which, from its assumption and its ignorance, recoils on himself, notwithstanding his knowledge and genius. BACON, who is sometimes put forward as a keen opponent of the belief that we can see evidence of Design in Nature, objects only to the misuse

<sup>s</sup> Advancement of Learning, book iii. cap. 4.

of the Method,—misuse which must occur whenever persons fancy that they are studying the means when they are but asking the purpose. As strongly as any man, Bacon holds up the contemplation of Ends in Nature as work worthy of a philosopher, in its proper time and for its proper purpose.

Of Harvey, then, we may here be satisfied that even in a purely scientific point of view his methods were right. By observation, by experiment, by reason; by faith in a Supreme Will, whom the reason cannot comprehend, but whom the heart can approach, in modesty and in patience he pursued his task. In the closet and by the bed-side, in the dissecting-room or in the outer world, may we think from time to time of that keen and gentle spirit whom the marble by our side has made so familiar; a spirit that may safely be looked up to by all students of Nature, who, whether they are ascending the hill of life, or, having reached its summit, are looking down the slope on the other side, are willing to learn not those lessons only which rigid proof impresses with the force of necessity; but can listen to those

subtler sounds which stir to hope and belief the willing heart, rising faintly yet certainly from time to time, as a wayworn traveller hears ever and anon the deep though distant roar of ocean on an unseen shore !

In conclusion, it should be borne in mind that the object of this Essay has been not so much to consider the bearing of the whole of Harvey's methods of research, as to examine, as far as time would permit, whether one conviction of his mind, the correctness of which is now much called in question, is to be repudiated as unworthy a scientific man. It must be remembered that we claim for the scientific student the privilege of using all methods of intellectual progress which the laws of thought allow. But the same method is not applicable to all subject-matter. If into pure science anything be admitted which is not based either on correct observation, or legitimate logical deductions from it, the whole constructed fabric totters as Science. Hypotheses, when employed, are to be narrowly watched, lest they slip into the category of accepted Fact.

The right appreciation of the character of

Science ought to cement into close union the Theologian and the Scientific man, instead of, as now, too often dividing them. What do I know? what do I hope? and what reasonably believe? are widely different questions. But they are correlative one of the other, and together make the sum of that portion of human experience by which man strives to work his way in the labyrinth of his present state.

Though we are not in this place unconscious of these things, it is not our special work to harmonize them. The comprehensiveness of Harvey's character, and the crucial instance of the Positivist leader, have drawn us into the discussion of them. Our ordinary duty, however, is clear enough. It is the duty well discharged by such as Kirkes and Baly, among those that are recently gone; by many yet living; and will be, we hope, by many more yet to come, under the increasing advantages of education, and the great opportunities of this Metropolis. It is the duty of precise and accurate observation of the structure of man in health and in disease,—tested and examined with all the

means supplied by an age of unprecedented research and industry, and a time of unexampled material reward from the "*Vera indagatio Naturæ*." The study of Physics, Chemistry, and the Microscope, draw on the Healing Art each day step by step more near to an Accurate Science, where facts are fully proved, where argumentation is rightly used, where loose opinions are discarded, and where every error, so far as may be, is guarded against.

It is not too much to express the hope that we, on the one hand, are doing all that in us lies to possess ourselves of these accurate powers; and on the other, that the public will become so instructed in the principles of Science as to be able to appreciate the immense progress that has already been made in the cultivation of sound and scientific medicine, and to estimate justly the great acquirements now expected of our younger well-trained men !



## APPENDIX.

### NOTE A, to p. 10.

"IF we consider microscopical observations, for instance, and perceive very numerous species of animals in a single drop of water, robbers accoutred with instruments of destruction, and which, whilst intent on persecuting others, are overwhelmed by still more powerful tyrants of this aqueous world; when we see the enmity and strife, the power, and the scene of rebellion in a single globule of matter, and look up in a clear night and behold the immense space filled with worlds which appear like particles of dust; no human language has words to express the feeling which such an intuition excites, and all subtile metaphysical dissections yield to it very much in point of grandeur and sublimity."—Kant's *Metaphysical Works*, translated by J. Richardson, pp. 134-136.

### NOTE B, to p. 13.

"As to the manner of demonstrating the first, I shall, without entering into deep speculations, like some philosophers, seriously intreat every one, that with a composed mind, and divesting himself of his passions and prejudices, he would silently set down and seriously consider, *First*, in case he should see that

1. Not one, but a great many,
2. And various or different

3. Things entirely ignorant, or unknowing of all, and even of themselves too :

4. Each of them frequently after a particular manner

5. However always unchangeably, and observing the same rule ;

6. Do act and move not once, but upon many occasions and times.

7. And not one of all them able to impart such *motion* to itself ;

8. Nor unless they thus come together of themselves, can produce one single effect without their own knowledge :

9. In the production of which effect or thing, if some few circumstances only, or oftentimes but one single one were wanting, it could not either be produced at all, or at least not in its due perfection ;

10. Although that same effect should in itself be of great use and service, and sometimes of the utmost importance.

Could he imagine otherwise than that all these things are formed to that end, and brought together with that design, to work such an effect as we observe to be produced by them ?

And, *Secondly*,

Supposing this first to be true, since these things are in themselves ignorant and unknowing of all that passes ; whether everybody must not agree, that they are all produced, and made to concur by a wise and understanding agent, who had such an end and design in his view ? And whether any one can persuade himself that mere chance, and unknowing laws of nature or other causes ignorantly cooperating, could have place therein, and could have directed and governed these things in all their circumstances and motions for such a purpose ?

That this may be shewn after a more plain and not less certain manner, let us apply to some particular thing what has been just now advanced in general, and as it were in an abstracted manner ; and let us suppose that in the middle of a sandy down, or in a desert and solitary place, where few people are used to pass, any one should find a watch, shewing the hours, minutes, and days of the months, and having examined the same, should perceive so many different wheels, nicely adapted by their teeth to each other, and that one of them could not move without moving the rest of the whole machine ; and should farther observe that those wheels are made of *brass* in order to keep them from rust ; that the spring is of *steel*, no other metal being so proper for that purpose ; that over the hand there is placed a clear glass ; in the space of which if there were any other but a transparent matter, he must be at the pains of opening it every time to look upon the hand : besides all which, he might discover in it a hole, and exactly opposite thereto a little square pin : he would likewise see hanging to this same watch a little key composed of two pieces, making a right angle together ; at the end of each of which there was a square hole so ordered that one of them was exactly adapted to the little pin in the said hole, which being applied thereto a chain would be wound up, and a spring bent, by which means the machine would be continued in motion, which otherwise would be in an entire rest : he might also find that the other square cavity, at the end of the little key, was adapted to another pin or instrument, which being turned this way or that, makes the hand move faster or slower. At the other end of this little key there would be a flat handle, which being moveable therein, might give him the conveniency that in the winding it up he should

not be obliged to take hold of it at every turn of his fingers.

Lastly, he would perceive that if there were any defect either in the wheels, spring, or any other parts of the watch, or if they had been put together after any other manner, the whole watch would have been entirely useless.

Now the question is, in order to form a kind of demonstration from hence, *First*, Whether anybody can imagine that such a watch among other purposes to which it might perhaps be serviceable, was not likewise made for this end, that it should shew the hours, minutes, and day of the month. *Secondly*, Whether he should make the least scruple to admit it for a truth that such a machine was made and put together by an understanding artificer for this very purpose, who, when he made it himself, knew that, and to what end he had made it.

And *Thirdly*, Whether it be possible that he can persuade himself that this watch, with all belonging to it, the niceness of its make, figure of so many parts, and other contrivances for shewing the time, could have acquired its being and form by mere chance only, which operated indifferently one way or another, and without any certain rule or direction.

Or otherwise, whether he could expect to pass for a man of sense and understanding, if, having found this watch in a solitary place, he should pretend to believe that it was not made by a skilful workman, nor that its parts were put together with judgment; but that there was a certain ignorant and yet necessary law of nature prevailing in the world that had brought into a regular method all the parts of which this watch consisted, and had adapted each of them to the use of shewing the time of the day; and especially that such a law of nature was not only ignorant

and unsensible of all that it did, or brought to pass, but likewise, that no being, endued with any wisdom or understanding, had established and produced this law at the beginning, or in the least contributed to the making the several parts that composed a machine proper to shew the hours.

What has been said above concerning a *watch*, is not less applicable to all other artificial works ; it will be therefore unnecessary to allege any further examples of *mills, ships, sluices, houses, paintings, &c.*, in all which the wisdom and understanding of the maker does equally appear.

*Finally*, We may apply all that has been said above to demonstrate that there is such a Wise, Mighty, and Merciful Being as GOD, in case we can make appear with as great (not to say a much greater) certainty and conviction, from the construction of the visible world, and all that passes therein, that there is a GOD and Great Creator, who in wisdom has made them all ; as we can shew from the structure of a watch, and the uses that result from the same, that it has been made and put together by a judicious and skilful workman ; and this we doubt not of doing in the following contemplations, with all necessary clearness."—pp. xlv–xlvii of Preface to Nieuwentyt's *Religious Philosopher*, translated by J. Chamberlayne. Lond., 1718, 3 vols. 8vo.

#### NOTE C, to p. 38.

HELMHOLTZ's Ophthalmometer may be obtained from the obliging and able constructor, Herr Dr. Meyerstein, Göttingen ; Professor Donders' Phacoeidoscope either from Utrecht or from Messrs. Powell and Lealand, London. This last instrument, though not necessary for shewing the images, is of great help ; but it does not supply the

G

place or perform the work of the Ophthalmometer. A translation of Helmholtz's papers on the whole subject is a desideratum.

After the delivery of the Oration, Mr. BOWMAN, F.R.S., was so good as to exhibit the images, and their change on adjustment, to those who could enter the small darkened room, including H. R. H. the Prince of Wales, Mr. Gladstone, Mr. Cardwell, and the President of the College, and many others. And I desire here to record my grateful thanks to Mr. Bowman for this and many other kindnesses.

Professor BEALE, F.R.S., shewed in the same obliging manner many skilful preparations illustrating the structure of the lens.

NOTE D, to p. 51.

"IMPROVED views, increased and accumulating evidence of the harmony pervading the material world, are attained in proportion to the advance of sound inductive science. The more close adherence to the spirit of philosophic analogy leads to a more commanding sense of the uniformity of nature, and the true idea of causation. As the generalizations of physical science become more comprehensive, we acquire juster notions of the stupendous aggregate of physical causes, of the inconceivable vastness and complexity of that universal mechanism, some small portion of which we are enabled to understand; and whose recondite and perfect adjustment, however imperfectly perceived, is the true ground and evidence of our conceptions, partial and limited as they must be, of the Infinite source of all things.

It is not a mere desultory and fragmentary knowledge of detached facts and portions of science, to however great an extent it be carried, which can suffice to lead us to a

correct perception of those truths. It can only be by a thorough insight into the interior principles of the inductive philosophy, and an imbibing of its real spirit, that we can attain adequate perception and sense of the real unity of nature which forms the basis and substance of those more sublime inferences.

In the confined and literal notions, often ignorantly entertained, of the sciences of observation, our conclusions might be supposed restricted to the field of mere sensible experience; and in this sense we should fall short of any worthy apprehension of the supreme intelligence. But the truly inductive philosopher extends his contemplation to intellectual conceptions of a higher class, pointing to order and uniformity as constant and universal as the extent of nature itself in space and in time; and in the same proportion he recognizes harmony and arrangement invested with the attributes of universality and eternity, and thus derives his loftier ideas of the Divine perfections.

The real nature and bearing of the evidence of natural theology as founded on *universal order*, has in fact come to be better understood only in an age of advanced philosophic cultivation: it tends to become continually more perfect with increasing knowledge; and its full force is hardly yet commonly apprehended even among men of science."—Baden Powell, *Essays on the Spirit of the Inductive Philosophy, the Unity of Worlds, and the Philosophy of Creation*, Lond. 1855, pp. 159–161.

NOTE E, to p. 62.

"THE result of what has been hitherto discoursed, upon the four questions proposed at the beginning of this small treatise, amounts in short to this:

That all consideration of final causes is not to be banished from natural philosophy ; but that it is rather allowable, and in some cases commendable, to observe and argue from the manifest uses of things, that the author of nature pre-ordained those ends and uses.

That the sun, moon, and other celestial bodies, excellently declare the power and wisdom, and consequently the glory of God ; and were some of them, among other purposes, made to be serviceable to man.

That from the supposed ends of inanimate bodies, whether celestial or sublunary, it is very unsafe to draw arguments to prove the particular nature of those bodies, or the true system of the universe.

That as to animals, and the more perfect sorts of vegetables, it is warrantable, not presumptuous, to say, that such and such parts were pre-ordained to such and such uses, relating to the welfare of the animal (or plant) itself, or the species it belongs to : but that such arguments may easily deceive, if those that frame them are not very cautious, and careful to avoid mistaking, among the various ends that nature may have in the contrivance of an animal's body, and the various ways which she may successfully take to compass the same ends. And,

That, however, a naturalist, who would deserve that name, must not let the search or knowledge of final causes make him neglect the industrious indagation of efficientes." — *Robert Boyle's Works*, vol. v. p. 444, 1772.

"... But judging that his (Des Cartes') doctrine (at least as it is understood by several of his followers, as well as his adversaries) about the rejection of final causes from the consideration of naturalists, tends much to weaken (as is elsewhere noted) if not quite to deprive us of one of the best and most successful arguments to convince men that



there is a God, and that they ought to admire, praise, and thank Him ; I think it my duty to prefer an important truth before my respect to any man, how eminent soever, that opposes it, and to consider more the glory of the great Author of nature, than the reputation of any one of her interpreters.

And to strengthen what I have been saying, give me leave to mind you more expressly here of what I have elsewhere intimated, viz., that the excellent contrivance of the great system of the world, and especially the curious fabric of the bodies of animals, and the uses of their sensories, and other parts, have been made the great motives, that in all ages and nations induced philosophers to acknowledge a Deity, as the author of these admirable structures ; and that the noblest and most intelligent praises, that have been paid Him by the priests of nature, have been occasioned and indited by the transcending admiration, which the attentive contemplation of the fabric of the universe, and of the curious structures of living creatures, justly produced in them. And therefore it seems injurious to God, as well as unwarrantable in itself, to banish from natural philosophy the consideration of final causes ; from which chiefly, if not only, I cannot but think (though some learned men do otherwise) that God must reap the honour that is due to those glorious attributes, his wisdom, and his goodness."—Boyle, *Disquisition about the Final Causes of Natural Things*, Works, vol. v. p. 401, 1772.

**27 DE 35**





16, BEDFORD STREET, COVENT GARDEN, LONDON.  
AND AT CAMBRIDGE.

# MACMILLAN AND CO.'S

## LIST OF PUBLICATIONS.

### A BOOK OF THOUGHTS.

By H. A. 18mo. cloth extra,  
gilt, 3s. 6d.

### ACROSS THE CARPATHIANS.

In 1858-60. With  
a Map. Crown 8vo. 7s. 6d.

### ÆSCHYLI EUMENIDES.

The Greek Text with English  
Notes, and an Introduction. By  
BERNARD DRAKE, M.A.  
8vo. 7s. 6d.

### AIRY.—TREATISE on the ALGEBRAICAL and NUME- RICAL THEORY of ERRORS of OBSERVATIONS, and the Combination of Observations. By G. B. AIRY, M.A. Crown 8vo. 6s. 6d.

### ALLINGHAM.—

LAURENCE BLOOMFIELD  
in IRELAND. A Modern Poem.  
By WILLIAM ALLINGHAM.  
Fcap. 8vo. 7s.

### ANDERSON. — SEVEN MONTHS' RESIDENCE in RUSSIAN POLAND in 1863. By the Rev. FORTESCUE L. M. ANDERSON. Cr. 8vo. 6s.

### ANOTHER "STORY of the GUNS;" or Sir Emerson Ten- nent and the Whitworth Gun. By the "FRASER REVIEWER." Extra fcap. 8vo. 2s.

### ANSTED.—THE GREAT

STONE BOOK of NATURE.  
By DAVID THOS. ANSTED,  
M.A. F.R.S. F.G.S. Fcap.  
8vo. 5s.

### ANSTIE. — STIMULANTS

and NARCOTICS, their MU-  
TUAL RELATIONS. With  
Special Researches on the Action  
of Alcohol, Æther, and Chloro-  
form, on the Vital Organism. By  
FRANCIS E. ANSTIE, M.D.  
M.R.C.P. 8vo. 14s.

### ARISTOTLE ON THE

VITAL PRINCIPLE. Trans-  
lated, with Notes, by CHARLES  
COLLIER, M.D. F.R.S. Cr.  
8vo. 8s. 6d.

### ARNOLD. — A FRENCH

ETON ; or, Middle Class Educa-  
tion and the State. By MAT-  
THEW ARNOLD. Fcap. 8vo.  
2s. 6d.

### ARNOLD. — ESSAYS ON

CRITICISM. By MATTHEW  
ARNOLD, Professor of Poetry  
in the University of Oxford. Fcp.  
8vo. cloth, 6s.

### ARTIST and CRAFTSMAN.

A Novel. Crown 8vo. 6s.

A

- BARWELL.**—GUIDE in the SICK ROOM. By RICHARD BARWELL, F.R.C.S. Extra fcap. 8vo. 3s. 6d.
- BEASLEY.**—An ELEMENTARY TREATISE on PLANE TRIGONOMETRY. With a Numerous Collection of Examples. By R. D. BEASLEY, M.A. Crown 8vo. 3s. 6d.
- BERNARD.**—THE PROGRESS OF DOCTRINE IN THE NEW TESTAMENT. By THOMAS DEHANY BERNARD, M.A. 8vo. cloth, 8s. 6d.
- BIRKS.**—The DIFFICULTIES of BELIEF in connexion with the CREATION and the FALL. By THOS. RAWSON BIRKS, M.A. Cr. 8vo. 4s. 6d.
- BIRKS.**—On MATTER and ETHER; or the Secret Laws of Physical Change. By THOS. RAWSON BIRKS, M.A. Cr. 8vo. 5s. 6d.
- BLAKE.**—THE LIFE OF WILLIAM BLAKE, the Artist. By ALEXR. GILCHRIST. With numerous Illustrations from Blake's Designs and Fac-similes of his Studies of the "Book of Job." 2 vols. Medium 8vo. 32s.
- BLANCHE LISLE, AND OTHER POEMS.** By CECIL HOME. Fcap. 8vo. 4s. 6d.
- BOOLE.**—A TREATISE on DIFFERENTIAL EQUATIONS. By GEO. BOOLE, D.C.L. *New Edition.* Edited by I. TODHUNTER, M.A., F.R.S. 8vo. cloth, 14s.
- BOOLE.**—A TREATISE on the CALCULUS of FINITE DIFFERENCES. By GEO. BOOLE, D.C.L. Crown 8vo. 10s. 6d.
- BRIMLEY.**—ESSAYS, by the late GEORGE BRIMLEY, M.A. Edited by W. G. CLARK, M.A. With Portrait. *Second Edition.* Fcap. 8vo. 5s.
- BROCK.**—DAILY READINGS on the PASSION of OUR LORD. By Mrs. H. F. BROCK. Fcap. 8vo. 4s.
- BROOK SMITH.**—ARITHMETIC in THEORY and PRACTICE. For Advanced Pupils. Part First. By J. BROOK SMITH, M.A. Crown 8vo. 3s. 6d.
- BULLOCK.**—POLISH EXPERIENCES during the INSURRECTION of 1863-4. By W. H. BULLOCK. Crown 8vo. with Map, 8s. 6d.
- BURGON.**—A TREATISE on the PASTORAL OFFICE. Addressed chiefly to Candidates for Holy Orders, or to those who have recently undertaken the cure of souls. By the Rev. JOHN W. BURGON, M.A. 8vo. 12s.
- BUTLER (ARCHER).**—WORKS by the Rev. WILLIAM ARCHER BUTLER, M.A. late Professor of Moral Philosophy in the University of Dublin :—
1. SERMONS, DOCTRINAL and PRACTICAL. Edited, with a Memoir of the Author's Life, by THOMAS WOODWARD, M.A. With Portrait. *Sixth Edition.* 8vo. 12s.

2. A SECOND SERIES OF SERMONS. Edited by J. A. JEREMIE, D.D. *Third Edition*. 8vo. 10s. 6d.

3. HISTORY OF ANCIENT PHILOSOPHY. Edited by WM. H. THOMPSON, M.A. 2 vols. 8vo. 1l. 5s.

4. LETTERS ON ROMANISM, in REPLY to MR. NEWMAN'S ESSAY on DEVELOPMENT. Edited by the Very Rev. T. WOODWARD. *Second Edition*, revised by Archdeacon HARDWICK. 8vo. 10s. 6d.

BUTLER (MONTAGU).—SERMONS PREACHED in the CHAPEL of HARROW SCHOOL. By H. MONTAGU BUTLER, Head Master. Crown 8vo. 7s. 6d.

BUTLER. — FAMILY PRAYERS. By the Rev. GEO. BUTLER. Cr. 8vo. 5s.

BUTLER. — SERMONS PREACHED in CHELTENHAM COLLEGE CHAPEL. By the Rev. GEO. BUTLER. Crown 8vo. 7s. 6d.

CAIRNES.—THE SLAVE POWER; its Character, Career, and Probable Designs. Being an Attempt to Explain the Real Issues Involved in the American Contest. By J. E. CAIRNES, M.A. *Second Edition*. 8vo. 10s. 6d.

CALDERWOOD.—PHILOSOPHY of the INFINITE. A Treatise on Man's Knowledge of the Infinite Being, in answer to Sir W. Hamilton and Dr. Mansel. By the Rev. HENRY CALDERWOOD, M.A. *Second Edition*. 8vo. 14s.

CAMBRIDGE SENATE-HOUSE PROBLEMS and RIDERS, with SOLUTIONS:—

1848—1851.—By FERRERS and JACKSON. 15s. 6d.

1848—1851.—By JAMESON. 7s. 6d.

1854.—By WALTON and MAC-KENZIE, M.A. 10s. 6d.

1857.—By CAMPION and WALTON. 8s. 6d.

1860.—By WATSON and ROUTH. 7s. 6d.

1864.—By WALTON and WILKINSON. 8vo. 10s. 6d.

CAMBRIDGE LENT SERMONS.—SERMONS Preached during LENT, 1864, in Great St. Mary's Church, Cambridge. By the LORD BISHOP OF OXFORD, Rev. H. P. LIDDON, T. L. CLAUGHTON, J. R. WOODFORD, DR. GOULBURN, J. W. BURGON, T. T. CARTER, DR. PUSEY, DEAN HOOK, W. J. BUTLER, DEAN GOODWIN. Crown 8vo. 7s. 6d.

CAMBRIDGE COURSE of ELEMENTARY NATURAL PHILOSOPHY, for the Degree of B.A. Originally compiled by J. C. SNOWBALL, M.A. Late Fellow of St. John's College. *Fifth Edition*, revised and enlarged, and adapted for the Middle Class Examinations by THOMAS LUND, B.D. Crown 8vo. 5s.

CAMBRIDGE. — CAMBRIDGE SCRAP BOOK: containing in a Pictorial Form a Report on the Manners, Customs, Humours, and Pastimes of the University of Cambridge. With nearly 300 Illustrations. *Second Edition*. Crown 4to. 7s. 6d.

- CAMBRIDGE.** — **CAMBRIDGE and DUBLIN MATHEMATICAL JOURNAL.** *The Complete Work*, in Nine Vols. 8vo. cloth, 7l. 4s. Only a few copies remain on hand.
- CAMPBELL.** — **THOUGHTS on REVELATION**, with SPECIAL REFERENCE to the PRESENT TIME. By JOHN M'LEOD CAMPBELL. Crown 8vo. 5s.
- CAMPBELL.** — **THE NATURE of the ATONEMENT and its RELATION to REMISSION of SINS and ETERNAL LIFE.** By JOHN M'LEOD CAMPBELL. 8vo. 10s. 6d.
- CATHERINES, The TWO ;** or, Which is the Heroine? A Novel. 2 vols. crown 8vo. 21s.
- CHALLIS.** — **CREATION in PLAN and in PROGRESS :** Being an Essay on the First Chapter of Genesis. By the Rev. JAMES CHALLIS, M.A. F.R.S. F.R.A.S. Crown 8vo. 3s. 6d.
- CHATTERTON.** — **LEONORE: a Tale, and other Poems.** By GEORGIANA LADY CHATTERTON. Fcap. 8vo. cloth, 7s. 6d.
- CHEYNE.** — **AN ELEMENTARY TREATISE on the PLANETARY THEORY.** With a Collection of Problems. By C. H. H. CHEYNE, B.A. Crown 8vo. 6s. 6d.
- CHILDE.** — **The SINGULAR PROPERTIES of the ELLIPSOID and ASSOCIATED SURFACES of the Nth DEGREE.** By the Rev. G. F. CHILDE, M.A. 8vo. 10s. 6d.
- CHRETIEN.** — **THE LETTER AND THE SPIRIT.** Six Sermons on the Inspiration of Holy Scripture. By CHARLES P. CHRETIEN. Crown 8vo. 5s.
- CHRISTIE.** — **NOTES ON BRAZILIAN QUESTIONS.** By W. D. CHRISTIE. Crown 8vo. cloth, 6s. 6d.
- CICERO.** — **THE SECOND PHILIPPIC ORATION.** With an Introduction and Notes, translated from Karl Halm. Edited with corrections and additions. By JOHN E. B. MAYOR, M.A. Fcap. 8vo. 5s.
- CLARA VAUGHAN.** — **A Novel.** 3 vols. crown 8vo. 31s. 6d.
- CLARK.** — **FOUR SERMONS PREACHED IN THE CHAPEL OF TRINITY COLLEGE, CAMBRIDGE.** By W. G. CLARK, M.A. Fcap. 8vo. 2s. 6d.
- CLAY.** — **THE PRISON CHAPLAIN.** A Memoir of the Rev. JOHN CLAY, B.D. late Chaplain of the Preston Gaol. With Selections from his Reports and Correspondence, and a Sketch of Prison-Discipline in England. By his son, the Rev. W. L. CLAY, M.A. 8vo. 15s.
- CLAY.** — **THE POWER OF THE KEYS.** Sermons preached in Coventry. By the Rev. W. L. CLAY, M.A. Fcap. 8vo. 3s. 6d.
- CLERGYMAN'S SELF-EXAMINATION** concerning the APOSTLES' CREED. Extra fcap. 8vo. 1s. 6d.



- CLOUGH.**—The POEMS of ARTHUR HUGH CLOUGH, sometime Fellow of Oriol College, Oxford. With a Memoir by F. T. PALGRAVE. *Second Edition.* Fcap. 8vo. 6s.
- COLENSO.**—WORKS by the Right Rev. J. W. COLENSO, D.D. Bishop of Natal:—
- THE COLONY OF NATAL.** A Journal of Visitation. With a Map and Illustrations. Fcap. 8vo. 5s.
- VILLAGE SERMONS.** *Second Edition.* Fcap. 8vo. 2s. 6d.
- FOUR SERMONS** on ORDINATION, and on MISSIONS. 18mo. 1s.
- COMPANION TO THE HOLY COMMUNION,** containing the Service, and Select Readings from the writings of Mr. MAURICE. *Fine Edition,* morocco, antique style, 6s. or in cloth, 2s. 6d. *Common Paper,* 1s.
- ST. PAUL'S EPISTLE TO THE ROMANS.** Newly Translated and Explained, from a Missionary point of View. Crown 8vo. 7s. 6d.
- LETTER TO HIS GRACE THE ARCHBISHOP OF CANTERBURY,** upon the Question of Polygamy, as found already existing in Converts from Heathenism. Second Edition. Crown 8vo. 1s. 6d.
- COOKERY FOR ENGLISH HOUSEHOLDS.** By a FRENCH LADY. Extra fcap. 8vo. 5s.
- COOPER.**—ATHENÆ CANTABRIGIENSES. By CHARLES HENRY COOPER, F. S. A. and THOMPSON COOPER, F. S. A. Vol. I. 8vo. 1500—85, 18s. Vol. II. 1586—1609, 18s.
- COTTON.**—SERMONS and ADDRESSES delivered in Marlborough College during Six Years, by GEORGE EDWARD LYNCH COTTON, D.D. Lord Bishop of Calcutta. Crown 8vo. 10s. 6d.
- COTTON.**—A CHARGE to the CLERGY of the DIOCESE and PROVINCE of CALCUTTA at the Second Diocesan and First Metropolitan Visitation. By GEORGE EDWARD LYNCH COTTON, D.D. 8vo. 3s. 6d.
- COTTON.**—SERMONS, chiefly connected with Public Events of 1854. Fcap. 8vo. 3s.
- COTTON.**—EXPOSITORY SERMONS on the EPISTLES for the Sundays of the Christian Year. By GEORGE EDWARD LYNCH COTTON, D.D. Two Vols. crown 8vo. 15s.
- CRAIK.**—MY FIRST JOURNAL. A book for the Young. By GEORGIANA M. CRAIK, Author of "Riverston," "Lost and Won," &c. Royal 16mo. cloth, gilt leaves, 3s. 6d.
- CROCKER.**—A NEW PROPOSAL for a GEOGRAPHICAL SYSTEM of MEASURES and WEIGHTS conveniently Introdudible, generally by retaining familiar notions by familiar names. To which are added remarks on systems of Coinage. By JAMES CROCKER, M.A. 8vo. 8s. 6d.
- CROSSE.**—AN ANALYSIS OF PALEY'S EVIDENCES. By C. H. CROSSE, M.A. 24mo. 2s. 6d.

**DANTE. — DANTE'S COMEDY, *The Hell*.** Translated by W. M. ROSETTI. Fcap. 8vo. cloth, 5s.

**DAVIES.—ST. PAUL AND MODERN THOUGHT:** Remarks on some of the Views advanced in Professor Jowett's Commentary on St. Paul. By Rev. J. LL. DAVIES, M.A. 8vo. 2s. 6d.

**DAVIES.—SERMONS ON THE MANIFESTATION OF THE SON OF GOD.** With a Preface addressed to Laymen on the present position of the Clergy of the Church of England; and an Appendix on the Testimony of Scripture and the Church as to the possibility of Pardon in the Future State. By the Rev. J. LL. DAVIES, M.A. Fcap. 8vo. 6s. 6d.

**DAVIES.—THE WORK OF CHRIST; OR THE WORLD RECONCILED TO GOD.** With a Preface on the Atonement Controversy. By the Rev. J. LL. DAVIES, M.A. Fcap. 8vo. 6s.

**DAVIES.—BAPTISM, CONFIRMATION, AND THE LORD'S SUPPER,** as interpreted by their outward signs. Three Expository Addresses for Parochial Use. By the Rev. J. LL. DAVIES, M.A. Limp cloth, 1s. 6d.

**DAYS OF OLD: STORIES FROM OLD ENGLISH HISTORY.** By the Author of "Ruth and her Friends." *New Edition.* 18mo. cloth, gilt leaves, 3s. 6d.

**DEMOSTHENES DE CORONA.** The Greek Text with English Notes. By B. DRAKE, M.A. *Second Edition*, to which is prefixed AESCHINES AGAINST CTESIPHON, with English Notes. Fcap. 8vo. 5s.

**DE TEISSIER.—VILLAGE SERMONS,** by G. F. DE TEISSIER, B.D. Crown 8vo. 9s.

**SECOND SERIES.** Crown 8vo. cloth. 8s. 6d.

**DE VERE.—THE INFANT BRIDAL, AND OTHER POEMS.** By AUBREY DE VERE. Fcap. 8vo. 7s. 6d.

**DICEY. — SIX MONTHS IN THE FEDERAL STATES.** By EDWARD DICEY. 2 Vols. crown 8vo. 12s.

**DICEY.—ROME IN 1860.** By EDWARD DICEY. Crown 8vo. 6s. 6d.

**DONALDSON.—A CRITICAL HISTORY OF CHRISTIAN LITERATURE AND DOCTRINE,** from the Death of the Apostles to the Nicene Council. By JAMES DONALDSON, M.A. Vol. I.—THE APOSTOLIC FATHERS. 8vo. cloth. 10s. 6d.

Vols. II. and III. in the Press.

**DREW. — A GEOMETRICAL TREATISE ON CONIC SECTIONS.** By W. H. DREW, M.A. *Third Edition.* Crown 8vo. 4s. 6d.

**DREW.—SOLUTIONS TO PROBLEMS CONTAINED IN MR. DREW'S TREATISE ON CONIC SECTIONS.** Crown 8vo. 4s. 6d.

- EARLY EGYPTIAN HISTORY FOR THE YOUNG.** With Descriptions of the Tombs and Monuments. *New Edition*, with Frontispiece. Fcap. 8vo. 5s.
- ENGLISH IDYLLS.** By JANE ELLICE. Fcap. 8vo. cloth. 6s.
- FAWCETT.—MANUAL of POLITICAL ECONOMY.** By HENRY FAWCETT, M.A. *Second Edition.* Crown 8vo. 12s.
- FERRERS.—A TREATISE ON TRILINEAR CO-ORDINATES,** the Method of Reciprocal Polars, and the Theory of Projections. By the Rev. N. M. FERRERS, M.A. Crown 8vo. 6s. 6d.
- FISHER. — CONSIDERATIONS ON THE ORIGIN OF THE AMERICAN WAR.** By HERBERT FISHER. Fcp. 8vo. 2s. 6d.
- FLETCHER. — THOUGHTS FROM A GIRL'S LIFE.** By LUCY FLETCHER. Fcap. 8vo. 4s. 6d.
- FORBES.—LIFE OF EDWARD FORBES, F.R.S.** By GEORGE WILSON, M.D. F.R.S.E. and ARCHIBALD GEIKIE, F.G.S. 8vo. with Portrait, 14s.
- FORSHALL.—THE FIRST TWELVE CHAPTERS OF THE GOSPEL ACCORDING TO ST. MATTHEW,** in the Received Greek Text, with various Readings, and Notes Critical and Expository. By the late Rev. JOSIAH FORSHALL, M.A. F.R.S. 10s. 6d.
- FREEMAN.—HISTORY of FEDERAL GOVERNMENT,** from the Foundation of the Achaian League to the Disruption of the United States. By EDWARD A. FREEMAN, M.A. Vol. I. General Introduction. — History of the Greek Federations. 8vo. 21s.
- FROST.—THE FIRST THREE SECTIONS of NEWTON'S PRINCIPIA.** With Notes and Problems in illustration of the subject. By PERCIVAL FROST, M.A. *Second Edition.* 8vo. 10s. 6d.
- FROST AND WOLSTENHOLME.—A TREATISE ON SOLID GEOMETRY.** By the Rev. PERCIVAL FROST, M.A. and the Rev. J. WOLSTENHOLME, M.A. 8vo. 18s.
- FURNIVALL.—LE MORTE ARTHUR.** Edited from the Harleian M.S. 2252, in the British Museum. By F. J. FURNIVALL, M.A. With Essay by the late HERBERT COLERIDGE. Fcap. 8vo. cloth, 7s. 6d.
- GALTON.—METEOROGRAPHICA,** or Methods of Mapping the Weather. Illustrated by upwards of 600 Printed Lithographed Diagrams. By FRANCIS GALTON, F.R.S. 4to. 9s.
- GARIBALDI at CAPRERA.** By COLONEL VECCHJ. With Preface by Mrs. GASKILL. Fcap. 8vo. 1s. 6d.

- GEIKIE.—STORY OF A BOULDER;** or, Gleanings by a Field Geologist. By ARCHIBALD GEIKIE. Illustrated with Woodcuts. Crown 8vo. 5s.
- GEIKIE'S SCENERY OF SCOTLAND,** with Illustrations and a new Geological Map. Cr. 8vo. cloth, 10s. 6d.
- GIFFORD.—THE GLORY OF GOD IN MAN.** By E. H. GIFFORD, D.D. Fcap. 8vo. cloth. 3s. 6d.
- GOLDEN TREASURY SERIES.** Uniformly printed in 18mo. with Vignette Titles by J. NOËL PATON, T. WOOLNER, W. HOLMAN HUNT, J. E. MILLAIS, &c. Bound in extra cloth, 4s. 6d.; morocco plain, 7s. 6d.; morocco extra, 10s. 6d. each Volume.
- THE GOLDEN TREASURY OF THE BEST SONGS AND LYRICAL POEMS IN THE ENGLISH LANGUAGE.** Selected and arranged, with Notes, by FRANCIS TURNER PALGRAVE.
- THE CHILDREN'S GARLAND FROM THE BEST POETS.** Selected and arranged by COVENTRY PATMORE.
- THE BOOK OF PRAISE.** From the best English Hymn Writers. Selected and arranged by ROUNDELL PALMER. A New and Enlarged Edition.
- THE FAIRY BOOK :** The Best Popular Fairy Stories. Selected and Rendered Anew by the Author of "John Halifax."
- THE BALLAD BOOK.** A Selection of the Choicest British Ballads. Edited by WILLIAM ALLINGHAM.
- THE JEST BOOK.** The Choicest Anecdotes and Sayings. Selected and arranged by MARK LEMON.
- BACON'S ESSAYS AND COLOURS OF GOOD AND EVIL.** With Notes and Glossarial Index, by W. ALDIS WRIGHT, M.A. Large paper copies, crown 8vo. 7s. 6d.; or bound in half morocco, 10s. 6d.
- The PILGRIM'S PROGRESS** from this World to that which is to Come. By JOHN BUNYAN.
- \* \* Large paper Copies, crown 8vo. cloth, 7s. 6d.; or bound in half morocco, 10s. 6d.
- THE SUNDAY BOOK OF POETRY FOR THE YOUNG.** Selected and arranged by C. F. ALEXANDER.
- A BOOK OF GOLDEN DEEDS OF ALL TIMES AND ALL COUNTRIES.** Gathered and Narrated anew by the Author of "The Heir of Redclyffe."
- THE POETICAL WORKS OF ROBERT BURNS.** Edited, with Biographical Memoir, by ALEXANDER SMITH. 2 vols.
- GORDON. — LETTERS** from EGYPT, 1863—5. By LADY DUFF GORDON. Cr. 8vo. cloth, 8s. 6d.
- GORST.—THE MAORI KING;** or, the Story of our Quarrel with the Natives of New Zealand. By J. E. GORST, M.A. With a Portrait of William Thompson, and a Map of the Seat of War. Crown 8vo. 10s. 6d.

GROVES.—A COMMENTARY ON THE BOOK OF GENESIS. For the Use of Students and Readers of the English Version of the Bible. By the Rev. H. C. GROVES, M.A. Crown 8vo. 9s.

GUIDE TO THE UNPROTECTED in Every Day Matters relating to Property and Income. By a BANKER'S DAUGHTER. *Second Edition*. Extra fcap. 8vo. 3s. 6d.

HAMERTON.—A PAINTER'S CAMP IN THE HIGHLANDS; and Thoughts about Art. By P. G. HAMERTON. 2 vols. crown 8vo. 21s.

HAMILTON.—THE RESOURCES OF A NATION. A Series of Essays. By ROWLAND HAMILTON. 8vo. 10s. 6d.

HAMILTON.—On TRUTH and ERROR: Thoughts on the Principles of Truth, and the Causes and Effects of Error. By JOHN HAMILTON. Crown 8vo. 5s.

HARDWICK.—CHRIST AND OTHER MASTERS. A Historical Inquiry into some of the Chief Parallelisms and Contrasts between Christianity and the Religious Systems of the Ancient World. By the Ven. ARCHDEACON HARDWICK. *New Edition*, revised, and a Prefatory Memoir by the Rev. FRANCIS PROCTER. Two vols. crown 8vo. 15s.

HARDWICK.—A HISTORY OF THE CHRISTIAN CHURCH, during the Middle Ages and the Reformation. (A.D. 590—1600.) By ARCHDEACON HARDWICK. Two vols. crown 8vo. 21s.

Vol. I. *Second Edition*. Edited by FRANCIS PROCTER, M.A. History from Gregory the Great to the Excommunication of Luther. With Maps.

Vol. II. History of the Reformation of the Church.

Each volume may be had separately. Price 10s. 6d.

HARDWICK.—TWENTY SERMONS FOR TOWN CONGREGATIONS. Crown 8vo. 6s. 6d.

HARE.—WORKS BY JULIUS CHARLES HARE, M.A. Sometime Archdeacon of Lewes, and Chaplain in Ordinary to the Queen.

CHARGES DELIVERED during the Years 1840 to 1854. With Notes on the Principal Events affecting the Church during that period. With an Introduction, explanatory of his position in the Church with reference to the parties which divide it. 3 vols. 8vo. 17. 11s. 6d.

MISCELLANEOUS PAMPHLETS on some of the Leading Questions agitated in the Church during the Years 1845—51. 8vo. 12s.

THE VICTORY OF FAITH. *New Edition, in the press*, with Life by Plumptre.

THE MISSION OF THE COMFORTER. *Third Edition*. With Notes, 12s.

VINDICATION OF LUTHER.  
*Second Edition.* 8vo. 7s.

PARISH SERMONS. Second Series. 8vo. cloth, 12s.

SERMONS PREACHED ON PARTICULAR OCCASIONS. 8vo. cloth, 12s.

PORTIONS OF THE PSALMS IN ENGLISH VERSE. Selected for Public Worship. 18mo. cloth, 2s. 6d.

\* \* The two following Books are included in the Three Volumes of Charges, but may be had separately.

THE CONTEST WITH ROME.  
*Second Edition.* 8vo. cl. 10s. 6d.

CHARGES DELIVERED in the Years 1843, 1845, 1846. With an Introduction. 6s. 6d.

HEARN. — PLUTOLOGY; or, the Theory of the Efforts to Satisfy Human Wants. By W. E. HEARN, LL.D. 8vo. 14s.

HEBERT. — CLERICAL SUBSCRIPTION, an Inquiry into the Real Position of the Church and the Clergy in reference to — I. The Articles; II. The Liturgy; III. The Canons and Statutes. By the Rev. CHARLES HEBERT, M.A. F.R.S.L. Cr. 8vo. 7s. 6d.

HEMMING. — AN ELEMENTARY TREATISE ON THE DIFFERENTIAL AND INTEGRAL CALCULUS. By G. W. HEMMING, M.A. *Second Edition.* 8vo. 9s.

HERVEY. — THE GENEALOGIES OF OUR LORD AND SAVIOUR JESUS CHRIST, as contained in the Gospels of St. Matthew and St. Luke, reconciled with each other, and shown to be in harmony with the true Chronology of the Times. By Lord ARTHUR HERVEY, M.A. 8vo. 10s. 6d.

HERVEY. — THE AARBERGS. By ROSAMOND HERVEY. 2 vols. crown 8vo. cloth, 21s.

HISTORICUS. — LETTERS ON SOME QUESTIONS OF INTERNATIONAL LAW. Reprinted from the *Times*, with considerable Additions. 8vo. 7s. 6d. Also, ADDITIONAL LETTERS. 8vo. 2s. 6d.

HODGSON. — MYTHOLOGY FOR LATIN VERSIFICATION: a Brief Sketch of the Fables of the Ancients, prepared to be rendered into Latin Verse for Schools. By F. HODGSON, B.D. late Provost of Eton. New Edition, revised by F. C. HODGSON, M.A. 18mo. 3s.

HORNER. — THE TUSCAN POET GIUSEPPE GIUSTI AND HIS TIMES. By SUSAN HORNER. Crown 8vo. 7s. 6d.

HOWARD. — THE PENTATEUCH; or, the Five Books of Moses. Translated into English from the Version of the LXX. With Notes on its Omissions and Insertions, and also on the Passages in which it differs from the Authorized Version. By the Hon. HENRY HOWARD, D.D. Crown 8vo. GENESIS, 1 vol. 8s. 6d.; EXODUS AND LEVITICUS, 1 vol. 10s. 6d.; NUMBERS AND DEUTERONOMY, 1 vol. 10s. 6d.

- HUMPHRY. — THE HUMAN SKELETON (including the JOINTS). By GEORGE MURRAY HUMPHRY, M.D. F.R.S. With Two Hundred and Sixty Illustrations drawn from Nature. Medium 8vo. 17. 8s.
- HUMPHRY. — THE HUMAN HAND AND THE HUMAN FOOT. With Numerous Illustrations. Fcp. 8vo. 4s. 6d.
- HYDE. — HOW TO WIN OUR WORKERS. An Account of the Leeds Sewing School. By Mrs. HYDE. Fcap. 8vo. 1s. 6d.
- HYMNI ECCLESIAE. — Fcap. 8vo. cloth, 7s. 6d.
- JAMESON. — LIFE'S WORK, IN PREPARATION AND IN RETROSPECT. Sermons Preached before the University of Cambridge. By the Rev. F. J. JAMESON, M.A. Fcap. 8vo. 1s. 6d.
- JAMESON. — BROTHERLY COUNSELS TO STUDENTS. Sermons preached in the Chapel of St. Catharine's College, Cambridge. By F. J. JAMESON, M.A. Fcap. 8vo. 1s. 6d.
- JANET'S HOME. — A Novel. *New Edition.* Crown 8vo. 6s.
- JEVONS. — THE COAL QUESTION. By W. STANLEY JEVONS, M.A. Fellow of University College, London. 8vo. 10s. 6d.
- JONES. — THE CHURCH of ENGLAND and COMMON SENSE. By HARRY JONES, M.A. Fcap. 8vo. cloth, 3s. 6d.
- JUVENAL. — JUVENAL, for Schools. With English Notes. By J. E. B. MAYOR, M.A. *New and Cheaper Edition.* Crown 8vo. *Reprinting.*
- KEARY'S THE LITTLE WANDERLING, and other Fairy Tales. 18mo cloth, 3s. 6d.
- KINGSLEY. — WORKS BY THE REV. CHARLES KINGSLEY, M.A. Rector of Eversley, and Professor of Modern History in the University of Cambridge: —
- THE ROMAN and the TEUTON. A Series of Lectures delivered before the University of Cambridge. 8vo. 12s.
- TWO YEARS AGO. *Third Edition.* Crown 8vo. 6s.
- "WESTWARD HO!" *Fourth Edition.* Crown 8vo. 6s.
- ALTON LOCKE. *New Edition.* with a New Preface. Crown 8vo. 4s. 6d.
- HYPATIA; *Fourth Edition.* Cmn. 8vo. 6s.
- YEAST. *Fourth Edition.* Fcap. 8vo. 5s.
- MISCELLANIES. *Second Edition.* 2 vols. crown 8vo. 12s.
- THE SAINT'S TRAGEDY. *Third Edition.* Fcap. 8vo. 5s.
- ANDROMEDA, and other Poems. *Third Edition.* Fcap. 8vo. 5s.
- THE WATER BABIES, a Fairy Tale for a Land Baby. With Two Illustrations by J. NOEL PATON, R.S.A. *New Edition.* Crown 8vo. 6s.

- GLAUCUS: or, the Wonders of the Shore. *New and Illustrated Edition*, containing beautifully Coloured Illustrations. 5s.
- THE HEROES; or, Greek Fairy Tales for my Children. With Eight Illustrations. *New Edition*. 18mo. 3s. 6d.
- VILLAGE SERMONS. *Sixth Edition*. Fcap. 8vo. 2s. 6d.
- THE GOSPEL OF THE PEN-TATEUCH. *Second Edition*. Fcap. 8vo. 4s. 6d.
- GOOD NEWS OF GOD. *Third Edition*. Fcap. 8vo. 6s.
- SERMONS FOR THE TIMES. *Third Edition*. Fcap. 8vo. 3s. 6d.
- TOWN AND COUNTRY SERMONS. Fcap. 8vo. 6s.
- SERMONS ON NATIONAL SUBJECTS. First Series. *Second Edition*. Fcap. 8vo. 5s.
- SERMONS ON NATIONAL SUBJECTS. Second Series. *Second Edition*. Fcap. 8vo. 5s.
- ALEXANDRIA AND HER SCHOOLS. With a Preface. Crown 8vo. 5s.
- THE LIMITS OF EXACT SCIENCE AS APPLIED TO HISTORY. An Inaugural Lecture delivered before the University of Cambridge. Crown 8vo. 2s.
- PHAETHON; or Loose Thoughts for Loose Thinkers. *Third Edition*. Crown 8vo. 2s.
- DAVID.—Four Sermons—David's Weakness—David's Strength—David's Anger—David's Deserts. Fcap. 8vo. cloth, 2s. 6d.
- KINGSLEY. — AUSTIN ELLIOT. By HENRY KINGSLEY, Author of "Ravenshoe," &c. *Third Edition*. 2 vols. crown 8vo. 21s.
- KINGSLEY. — THE RECOLLECTIONS OF GEOFFREY HAMLYN. By HENRY KINGSLEY. *Second Edition*. Crown 8vo. 6s.
- KINGSLEY.—THE HILL-YARS AND THE BURTONS: a Story of Two Families. By HENRY KINGSLEY. 3 vols. crown 8vo. cloth, 17. 11s. 6d.
- KINGSLEY.—RAVENSHOE. By HENRY KINGSLEY. *New Edition*. Crown 8vo. 6s.
- KINGTON.—HISTORY of FREDERICK the SECOND, Emperor of the Romans. By T. L. KINGTON, M.A. 2 vols. demy 8vo. 32s.
- KIRCHHOFF. — RESEARCHES on the SOLAR SPECTRUM and the SPECTRA of the CHEMICAL ELEMENTS. By G. KIRCHHOFF, of Heidelberg. Translated by HENRY E. ROSCOE, B.A. 4to. 5s. Also the Second Part. 4to. 5s. with 2 Plates.
- LANCASTER — ECLOGUES AND MONO-DRAMAS; or, a Collection of Verses. By WILLIAM LANCASTER. Extra fcap. 8vo. 4s. 6d.
- LANCASTER. — PRÆTERITA: Poems. By WILLIAM LANCASTER. Extra fcap. 8vo. 4s. 6d.



- LATHAM.** — THE CONSTRUCTION of WROUGHT-IRON BRIDGES, embracing the Practical Application of the Principles of Mechanics to Wrought-Iron Girdér Work. By J. H. LATHAM, Esq. Civil Engineer. 8vo. With numerous detail Plates. *Second Edition.* [Preparing.]
- LECTURES TO LADIES ON PRACTICAL SUBJECTS.** *Third Edition,* revised. Crown 8vo. 7s. 6d.
- LEMON.** — LEGENDS OF NUMBER NIP. By MARK LEMON. With Six Illustrations by CHARLES KEENE. Extra fcap. 5s.
- LESLEY'S GUARDIANS:** A Novel. By CECIL HOME. 3 vols. crown 8vo. 31s. 6d.
- LIGHTFOOT.** — S. T. PAUL'S EPISTLE TO THE GALATIANS. A Revised Text, with Notes and Dissertations. By J. D. LIGHTFOOT, D.D. 8vo. cloth, 10s. 6d.
- LOWELL.** — FIRESIDE TRAVELS. By JAMES RUSSELL LOWELL, Author of "The Biglow Papers." Fcap. 8vo. 4s. 6d.
- LUDLOW and HUGHES.** — A SKETCH of the HISTORY of the UNITED STATES from Independence to Secession. By J. M. LUDLOW, Author of "British India, its Races and its History," "The Policy of the Crown towards India," &c. To which is added, THE STRUGGLE FOR KANSAS. By THOMAS HUGHES, Author of "Tom Brown's School Days," "Tom Brown at Oxford," &c. Crown 8vo. 8s. 6d.
- LUDLOW.** — BRITISH INDIA; its Races, and its History, down to 1857. By JOHN MALCOLM LUDLOW, Barrister-at-Law. 2 vols. 9s.
- LUSHINGTON.** — THE ITALIAN WAR 1848-9, and the Last Italian Poet. By the late HENRY LUSHINGTON. With a Biographical Preface by G. S. VENABLES. Crown 8vo. 6s. 6d.
- LYTTELTON.** — THE COMUS OF MILTON rendered into Greek Verse. By LORD LYTTELTON. Royal fcap. 8vo. 5s.
- MACKENZIE.** — THE CHRISTIAN CLERGY of the FIRST TEN CENTURIES, and their Influence on European Civilization. By HENRY MACKENZIE, B.A. Scholar of Trinity College, Cambridge. Crown 8vo. 6s. 6d.
- MACLAREN.** — SERMONS PREACHED AT MANCHESTER. By ALEXANDER MACLAREN. *Second Edition.* Fcap. 8vo. 4s. 6d.
- MACLEAR.** — A HISTORY OF CHRISTIAN MISSIONS DURING THE MIDDLE AGES. By G. F. MACLEAR, M.A. Crown 8vo. 10s. 6d.
- MACLEAR.** — THE WITNESS OF THE EUCHARIST; or, The Institution and Early Celebration of the Lord's Supper, considered as an Evidence of the Historical Truth of the Gospel Narrative and of the Atonement. Crown 8vo. 4s. 6d.

**MACLEAR. — A CLASS-BOOK OF OLD TESTAMENT HISTORY.** By the Rev. G. F. MACLEAR, M.A. With Four Maps. 18mo. cloth, 4s. 6d.

**MACLEAR. — A CLASS-BOOK OF NEW TESTAMENT HISTORY,** including the connexion of the Old and New Testament.

*[In the press.]*

**MACMILLAN. — FOOTNOTES FROM THE PAGE OF NATURE.** By the Rev. HUGH MACMILLAN, F.R.S.E. With numerous Illustrations. Fcap. 8vo. 5s.

**MACMILLAN'S MAGAZINE.** Published Monthly, price One Shilling. Volumes I.—XI. are now ready, 7s. 6d. each.

**McCOSH. — The METHOD of the DIVINE GOVERNMENT,** Physical and Moral. By JAMES McCOSH, LL.D. *Eighth Edition.* 8vo. 10s. 6d.

**McCOSH. — THE SUPERNATURAL IN RELATION TO THE NATURAL.** By JAMES McCOSH, LL.D. Crown 8vo. 7s. 6d.

**McCOSH. — THE INTUITIONS OF THE MIND.** By JAMES McCOSH, LL.D. *A New Edition.* 8vo. cloth, 10s. 6d.

**McCOY. — CONTRIBUTIONS TO BRITISH PALÆONTOLOGY;** or, First Descriptions of several hundred Fossil Radiata, Articulata, Mollusca, and Pisces, from the Tertiary, Cretaceous, Oolitic, and Palæozoic Strata of Great Britain. With numerous Woodcuts. By FRED. McCOY, F.G.S. Professor of Natural History in the University of Melbourne. 8vo. 9s.

**MANSFIELD. — PARAGUAY, BRAZIL, AND THE PLATE.** With a Map, and numerous Woodcuts. By CHARLES MANSFIELD, M.A. With a Sketch of his Life. By the Rev. CHARLES KINGSLEY. Crown 8vo. 12s. 6d.

**MARRIED BENEATH HIM.** By the Author of "Lost Sir Massingberd." 3 vols. crown 8vo. cloth, 17. 11s. 6d.

**MARRINER. — SERMONS PREACHED at LYME REGIS.** By E. T. MARRINER, Curate. Fcap. 8vo. 4s. 6d.

**MARSTON. — A LADY IN HER OWN RIGHT.** By WESTLAND MARSTON. Crown 8vo. 6s.

**MARTIN. — THE STATESMAN'S YEAR BOOK for 1865.** A Statistical, Genealogical, and Historical Account of the Civilized World for the Year 1865. By FREDERICK MARTIN. Cr. 8vo. 10s. 6d.

**MARTIN. — STORIES OF BANKS AND BANKERS.** By FREDERICK MARTIN. Fcp. 8vo. cloth, 3s. 6d.

MARTIN.—THE LIFE OF JOHN CLARE. By FREDERICK MARTIN. Crown 8vo. cloth, 7s. 6d.

MASSON.—ESSAYS, BIOGRAPHICAL and CRITICAL; chiefly on the English Poets. By DAVID MASSON, M.A. 8vo. 12s. 6d.

MASSON.—BRITISH NOVELISTS AND THEIR STYLES; being a Critical Sketch of the History of British Prose Fiction. By DAVID MASSON, M.A. Crown 8vo. 7s. 6d.

MASSON.—LIFE of JOHN MILTON, narrated in Connexion with the Political, Ecclesiastical, and Literary History of his Time. Vol. I. with Portraits. 18s.

MASSON.—RECENT BRITISH PHILOSOPHY. A Review, with Criticisms. By DAVID MASSON. Crown 8vo. cloth, 7s. 6d.

MAURICE.—WORKS BY THE REV. FREDERICK DENISON MAURICE, M.A.

THE CLAIMS OF THE BIBLE AND OF SCIENCE; a Correspondence on some questions respecting the Pentateuch. Crown 8vo. 4s. 6d.

DIALOGUES on FAMILY WORSHIP. Crown 8vo. 6s.

EXPOSITORY DISCOURSES on the Holy Scriptures:—

THE PATRIARCHS and LAW-GIVERS of the OLD TESTAMENT. *Second Edition.* Crown 8vo. 6s.

This volume contains Discourses on the Pentateuch, Joshua, Judges, and the beginning of the First Book of Samuel.

THE PROPHETS and KINGS of the OLD TESTAMENT. *Second Edition.* Crown 8vo. 10s. 6d.

This volume contains Discourses on Samuel I. and II., Kings I. and II. Amos, Joel, Hosea, Isaiah, Micah, Nahum, Habakkuk, Jeremiah, and Ezekiel.

THE GOSPEL OF THE KINGDOM OF GOD. A Series of Lectures on the Gospel of St. Luke. Crown 8vo. 9s.

THE GOSPEL OF ST. JOHN; a Series of Discourses. *Second Edition.* Crown 8vo. 10s. 6d.

THE EPISTLES OF ST. JOHN; a Series of Lectures on Christian Ethics. Crown 8vo. 7s. 6d.

EXPOSITORY SERMONS ON THE PRAYER-BOOK:—

THE ORDINARY SERVICES. *Second Edition.* Fcap. 8vo. 5s. 6d.

THE CHURCH A FAMILY. Twelve Sermons on the Occasional Services. Fcap. 8vo. 4s. 6d.

LECTURES ON THE APOCALYPSE, or, Book of the Revelation of St. John the Divine. Crown 8vo. 10s. 6d.

WHAT IS REVELATION? A Series of Sermons on the Epiphany, to which are added Letters to a Theological Student on the Bampton Lectures of Mr. MANSEL. Crown 8vo. 10s. 6d.

SEQUEL TO THE INQUIRY, "WHAT IS REVELATION?" Letters in Reply to Mr. Mansel's Examination of "Strictures on the Bampton Lectures." Crown 8vo. 6s.

LECTURES ON ECCLESIASTICAL HISTORY. 8vo. 10s. 6d.

**THEOLOGICAL ESSAYS.**  
*Second Edition.* Crown 8vo.  
10s. 6d.

**THE DOCTRINE OF SACRIFICE DEDUCED FROM THE SCRIPTURES.** Cr. 8vo. 7s. 6d.

**THE RELIGIONS OF THE WORLD,** and their Relations to Christianity. *Fourth Edition.* Fcap. 8vo. 5s.

**ON THE LORD'S PRAYER.**  
*Fourth Edition.* Fcap. 8vo.  
2s. 6d.

**ON THE SABBATH DAY;** the Character of the Warrior; and on the Interpretation of History. Fcap. 8vo. 2s. 6d.

**LEARNING AND WORKING.**  
—Six Lectures on the Foundation of Colleges for Working Men. Crown 8vo. 5s.

**THE INDIAN CRISIS.** Five Sermons. Crown 8vo. 2s. 6d.

**LAW'S REMARKS ON THE FABLE OF THE BEES.** With an Introduction by F. D. MAURICE, M.A. Fcap. 8vo. 4s. 6d.

**MAYOR.—AUTOBIOGRAPHY OF MATTHEW ROBINSON.** By JOHN E. B. MAYOR, M.A. Fcap. 8vo. 5s. 6d.

**MAYOR.—EARLY STATUTES OF ST. JOHN'S COLLEGE, CAMBRIDGE.** With Notes. Royal 8vo. 18s.

**MELIBEUS IN LONDON.** By JAMES PAYN, M.A. Fcap. 8vo. 2s. 6d.

**MERIVALE.—SALLUST FOR SCHOOLS.** By C. MERIVALE, B. D. *Second Edition.* Fcap. 8vo. 4s. 6d.

\* \* The Jugurtha and the Catalina may be had separately, price 2s. 6d. each.

**MERIVALE.—KEATS' HYPERION** Rendered into Latin Verse. By C. MERIVALE, B.D. *Second Edition.* Royal fcap. 8vo. 3s. 6d.

**MOOR COTTAGE.**—A Tale of Home Life. By the Author of "Little Estella." Crown 8vo. 6s.

**MOORHOUSE.—SOME MODERN DIFFICULTIES** respecting the FACTS of NATURE and REVELATION. By JAMES MOORHOUSE, M.A. Fcap. 8vo. 2s. 6d.

**MORGAN.—A COLLECTION OF MATHEMATICAL PROBLEMS and EXAMPLES.** By H. A. MORGAN, M.A. Crown 8vo. 6s. 6d.

**MORSE.—WORKING FOR GOD,** and other Practical Sermons. By FRANCIS MORSE, M.A. *Second Edition.* Fcap. 8vo. 5s.

**MORTLOCK.—CHRISTIANITY AGREEABLE TO REASON.** By the Rev. EDMUND MORTLOCK, B.D. *Second Edition.* Fcap. 8vo. 3s. 6d.

**NOEL.—BEHIND THE VEIL,** and other Poems. By the Hon. RODEN NOEL. Fcap. 8vo. 7s.

**NORTHERN CIRCUIT.** Brief Notes of Travel in Sweden, Finland, and Russia. With a Frontispiece. Crown 8vo. 5s.

**NORTON.—THE LADY of LA GARAYE.** By the Hon. Mrs. NORTON. With Vignette and Frontispiece. *New Edition.* 4s. 6d.,

- O'BRIEN.—An ATTEMPT to EXPLAIN and ESTABLISH the DOCTRINE of JUSTIFICATION BY FAITH ONLY. By JAMES THOS. O'BRIEN, D.D. Bishop of Ossory. *Third Edition.* 8vo. 12s.
- O'BRIEN.—CHARGE delivered at the Visitation in 1863. *Second Edition.* 8vo. 2s.
- OLIPHANT.—AGNES HOPETOUN'S SCHOOLS AND HOLIDAYS. By MRS. OLIPHANT. Royal 16mo. cloth, gilt leaves. 3s. 6d.
- OLIVER.—LESSONS IN ELEMENTARY BOTANY. With nearly 200 Illustrations. By DANIEL OLIVER, F.R.S. F.L.S. 18mo. 4s. 6d.
- OPPEN.—FRENCH READER, for the Use of Colleges and Schools. By EDWARD A. OPPEN. Fcap. 8vo. cloth, 4s. 6d.
- ORWELL.—The BISHOP'S WALK AND THE BISHOP'S TIMES. Poems on the Days of Archbishop Leighton and the Scottish Covenant. By ORWELL. Fcap. 8vo. 5s.
- OUR YEAR.—A Child's Book, in Prose and Verse. By the Author of "John Halifax, Gentleman." Illustrated by CLARENCE DOVELL. Royal 16mo. cloth, 3s. 6d.
- PALGRAVE.—HISTORY OF NORMANDY AND OF ENGLAND. By Sir FRANCIS PALGRAVE. Completing the History to the Death of William Rufus. Vols. I. to IV. 8vo. each 21s.
- PALGRAVE.—A NARRATIVE OF A YEAR'S JOURNEY THROUGH CENTRAL AND EASTERN ARABIA, 1862-3. By WILLIAM GIFFARD PALGRAVE (late of the Eighth Regiment Bombay N.I.). 2 vols. 8vo. cloth. 28s.
- PALMER.—THE BOOK of PRAISE: from the Best English Hymn Writers. Selected and arranged by ROUNDELL PALMER. With Vignette by WOOLNER. *Large Type Edition*, demy 8vo. 10s. 6d.; morocco, 28s. *Royal Edition*, crown 8vo. 6s.; morocco, 12s. 6d.
- PARKINSON.—A TREATISE ON ELEMENTARY MECHANICS. For the Use of the Junior Classes at the University and the Higher Classes in Schools. With a Collection of Examples. By S. PARKINSON, B.D. *Third Edition*, revised. Crown 8vo. 9s. 6d.
- PARKINSON.—A TREATISE ON OPTICS. By S. PARKINSON, B.D. Crown 8vo. 10s. 6d.
- PATERSON.—TREATISE ON THE FISHERY LAWS of the UNITED KINGDOM, including the Laws of Angling. By JAMES PATERSON, M.A. Crown 8vo. 10s.
- PATMORE.—The ANGEL IN THE HOUSE. Book I. The Betrothal.—Book II. The Espousals.—Book III. Faithful for Ever. With Tamerton Church Tower. By COVENTRY PATMORE. 2 vols. fcap. 8vo. 12s.

PATMORE. — THE VICTORIES OF LOVE. Fcap. 8vo. 4s. 6d.

PAULI. — PICTURES OF OLD ENGLAND. By Dr. REINHOLD PAULI. Translated by E. C. OTTE. Crown 8vo. 8s. 6d.

PEEL. — JUDAS MACCABÆUS. An Heroic Poem. By EDMUND PEEL. Fcap. 8vo. 7s. 6d.

PHEAR. — ELEMENTARY HYDROSTATICS. By J. B. PHEAR, M.A. *Third Edition*. Crown 8vo. 5s. 6d.

PHILLIMORE. — PRIVATE LAW among the ROMANS. From the Pandects. By JOHN GEORGE PHILLIMORE, Q.C. 8vo. 16s.

PHILLIPS. — LIFE on the EARTH : its Origin and Succession. By JOHN PHILLIPS, M.A. LL.D. F.R.S. With Illustrations. Crown 8vo. 6s. 6d.

PHILOLOGY. — The JOURNAL OF SACRED AND CLASSICAL PHILOLOGY. Four vols. 8vo. 12s. 6d. each.

PLATO. — The REPUBLIC OF PLATO. Translated into English, with Notes. By Two Fellows of Trinity College, Cambridge (J. Ll. Davies, M.A. and D. J. Vaughan, M.A.). *Second Edition*. 8vo. 10s. 6d.

PLATONIC DIALOGUES. The. For English Readers. By W. WHEWELL, D.D. F.R.S. Master of Trinity College, Cambridge. Vol. I. *Second Edition*, containing *The Socratic Dialogues*, fcap. 8vo. 7s. 6d. Vol. II. containing *The Anti-Sophist Dialogues*, 6s. 6d. Vol. III. containing *The Republic*, fcap. 8vo. 7s. 6d.

PLEA for a NEW ENGLISH VERSION of THE SCRIPTURES. By a Licentiate of the Church of Scotland. 8vo. 6s.

POTTER. — A VOICE from the CHURCH in AUSTRALIA : Sermons preached in Melbourne. By the Rev. ROBERT POTTER, M.A. Royal fcap. 8vo. 4s. 6d.

PRATT. — TREATISE ON ATTRACTIONS, La Place's FUNCTIONS, and the FIGURE of the EARTH. By J. H. PRATT, M.A. *Second Edition*. Crown 8vo. 6s. 6d.

PROCTER. — A HISTORY of the BOOK OF COMMON PRAYER : with a Rationale of its Offices. By FRANCIS PROCTER, M.A. *Fifth Edition*, revised and enlarged. Cr. 8vo. 10s. 6d.

PROCTER. — An ELEMENTARY HISTORY of the BOOK of COMMON PRAYER. By FRANCIS PROCTER, M.A. 18mo. 2s. 6d.

PROPERTY and INCOME. — GUIDE to the UNPROTECTED in Matters relating to Property and Income. *Second Edition*. Crown 8vo. 3s. 6d.

- PUCKLE.—AN ELEMEN-  
TARY TREATISE on CONIC  
SECTIONS and ALGEBRAIC  
GEOMETRY, especially designed  
for the Use of Schools and  
Beginners. By G. HALE  
PUCKLE, M.A. *Second Edi-  
tion.* Crown 8vo. 7s. 6d.
- RAMSAY. — THE CATE-  
CHISER'S MANUAL; or, the  
Church Catechism illustrated and  
explained, for the Use of Clergy-  
men, Schoolmasters, and Teach-  
ers. By ARTHUR RAMSAY,  
M.A. *Second Edition.* 18mo.  
1s. 6d.
- RAWLINSON.—ELEMEN-  
TARY STATICS. By G.  
RAWLINSON, M.A. Edited  
by EDWARD STURGES, M.A.  
Crown 8vo. 4s. 6d.
- RAYs of SUNLIGHT for  
DARK DAYS. A Book of  
Selections for the Suffering. With  
a Preface by C. J. VAUGHAN,  
D.D. 18mo. *New Edition.*  
3s. 6d.; morocco, old style, 9s.
- ROBERTS.—DISCUS-  
SIONS ON THE GOSPELS.  
By REV. ALEXANDER RO-  
BERTS, D.D. *Second Edition.*  
revised and enlarged. 8vo. cloth,  
16s.
- ROBY.—AN ELEMEN-  
TARY LATIN GRAMMAR.  
By H. J. ROBY, M.A. 18mo.  
2s. 6d.
- ROBY.—STORY OF A  
HOUSEHOLD, and Other  
Poems. By MARY K. ROBY.  
Fcap. 8vo. 5s.
- ROMANIS.—SERMONS  
PREACHED at ST. MARY'S,  
READING. By WILLIAM  
ROMANIS, M.A. *First Series.*  
Fcap. 8vo. 6s. Also, *Second  
Series.* 6s.
- ROSSETTI.—GOBLIN  
MARKET, and other Poems.  
By CHRISTINA ROSSETTI.  
With Two Designs by D. G.  
ROSSETTI. *Second Edition.* Fcap.  
8vo. 5s.
- ROSSETTI. — THE  
PRINCE'S PROGRESS, and  
other Poems. By CHRISTINA  
ROSSETTI. With Two Designs  
by D. G. ROSSETTI. *In the press.*
- ROSSETTI.—DANTE'S  
COMEDY: *The Hell.* Trans-  
lated into Literal Blank Verse.  
By W. M. ROSSETTI. Fcap.  
8vo. cloth. 5s.
- ROUTH.—TREATISE ON  
DYNAMICS OF RIGID BO-  
DIES. With Numerous Exam-  
ples. By E. J. ROUTH, M.A.  
Crown 8vo. 10s. 6d.
- ROWSSELL.—The ENGLISH  
UNIVERSITIES AND THE  
ENGLISH POOR. Sermons  
preached before the University of  
Cambridge. By T. J. ROW-  
SELL, M.A. Fcap. 8vo. 2s.
- ROWSSELL. — MAN'S  
LABOUR and GOD'S HAR-  
VEST. Sermons preached before  
the University of Cambridge in  
Lent, 1861. Fcap. 8vo. 3s.
- RUFFINI. — VINCENZO;  
or, SUNKEN ROCKS. By  
JOHN RUFFINI. Three vols.  
crown 8vo. 31s. 6d.

- RUTH and her FRIENDS.**  
A Story for Girls. With a Frontispiece. *Fourth Edition.* Royal 16mo. 3s. 6d.
- SCOURING of the WHITE HORSE;** or, the Long Vacation Ramble of a London Clerk. By the Author of "Tom Brown's School Days." Illustrated by DOYLE. *Eighth Thousand.* Imp. 16mo. 8s. 6d.
- SEEMANN.—VITI:** an Account of a Government Mission to the Vitian or Fijian Group of Islands. By BERTHOLD SEEMANN, Ph. D. F. L. S. With Map and Illustrations. Demy 8vo. 14s.
- SELWYN.—THE WORK of CHRIST in the WORLD.** By G. A. SELWYN, D.D. *Third Edition.* Crown 8vo. 2s.
- SHAKESPEARE.—THE WORKS OF WILLIAM SHAKESPEARE.** Edited by WM. GEORGE CLARK, M.A. and W. ALDIS WRIGHT, M.A. Vols. I to 6, 8vo. 10s. 6d. each. To be completed in Eight Volumes.
- SHAKESPEARE.—THE COMPLETE WORKS OF WILLIAM SHAKESPEARE.** The *Globe Edition.* Edited by W. G. CLARK and W. A. WRIGHT. Royal Fcap. 3s. 6d.
- SHAKESPEARE'S TEMPEST.** With Glossarial and Explanatory Notes. By the Rev. J. M. JEPHSON. 18mo. 3s. 6d.
- SHAIRP. — KILMAHOE:** and other Poems. By J. CAMPBELL SHAIRP. Fcap. 8vo. 5s.
- SHIRLEY.—ELIJAH;** Four University Sermons. I. Samaria. II. Carmel.—III. Kishon.—IV. Horeb. By W. W. SHIRLEY, D.D. Fcap. 8vo. 2s. 6d.
- SIMEON.—STRAY NOTES ON FISHING AND ON NATURAL HISTORY.** By CORNWALL SIMEON. Cr. 8vo. 7s. 6d.
- SIMPSON.—AN EPITOME OF THE HISTORY OF THE CHRISTIAN CHURCH.** By WILLIAM SIMPSON, M.A. *Fourth Edition.* Fcp. 8vo. 3s. 6d.
- SKETCHES FROM CAMBRIDGE.** By A DON. Crown 8vo. cloth, 3s. 6d.
- SMITH.—A LIFE DRAMA,** and other Poems. By ALEXANDER SMITH. Fcap. 8vo. 2s. 6d.
- SMITH. — CITY POEMS.** By ALEXANDER SMITH, Fcap. 8vo. 5s.
- SMITH.—EDWIN OF DEIRA.** *Second Edition.* By ALEXANDER SMITH. Fcap. 8vo. 5s.
- SMITH.—A LETTER TO A WHIG MEMBER of the SOUTHERN INDEPENDENCE ASSOCIATION.** By GOLDWIN SMITH. Extra fcap. 8vo. 2s.
- SMITH. — ARITHMETIC AND ALGEBRA.** By BARNARD SMITH, M.A. *Ninth Edition.* Cr. 8vo. cloth, 10s. 6d.
- SMITH. — ARITHMETIC for the USE of SCHOOLS.** *New Edition.* Crown 8vo. 4s. 6d.



SMITH.—A KEY to the ARITHMETIC for SCHOOLS. *Second Edition.* Crown 8vo. 8s. 6d.

SMITH.—EXERCISES IN ARITHMETIC. By BARNARD SMITH. With Answers. Crown 8vo. limp cloth, 2s. 6d. Or sold separately, as follows :—Part I. 1s. Part II. 1s. Answers, 6d.

SMITH.—SCHOOL CLASS BOOK OF ARITHMETIC. By BARNARD SMITH. 18mo. cloth, 3s. Or sold separately, Parts I. and II. 10d. each, Part III. 1s.

SNOWBALL.—THE ELEMENTS of PLANE and SPHERICAL TRIGONOMETRY. By J. C. SNOWBALL, M.A. *Tenth Edition.* Crown 8vo. 7s. 6d.

SPRING SONGS.—By a WEST HIGHLANDER. With a Vignette Illustration by GOURLAY STEELE. Fcap. 8vo. 1s. 6d.

STEPHEN.—GENERAL VIEW of the CRIMINAL LAW of ENGLAND. By J. FITZ-JAMES STEPHEN. 8vo. 18s.

STORY.—MEMOIR of the Rev. ROBERT STORY. By R.H. STORY. Crown 8vo. 7s. 6d.

STRICKLAND.—ON COTTAGE CONSTRUCTION and DESIGN. By C. W. STRICKLAND. With Specifications and Plans. 8vo. 7s. 6d.

SWAINSON.—A HANDBOOK to BUTLER'S ANALOGY. By C. A. SWAINSON, D.D. Crown 8vo. 1s. 6d.

SWAINSON.—The CREEDS of the CHURCH in their RELATIONS to HOLY SCRIPTURE and the CONSCIENCE of the CHRISTIAN. 8vo. cloth, 9s.

SWAINSON.—The AUTHORITY of the NEW TESTAMENT, and other Lectures, delivered before the University of Cambridge. 8vo. cloth, 12s.

TACITUS.—The HISTORY of TACITUS translated into ENGLISH. By A. J. CHURCH, M.A., and W. J. BRODRIBB, M.A. With a Map and Notes. 8vo. 10s. 6d.

TAIT AND STEELE.—A TREATISE ON DYNAMICS, with numerous Examples. By P. G. TAIT and W. J. STEELE. *Second Edition.* Crown 8vo. 10s. 6d.

TAYLOR.—WORDS AND PLACES; or, Etymological Illustrations of History, Ethnology, and Geography. By the Rev. ISAAC TAYLOR. *Second Edition.* Crown 8vo. 12s. 6d.

TAYLOR.—THE RESTORATION OF BELIEF. New and Revised Edition. By ISAAC TAYLOR, Esq. Crown 8vo. 8s. 6d.

TAYLOR.—BALLADS AND SONGS OF BRITAIN. By TOM TAYLOR. With Illustrations by TISSOT, MILLAIS, TENNIEL, KEENE, and H. K. BROWNE. Small 4to. cloth gilt, 12s.

TAYLOR.—GEOMETRICAL CONICS. By C. TAYLOR, B.A. Crown 8vo. 7s. 6d.

TEMPLE. — SERMONS  
PREACHED in the CHAPEL  
of RUGBY SCHOOL. By F.  
TEMPLE, D.D. 8vo. 10s. 6d.

THRING.—A CONSTRU-  
ING BOOK. Compiled by  
EDWARD THRING, M.A.  
Fcap. 8vo. 2s. 6d.

THRING.—A LATIN GRA-  
DUAL. A First Latin Constru-  
ing Book for Beginners. Fcap.  
8vo. 2s. 6d.

THRING.—THE ELE-  
MENTS of GRAMMAR taught  
in ENGLISH. *Third Edition.*  
18mo. 2s.

THRING.—THE CHILD'S  
GRAMMAR. *A New Edition.*  
18mo. 1s.

THRING. — SERMONS  
DELIVERED at UPPINGHAM  
SCHOOL. Crown 8vo. 5s.

THRING.—SCHOOL  
SONGS. With the Music ar-  
ranged for four Voices. Edited  
by the Rev. EDWD. THRING,  
M.A. and H. RICCIUS. Small  
folio, 7s. 6d.

THRING. — EDUCATION  
and SCHOOL. By the Rev.  
EDWARD THRING, M.A.  
Crown 8vo. 6s. 6d.

THRUPP.—The SONG of  
SONGS. A New Translation,  
with a Commentary and an In-  
troduction. By the Rev. J. F.  
THRUPP. Crown 8vo. 7s. 6d.

THRUPP. — ANTIQENT  
JERUSALEM: a New Investi-  
gation into the History, Topo-  
graphy, and Plan of the City,  
Environs, and Temple. With  
Map and Plans. 8vo. 15s.

THRUPP. — INTRODUC-  
TION to the STUDY and USE  
of the PSALMS. 2 vols. 21s.

THRUPP—PSALMS AND  
HYMNS for PUBLIC WOR-  
SHIP. Selected and Edited by  
the Rev. J. F. THRUPP, M.A.  
18mo. 2s. common paper, 1s. 4d.

TOCQUEVILLE. — ME-  
MOIR, LETTERS, and RE-  
MAINS of ALEXIS DE TOC-  
QUEVILLE. Translated from  
the French by the Translator of  
"Napoleon's Correspondence with  
King Joseph." With Numerous  
additions, 2 vols. crown 8vo. 21s.

TODD.—THE BOOKS OF  
THE VAUDOIS. The Walden-  
sian Manuscripts preserved in the  
Library of Trinity College, Dub-  
lin, with an Appendix by JAMES  
HENTHORN TODD, D.D.  
Crown 8vo. cloth, 6s.

TODHUNTER. — WORKS  
by ISAAC TODHUNTER,  
M.A. F.R.S.

EUCLID FOR COLLEGES  
AND SCHOOLS. *New Edition.*  
18mo. 3s. 6d.

ALGEBRA FOR BEGINNERS.  
With numerous Examples. 18mo.  
2s. 6d.

A TREATISE ON THE DIF-  
FERENTIAL CALCULUS.  
With numerous Examples. *Fourth*  
*Edition.* Crown 8vo. 10s. 6d.

A TREATISE ON THE IN-  
TEGRAL CALCULUS. *Second*  
*Edition.* With numerous Exam-  
ples. Crown 8vo. 10s. 6d.

A TREATISE ON ANALYTI-  
CAL STATICS. *Second Edition.*  
Crown 8vo. 10s. 6d.

- A TREATISE ON CONIC SECTIONS. *Third Edition.* Crown 8vo. 7s. 6d.
- ALGEBRA FOR THE USE OF COLLEGES AND SCHOOLS. *Third Edition.* Crown 8vo. 7s. 6d.
- PLANE TRIGONOMETRY for COLLEGES AND SCHOOLS. *Third Edition.* Crown 8vo. 5s.
- A TREATISE ON SPHERICAL TRIGONOMETRY for the USE of COLLEGES and SCHOOLS. *Second Edition.* Crown 8vo. 4s. 6d.
- CRITICAL HISTORY OF THE PROGRESS of the CALCULUS of VARIATIONS during the NINETEENTH CENTURY. 8vo. 12s.
- EXAMPLES OF ANALYTICAL GEOMETRY of THREE DIMENSIONS. *Second Edition.* Crown 8vo. 4s.
- A TREATISE on the THEORY of EQUATIONS. Crown 8vo. cloth, 7s. 6d.
- MATHEMATICAL THEORY OF PROBABILITY. 8vo. cloth, 18s.
- TOM BROWN'S SCHOOL DAYS. By an OLD BOY. 29th Thousand. Fcap. 8vo. 5s. (*People's Edition*, 2s.)
- TOM BROWN at OXFORD. By the Author of "Tom Brown's School Days." *New Edition.* Crown 8vo. 6s.
- TRACTS FOR PRIESTS and PEOPLE. By VARIOUS WRITERS.
- THE FIRST SERIES, Crown 8vo. 8s.
- THE SECOND SERIES, Crown 8vo. 8s.
- The whole Series of Fifteen Tracts may be had separately, price One Shilling each.
- TRENCH. — WORKS BY R. CHENEVIX TRENCH, D.D. Archbishop of Dublin.
- NOTES ON THE PARABLES OF OUR LORD. *Ninth Edition.* 8vo. 12s.
- NOTES ON THE MIRACLES OF OUR LORD. *Seventh Edition.* 8vo. 12s.
- SYNONYMS OF THE NEW TESTAMENT. *New Edition.* 1 vol. 8vo. cloth, 10s. 6d.
- ON THE STUDY OF WORDS. *Eleventh Edition.* Fcap. 4s.
- ENGLISH PAST AND PRESENT. *Fifth Edition.* Fcap. 8vo. 4s.
- PROVERBS and their LESSONS. *Fifth Edition.* Fcap. 8vo. 3s.
- SELECT GLOSSARY OF ENGLISH WORDS used Formerly in SENSES different from the PRESENT. *Second Edition.* 4s.
- ON SOME DEFICIENCIES IN our ENGLISH DICTIONARIES. *Second Edition.* 8vo. 3s.
- SERMONS PREACHED IN WESTMINSTER ABBEY. *Second Edition.* 8vo. 10s. 6d.
- THE FITNESS OF HOLY SCRIPTURE for UNFOLDING the SPIRITUAL LIFE of MAN: Christ the Desire of all Nations; or, the Unconscious Prophecies of Heathendom. Hulsean Lectures. Fcap. 8vo. *Fourth Edition.* 5s.

**ARCHBISHOP TRENCH'S**  
WORKS (*continued*)—

ON THE AUTHORIZED VERSION of the NEW TESTAMENT. *Second Edition.* 7s.

JUSTIN MARTYR and OTHER POEMS. *Fifth Edition.* Fcap. 8vo. 6s.

POEMS FROM EASTERN SOURCES, GENOVEVA, and other Poems. *Second Edition.* 5s. 6d.

ELEGIAC POEMS. *Third Edition.* 2s. 6d.

CALDERON'S LIFE'S A DREAM: the Great Theatre of the World. With an Essay on his Life and Genius. 4s. 6d.

REMAINS OF THE LATE MRS. RICHARD TRENCH. Being Selections from her Journals, Letters, and other Papers. *Second Edition.* With Portrait, 8vo. 15s.

COMMENTARY ON THE EPISTLES TO THE SEVEN CHURCHES IN ASIA. *Second Edition.* 8s. 6d.

SACRED LATIN POETRY. Chiefly Lyrical. Selected and Arranged for Use. *Second Edition.* Corrected and Improved. Fcap. 8vo. 7s.

TRENCH—BRIEF NOTES on the GREEK of the NEW TESTAMENT (for English Readers). By the Rev. FRANCIS TRENCH, M.A. Crown 8vo. cloth, 6s.

TRENCH.—FOUR ASSIZE SERMONS, Preached at York and Leeds. By the Rev. FRANCIS TRENCH, M.A. Crown 8vo. cloth, 2s. 6d.

TREVELYAN.—THE COMPETITION WALLAH. By G. O. TREVELYAN. Cr. 8vo. 9s.

TREVELYAN.—CAWNPORE. By G. O. TREVELYAN. Illustrated with Plan and two Engravings. Crown 8vo. 10s. 6d.

TUDOR.—THE DECALOGUE VIEWED AS THE CHRISTIAN'S LAW, with Special Reference to the Questions and Wants of the Times. By the Rev. RICH. TUDOR, B.A. Crown 8vo. 10s. 6d.

TULLOCH.—The CHRIST OF THE GOSPELS AND THE CHRIST OF MODERN CRITICISM. Lectures on M. RENNAN'S "Vie de Jésus." By JOHN TULLOCH, D.D. Principal of the College of St. Mary, in the University of St. Andrew. Extra fcap. 8vo. 4s. 6d.

TURNER.—SONNETS by the Rev. CHARLES TENNYSON TURNER. Dedicated to his brother, the Poet Laureate. Fcap. 8vo. 4s. 6d.

TYRWHITT.—THE SCHOOLING OF LIFE. By R. St. JOHN TYRWHITT, M.A. Vicar of St. Mary Magdalen, Oxford. Fcap. 8vo. 3s. 6d.

VACATION TOURISTS; and Notes of Travel in 1861. Edited by F. GALTON, F.R.S. With Ten Maps illustrating the Routes. 8vo. 14s.

VACATION TOURISTS; and Notes of Travel in 1862 and 3. Edited by FRANCIS GALTON, F.R.S. 8vo. 16s.

- VAUGHAN. — SERMONS PREACHED in ST. JOHN'S CHURCH, LEICESTER, during the Years 1855 and 1856. By DAVID J. VAUGHAN, M.A. Vicar of St. Martin's, Leicester. Crown 8vo. 5s. 6d.
- VAUGHAN. — SERMONS ON THE RESURRECTION. With a Preface. By D. J. VAUGHAN, M.A. Fcap. 8vo. 3s.
- VAUGHAN. — THREE SERMONS ON THE ATONEMENT. By D. J. VAUGHAN, M.A. 1s. 6d.
- VAUGHAN. — SERMONS ON SACRIFICE AND PROPITIATION. By D. J. VAUGHAN, M.A. 2s. 6d.
- VAUGHAN. — CHRISTIAN EVIDENCES and the BIBLE. By DAVID J. VAUGHAN, M.A. Fcap. 8vo. cloth, price 3s. 6d.
- VAUGHAN. — WORKS BY CHARLES J. VAUGHAN, D.D. Vicar of Doncaster :—
- NOTES FOR LECTURES ON CONFIRMATION. With suitable Prayers. *Sixth Edition.* 1s. 6d.
- LECTURES on the EPISTLE to the PHILIPPIANS. *Second Edition.* 7s. 6d.
- LECTURES on the REVELATION of ST. JOHN. 2 vols. crown 8vo. 15s. *Second Edition.* 15s.
- EPIPHANY, LENT, AND EASTER. A Selection of Expository Sermons. *Second Edition.* Crown 8vo. 10s. 6d.
- THE BOOK AND THE LIFE: and other Sermons Preached before the University of Cambridge. *Second Edition.* Fcap. 8vo. 4s. 6d.
- MEMORIALS OF HARROW SUNDAYS. A Selection of Sermons preached in Harrow School Chapel. With a View of the Chapel. *Fourth Edition.* Cr. 8vo. 10s. 6d.
- ST. PAUL'S EPISTLE TO THE ROMANS. The Greek Text with English Notes. *Second Edition.* Crown 8vo. red leaves, 5s.
- REVISION OF THE LITURGY. Four Discourses. With an Introduction. I. ABSOLUTISM. II. REGENERATION. III. ATHANASIAN CREED. IV. BURIAL SERVICE. V. HOLY ORDERS. *Second Edit.* Cr. 8vo. red leaves, 4s. 6d.
- LESSONS OF LIFE AND GODLINESS. A Selection of Sermons Preached in the Parish Church of Doncaster. *Third Edition.* Fcap. 8vo. 4s. 6d.
- WORDS from the GOSPELS. A Second Selection of Sermons Preached in the Parish Church of Doncaster. *Second Edition.* Fcap. 8vo. 4s. 6d.
- THE EPISTLES of ST. PAUL. For English Readers. Part I. containing the First Epistle to the Thessalonians. 8vo. 1s. 6d. Each Epistle will be published separately.
- THE CHURCH OF THE FIRST DAYS :—
- Series I. The Church of Jerusalem.
- „ II. The Church of the Gentiles.
- „ III. The Church of the World.
- Fcap. 8vo. cloth, 4s. 6d. each.

LIFE'S WORK AND GOD'S DISCIPLINE. Three Sermons. Fcap. 8vo. cloth, 2s. 6d.

VAUGHAN.—MEMOIR of ROBERT A. VAUGHAN, Author of "Hours with the Mystics." By ROB. VAUGHAN, D.D. *Second Edition*. Revised and enlarged. Extra fcap. 8vo. 5s.

VILLAGE SERMONS BY A NORTHAMPTONSHIRE RECTOR. With a Preface on the Inspiration of Holy Scripture. Crown 8vo. 6s.

VIRGIL.—THE ÆNEID Translated into English Blank VERSE. By JOHN MILLER. Crown 8vo. 10s. 6d.

VOLUNTEER'S SCRAP BOOK. By the Author of "The Cambridge Scrap Book." Crown 4to. 7s. 6d.

WAGNER.—MEMOIR OF THE REV. GEORGE WAGNER, late of St. Stephen's, Brighton. By J. N. SIMPKINSON, M.A. *Third and Cheaper Edition*. 5s.

WATSON AND ROUTH.—CAMBRIDGE SENATE-HOUSE PROBLEMS AND RIDERS. For the Year 1860. With Solutions by H. W. WATSON, M.A. and E. J. ROUTH, M.A. Cr. 8vo. 7s. 6d.

WARREN.—AN ESSAY on GREEK FEDERAL COINAGE. By the Hon. J. LEICESTER WARREN, M.A. 8vo. 2s. 6d.

WESTCOTT.—HISTORY of the CANON of the NEW TESTAMENT during the First Four Centuries. By BROOKE FOSS WESTCOTT, M.A. Cr. 8vo. 12s. 6d.

WESTCOTT.—CHARACTERISTICS of the GOSPEL MIRACLES. Sermons Preached before the University of Cambridge. *With Notes*. By B. F. WESTCOTT, M.A. Crown 8vo. 4s. 6d.

WESTCOTT.—INTRODUCTION TO THE STUDY OF THE FOUR GOSPELS. By B. F. WESTCOTT, M.A. Crown 8vo. 10s. 6d.

WESTCOTT.—The BIBLE in the CHURCH. A Popular Account of the Collection and Reception of the Holy Scriptures in the Christian Churches. By B. F. WESTCOTT, M.A. 18mo. 4s. 6d.

WESTMINSTER PLAYS.—Sive Prologi et Epilogi ad Fabulas in Sui Petri Colleg: actas qui Exstabant collecti et justa quoad licuit annorum serie ordinati, quibus accedit Declamationum qui vocantur et Epigrammatum delectus cur. F. MURE, A.M., H. BULL, A.M., CAROLO B. SCOTT, B.D. 8vo. 12s. 6d.

WILSON.—COUNSELS OF AN INVALID: Letters on Religious Subjects. By GEORGE WILSON, M.D. With Vignette Portrait. Fcap. 8vo. 4s. 6d.

WILSON.—RELIGIO CHEMICI. By GEORGE WILSON, M.D. With a Vignette beautifully engraved after a Design by NOEL PATON. Crown 8vo. 8s. 6d.

WILSON.—MEMOIR OF GEORGE WILSON, M.D. F.R.S.E. Regius Professor of Technology in the University of Edinburgh. By his Sister. Third Thousand. 8vo. with Portrait. 10s. 6d.

- WILSON. — THE FIVE GATEWAYS OF KNOWLEDGE. By GEORGE WILSON, M.D. *New Edit.* Fcap. 8vo. 2s. 6d. or in Paper Covers, 1s.
- WILSON. — The PROGRESS of the TELEGRAPH. Fcap. 8vo. 1s.
- WILSON. — PREHISTORIC ANNALS of SCOTLAND. By DANIEL WILSON, LL.D. Author of "Prehistoric Man," &c. 2 vols. demy 8vo. *New Edition.* With numerous Illustrations. 36s.
- WILSON. — PREHISTORIC MAN. By DANIEL WILSON, LL.D. *New Edition.* Revised and partly re-written, with numerous Illustrations. 1 vol. 8vo. 21s.
- WILSON. — A TREATISE ON DYNAMICS. By W. P. WILSON, M.A. 8vo. 9s. 6d.
- WILTON. — THE NEGB; or, "South Country" of Scripture. By the Rev. E. WILTON, M.A. Crown 8vo. 7s. 6d.
- WOLFE. — ONE HUNDRED AND FIFTY ORIGINAL PSALM AND HYMN TUNES. For Four Voices. By ARTHUR WOLFE, M.A. 10s. 6d.
- WOLFE. — HYMNS FOR PUBLIC WORSHIP. Selected and arranged by ARTHUR WOLFE, M.A. 18mo. 2s. Common Paper Edition, 1s. or twenty-five for 1l.
- WOLFE. — HYMNS FOR PRIVATE USE. — Selected and arranged by ARTHUR WOLFE, M.A. 18mo. 2s.
- WOODFORD. — CHRISTIAN SANCTITY. By JAMES RUSSELL WOODFORD, M.A. Fcap. 8vo. cloth. 3s.
- WOODWARD. — ESSAYS, THOUGHTS and REFLECTIONS, and LETTERS. By the Rev. HENRY WOODWARD. Edited by his Son. *Fifth Edition.* 8vo. cloth. 10s. 6d.
- WOODWARD. — THE SHUNAMITE. By the Rev. HENRY WOODWARD, M.A. Edited by his Son, THOMAS WOODWARD, M.A. Dean of Down. *Second Edition.* Crown 8vo. cloth. 10s. 6d.
- WOOLLEY. — LECTURES DELIVERED IN AUSTRIA. By JOHN WOOLLEY, D.C.L. Crown 8vo. 8s. 6d.
- WOOLNER. — MY BEAUTIFUL LADY. By THOMAS WOOLNER. *Second Edition.* Fcap. 8vo. 5s.
- WORSHIP (THE) OF GOD AND FELLOWSHIP AMONG MEN — Sermons on Public Worship. By MAURICE and Others. Fcap. 8vo. cloth. 3s. 6d.
- WRIGHT. — HELLENICA; or, a History of Greece in Greek, as related by Diodorus and Thucydides, being a First Greek Reading Book, with Explanatory Notes, Critical and Historical. By J. WRIGHT, M.A. *Second Edition,* WITH A VOCABULARY. 12mo. 3s. 6d.

WRIGHT.—A HELP TO  
LATIN GRAMMAR; or, the  
Form and Use of Words in Latin.  
With Progressive Exercises. Cr.  
8vo. 4s. 6d.

WRIGHT.—THE SEVEN  
KINGS OF ROME: An Easy  
Narrative, abridged from the First  
Book of Livy by the omission of  
difficult passages, being a First  
Latin Reading Book, with Gram-  
matical Notes. Fcap. 8vo. 3s.

WRIGHT.—A VOCABU-  
LARY AND EXERCISES ON  
THE "SEVEN KINGS OF  
ROME." Fcap. 8vo. 2s. 6d.

\* \* The Vocabulary and Exercises  
may also be had bound up with  
"The Seven Kings of Rome."  
5s.

WRIGHT.—DAVID, KING  
OF ISRAEL: Readings for the  
Young. By J. WRIGHT, M.A.  
With Six Illustrations. Royal  
16mo. cloth, gilt. 3s. 6d.

### WORKS BY THE AUTHOR OF "THE HEIR OF REDCLYFFE."

A BOOK OF GOLDEN DEEDS. 18mo. 4s. 6d.

THE TRIAL; More Links of the Daisy Chain. *Second Edition.* Crown  
8vo. 6s.

HISTORY OF CHRISTIAN NAMES. Two Vols. Crown 8vo. 1l. 1s.

THE HEIR OF REDCLYFFE. *Fourteenth Edition.* Crown 8vo. 6s.

DYNEVOR TERRACE. *Third Edition.* Crown 8vo. 6s.

THE DAISY CHAIN. *Seventh Edition.* Crown 8vo. 6s.

HEART'S EASE. *Eighth Edition.* Crown 8vo. 6s.

HOPES AND FEARS. *Second Edition.* Crown 8vo. 6s.

THE YOUNG STEPMOTHER. Crown 8vo. 6s.

THE LANCES OF LYNWOOD. 18mo. cloth, 3s. 6d.

THE LITTLE DUKE. *New Edition.* 18mo. cloth, 3s. 6d.

CLEVER WOMAN OF THE FAMILY. 2 vols. 12s.