THE BRIDGEWATER TREATISES:

THEIR THEOLOGICAL SIGNIFICANCE

by

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Thesis

submitted to the

University of Edinburgh

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy.

- Prefatory Notice -

The first chapter of this study on the theological significance of the Bridgewater Treatises is a description of the origin of the treatises. Chapter two contains an inclusive view of the method and content of the treatises — the details being arranged from the most general aspects of the earth's condition upwards through the vegetable and animal kingdoms to man. The treatises are so similar in the main features of their method and argument that it has been thought wisest not to make long reviews of the individual volumes. Instead a composite picture of the apologetic content of the series has been assembled into this single, comprehensive description. References to particular emphases and contributions of the individual treatises have been made at appropriate points. No effort has been made in the second chapter to be critical on points of natural science or to adjust errors, discrepancies, or out-of-date conceptions.

The third chapter is of minor value in comparison to the second. It contains an account of the outline or the sequence of contents of the individual treatises. It is hoped that any one who wishes to consult one or two of the Bridgewater Treatises can discover in the third chapter ample description of the volumes to guide him in the choice of treatises appropriate to his individual interests. A more extended treatment of the separate volumes could hardly avoid the stigma of wearisome repetition. A description of the life and work of each of the eight authors is also presented. The

selection of data has been made on the basis of the attainments which prepared or qualified the authors for participation in the Bridgewater project. The biographical notices are purposely brief, because more detailed information can be so easily obtained elsewhere. Any reader who wishes to have further information about the material in the third chapter will find that the footnotes give references to printed reviews of the individual treatises and biographies of the authors.

The final chapter has been prepared to show the place of the Bridgewater Treatises in the religious thought and feeling of their era and their fortunes in subsequent periods. They came as a climax to the popularity of the design argument. Contemporary comment and the long succession of editions indicate that their success was both extensive and sustained. The Darwinian controversy has been discussed in its relations to the reputation of the Bridgewater Treatises and their apologetic method. The last section of the chapter deals with the status of the design argument in the twentieth century. In showing the current standing of the design argument, no effort has been made to impute errors or excesses of judgment to those who accept or reject the argument. The purpose has been to indicate the position of the thinkers in relation to the design argument, not to vindicate their position. The Bridgewater authors were primarily interested in demonstrating the existence and character of God. For that reason, no attempt has been made in the present study to draw out the implications of their views on the doctrines of man, sin, salvation, free will, and providence.

The teleological argument has been called variously the argument *from* design, the argument *to* design, and the design argument. It seems preferable to use the latter term, including under it the lines of demonstration denoted by the other two terms. The term *design argument* has often been used as though it were equivalent to the term *teleological argument*. The present writer, assuming that all genuine teleology depends on design, has felt that no good purpose would be served in this dissertation by trying to make a distinction between the two terms.

The forms of spelling in this study follow the American practice, except within quotations from British authors. Quotations of more than four lines are customarily written in blocked, single-spaced form. Two or three exceptions to this procedure have been made, the purpose in each case being to assist the reader by a better continuity of narration.

The method of giving footnotes should be explained. The author, title, and page numbers of a book are given in the first reference to a book. In succeeding references within the same chapter, it has been customary to give only the author's name and the page numbers. Where two or more books by the same author have been cited in the chapter, the title or some abbreviation is repeated in later footnotes to specify the books. Roman numerals indicate volume numbers; Arabic numerals refer to page numbers. In the bibliography are listed only those books and publications actually consulted in the course of this study. It has not been deemed necessary to include standard reference works in the list.

April 30, 1949. M.C.T.

The Bridgewater Treatises: Their Theological Significance

— A Plan of the Work —

I. The Background of the Bridgewater Treatises.

A. The Life of the Earl of Bridgewater.

B. The Earl's Interest in Natural Theology.

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II. The Theology of the Bridgewater Treatises.

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The Background of the Bridgewater Treatises

Francis Henry Egerton was born in London on November 11, 1756. His father, John Egerton, was the Bishop of Durham. His mother was Lady Anne Sophia Grey, the daughter of Henry Grey, Duke of Kent. Francis Henry was educated at Eton and proceeded in 1773 to Oxford to study at Christ Church. There he received his B. A. degree in 1776 and, after further study, was awarded the degree of M. A. in 1780. He was enrolled as a fellow at All Soul's College, Oxford, in 1780, the same year in which his father gave him an appointment as prebendary of Durham Cathedral.[1] The Royal Society of London made him a fellow in 1781, the year in which the efforts of his cousin, Francis, the third Duke of Bridgewater, obtained for him the rectorship of Middle, in Shropshire.[2] He was appointed rector also of Whitchurch in 1797.[3]

In 1802 he began a period of residence in Paris, from which he never returned to England.[4] Among the French people he attained a distinctive reputation for his eccentric conduct and obstinate manner. It was his custom to keep a number of dogs and cats in his large home, at times having them dressed in bright costumes and seated about his table at dinner like

1 Dictionary of National Biography, 1908, VI, 572. (This will be denoted in subsequent footnotes as D. N. B.); Falk, Bernard, The Bridgewater Millions, 188.
2 D. N. B., loc. cit.; Falk, 188, 189.
3 Cokayne, G. E., The Complete Peerage, II, 1912, 316; D. N. B., VI, 572; Falk, 188, 189.
4 Falk, 185, 188.

privileged guests. Parisians became accustomed to the sight of him on his drives, with the noisy pets accompanying him in the carriage.[5]

An outstanding example of his steadfast loyalty to his decisions was his defiance of Napoleon's order in 1814 for the confiscation of the Hôtel de Noailles, which Egerton had purchased as his residence.[6] When the emperor later decreed that all buildings in the section where the Hôtel de Noailles stood were to be renovated in their facades to a uniform style, Egerton again refused to comply and he survived the incident with impunity.[7]

He was a respected antiquary and a student of classical literature.[8] He published an annotated Latin version of the Hippolytus of Euripides.[9] His works on Sappho gave him rank among the recognized authorities on her poetry.[10] He made Italian and French translations of Milton's Comus.[11] Among other of his publications were biographical works which proclaimed the nobility and accomplishments of his ancestors.[12] He gathered a valuable collection of manuscripts and autographs, principally on the literature of France and Italy, which passed to the British Museum at his death.[13]

5 Cokayne, The Complete Peerage, II, 316; D. N. B., VI, 573; Falk, 8, 209, 210; Timbs, John, English Eccentrics and Eccentricities, 111, 112.
6 Falk, 201, 202.
7 Falk, 202.
8 Cokayne, The Complete Peerage, II, 316; Falk, 189, 191.
9 Falk, 189.
10 Falk, 190, 191.
11 Falk, 199.
12 Allibone, S. A., Dictionary of English Literature, I, 245; D. N. B., VI, 573; Falk, 191, 192.
13 Falk, 218.

The theme of another work ascribed to him gives an indication of another of his interests. Allibone has credited Egerton with the authorship of a small volume "privately printed at Paris, by Didot" on "the subject of man's relation to his Maker."[14] C. W. Sutton, in the Dictionary of National Biography, mentioned this treatise on "Natural Theology," reporting that Didot was the printer for the volume, but that it was not finished.[15] It is not clear whether Sutton meant that Didot did not finish the task of printing Egerton's completed treatise or that Egerton did not complete the treatise which Didot, however, had agreed to print for him. Bernard Falk's comprehensive survey of the history of the dukes and earls of Bridgewater reports the theme of the volume to have been "the Goodness of God," adding that "nobody has ever come across a copy."[16]

•Francis Henry Egerton often sent requests for funds to his older brother, John William Egerton,[17] who had inherited a fortune of at least two million pounds[18] and the title of Earl of Bridgewater in 1803 upon the death of their cousin, Francis, the third and last Duke of Bridgewater.[19] In an exchange of letters in May, 1819, Francis Henry wrote to John William to ask him to guarantee, among other things, a sum of "£4000 for a work or works to display the power, wisdom, and goodness of God in creation,"[20] which Francis Henry wanted to endow in his will. John William remained as unresponsive

14 Allibone, I, 245.
15 D. N. B., VI, 573.
16 Falk, 218.
17 Falk, 206.
18 Falk, 175.
19 D. N. B., VI, 576; Falk, 175.
20 Falk, 207.

to this request as he had to the others with which his brother harrassed him. In 1823 John William died, disappointing the prevalent expectation that he would outlive his less healthy younger brother, to whom then fell the Bridgewater title and a considerable fortune.[21] Francis Henry Egerton thus became the ninth and last Earl of Bridgewater,[22] Viscount Brackley, and Baron Ellesmere,[23] and quietly and unaccountably assumed the title also of "Prince of the Holy Roman Empire."[24]

When the ninth earl died at Paris on February 11, 1829, it was discovered that he had bequeathed his valuable manuscripts to the British Museum with a generous fund for their care,[25] had left a sketch from which his memorial was to be designed, and had gifted a sum of 8000 pounds sterling to be paid to the author, or cooperating authors, whom the President of the Royal Society of London was instructed to appoint for the preparation and publication, in at least one thousand copies, of a work "on the Power, Wisdom, and Goodness of God, as manifested in the Creation; illustrating such work by all reasonable arguments, as for instance, the

21 Falk, 207, 208.

22 Francis Henry Egerton has been cited in Allibone, I, 245; D. N. B., VI, 572; The Encyclopedia Britannica, 1947, IV, 139; Falk, 8; and others as having been the "eighth and last Earl of Bridgewater." Cokayne, The Complete Peerage, II, 1910, edited by Vicary Gibbs, on page 316 listed him as the ninth Earl of Bridgewater. The latter authority is deemed to be preferrable on this point.

Gibbs also pointed out that 'Bridgwater,' not 'Bridgewater,' is the "correct spelling, as the word does not mean bridge over the water, but the burg of Walter." II, 211. The latter form of spelling is employed in all the Bridgewater Treatises and will be used throughout this dissertation for the sake of uniformity.

23 D. N. B., VI, 572, 573.

24 Falk, 209.

25 D. N. B., VI, 573; Falk, 216.

variety and formation of God's creatures in the animal, vegetable, and mineral kingdoms; the effect of digestion and thereby of conversion, the construction of the hand of man, and an infinite variety of other arguments; as also by discoveries, ancient and modern, in arts, sciences, and the whole extent of literature."[26]

The earl was interred beside many of his ancestors at the Little Gadesden Church, Hertfordshire, near Ashridge, the family home. A monument in white marble was prepared from the sketch which Egerton had left for his executors and was erected on the north wall of the church. Falk has described the monument as having for its central figure a woman, seated on a rock. Behind her is a stork, in front a dolphin. Her left elbow is laid upon the back of an elephant. Her right hand is extended to a volume inscribed "Works of Creation."[27]

The President of the Royal Society of London in 1829 was Davies Gilbert, who held the office from November 30, 1827, to November 30, 1830, when the Duke of Sussex succeeded him.[28] After being informed of the bequest of the Earl of Bridgewater and having the assurance of the relatives of the earl that they did not intend to dispute the endowment,[29] Davies Gilbert deemed it wise to seek advice on the matter from some outstanding clergymen, lest he be considered to be acting from personal favor or ill-informed judgment in making the

26 Philosophical Magazine, IX, 201 (March, 1831).
27 Falk, 218.
28 D. N. B., VII, 1203.
29 Gilbert to John F. W. Herschel on June 29, 1830, in Correspondence Regarding the Appointment of the Writers of the Bridgewater Treatises between Davies Gilbert and Others, 5, 6. (This will be denoted as 'Correspondence' in subsequent footnotes.)

appointments necessary for fulfilling the terms of the legacy.[30] He spoke to the Rev. G. D'Oyley, Chaplain to the Archbishop of Canterbury, to ascertain whether the Archbishop could be constrained to give advice. The chaplain undertook to enlist the latter's consent, or perhaps that of the Bishop of London if the Archbishop were unable to give his help. Chaplain D'Oyley wrote to Davies Gilbert on May 14, 1829, to announce that both the Archbishop of Canterbury and the Bishop of London were "most willing to assist . . . with any advice for which [Davies Gilbert] might think it proper to apply to them."[31] During the ensuing discussions and correspondence, the Archbishop on the eighth of June, 1830, offered the following suggestion:

> . . . I conceive the intention of the Testator was not so much to give a prize to an ingenious young man, as to encourage the publication of a work or works which might be really useful to the public. It has occurred to me that this object might perhaps be effected by your selecting a certain number of eminent persons, and desiring them to form outlines of a plan, the several parts of which might be filled up by them respectively, as they might agree amongst themselves.[32]

In a letter written on June 29, 1830, to John F. W. Herschel, Davies Gilbert stated that the decision had been reached in the consultations that the project would be accomplished by eight authors who were to prepare separate sections of the work under their own names. The eight

30 Philosophical Magazine, IX, 201, 202; Weld, C. R., A History of the Royal Society, II, 450, 451.
31 D'Oyley to Gilbert on May 14, 1829, in Correspondence, 4.
32 The Archbishop of Canterbury to Gilbert on June 8, 1830, in Correspondence, 4, 5.

contributions would be assembled and published together, the entire work perhaps filling two volumes of octavo size.[33] There must have been an earlier tentative decision to have three sections, for Charles Long, Baron Farnborough, a relative of the Earl of Bridgewater by marriage, wrote to Davies Gilbert and stated of the project, "you proposed I think to divide it into three parts. . . ."[34]

Meanwhile Dr. Peter Mark Roget, the Secretary to the Royal Society, having been informed of Davies Gilbert's intention to resign from the presidency of the society, wrote to Davies Gilbert on August 17, 1830, commenting that the appointment of the authors had been rather long delayed and that some concern was felt over the matter.[35] In writing to the Archbishop of Canterbury six days later, Davies Gilbert urged "the expediency of proceeding to make the appointments."[36]

Gilbert sent a list of the proposed divisions of the work and the authors suggested for the project to the Bishop of London on September 2, 1830, for the Bishop's advice. The list was as follows:

1. Human Anatomy, with the Hand . . . . C. Bell.
2. Comparative Anatomy with Physiology . . . . . P. M. Roget.
3. Geology . . . . . William Buckland.
4. Astronomy . . . . . William Whewell.
5. Adaptations in Nature for the Intellectual and Moral Functions of Man . . . Thomas Chalmers.

33 Gilbert to John F. W. Herschel on June 29, 1830, in Correspondence, 15.
34 Farnborough to Gilbert on August 7, 1830, in Correspondence, 7.
35 Roget to Gilbert on August 17, 1830, in Correspondence, 8.
36 Gilbert to the Archbishop of Canterbury on August 23, 1830, in Correspondence, 8, 9.

6. Adaptations in Nature for Man's Physical Constitution . . Dr. Kidd or Dr. Herbert Mayo.
7. Chemistry and Optics . . . . Dr. Prout or Dr. Brewster.
8. Natural History and its related Physiology . . . . . John Leonard Knapp.[37]

Eventually the letters of invitation were sent to the authors who had been selected. As early as August 23, 1830, Davies Gilbert and his advisors had agreed on Charles Bell, the surgeon who had "so eminently distinguished himself by writing on the Nervous System," as their choice for the section on human anatomy. The topic was to be treated in a way which would give prominence to the characteristics and the adaptations of the hand, a subject which was known to have been of especial interest to the Earl of Bridgewater.[38] Gilbert communicated with Bell in September, 1830, and elicited his acceptance in these words:

> I accept the task you propose to me, and although I see great difficulties in reconciling the people to such a bequest — which it will be my duty to attempt, yet it must lead me into very pleasant contemplations, and an improving course of reading and investigation . . . .[39]

Dr. Peter Mark Roget was another of the early nominees. As Secretary to the Royal Society he was in a position to be noticed by the president. Roget had written on August 17, 1830, to point out to Gilbert the desirability of bringing the project toward execution.[40] Within six days Davies

37 Gilbert to the Bishop of London on September 2, 1830, in Correspondence, 12, 13.
38 Gilbert to the Archbishop of Canterbury on August 23, 1830, in Correspondence, 8, 9.
39 Bell to Davies Gilbert on September 14, 1830, in Correspondence, 15.
40 Roget to Davies Gilbert on August 17, 1830, in Correspondence, 8.

Gilbert indicated in writing to the Archbishop of Canterbury that "I believe it was agreed . . . that Dr. Roget should be offered the department of Physiological or Comparative Anatomy" and that " . . . Dr. Roget also accepts."[41]

By that time Davies Gilbert and his two advisors had concurred in the thought that Dr. William Buckland was the proper man for the division on geology. His ready consent was obtained.[42] Buckland's name had first been proposed by the Archbishop of Canterbury.[43]

Davies Gilbert, by his letter of June 29, 1830, had invited John F. W. Herschel to write the section on astronomy.[44] Herschel replied promptly in a letter dated on July 1, 1830, declining to undertake the authorship of the treatise proposed to him. His explanation was that he was reluctant to weaken the effect of his testimony by offering it under such obvious financial inducement.[45] Upon Herschel's refusal to accept the assignment,[46] the Bishop of London proposed William Whewell of Cambridge for the task.[47] Whewell indicated his willingness to assist in the work.[48]

41 Gilbert to the Archbishop of Canterbury on August 23, 1830, in Correspondence, 8, 9; Roget, Bridgewater Treatise, I, xiii.

42 Gilbert to the Archbishop of Canterbury on August 23, 1830, in Correspondence, 8, 9.

43 Bishop of London to Gilbert on November 18, 1830, in Correspondence, 24, 25.

44 Gilbert to John F. W. Herschel on June 29, 1830, in Correspondence, 5, 6.

45 Herschel to Davies Gilbert on July 1, 1830, in Correspondence, 6, 7.

46 Available records show that Herschel was the only nominee who refused to participate.

47 Bishop of London to Gilbert on November 18, 1830, in Correspondence, 24, 25; Whewell, Bridgewater Treatise, v.

48 Whewell to Davies Gilbert on October 17, 1830, in Correspondence, 19.

The Bishop of London wrote to Dr. Thomas Chalmers, the professor of divinity in the University of Edinburgh, on October 1, 1830, stating that

> Mr. Davies Gilbert is of the opinion it may with advantage be treated of under eight distinct heads, one of which is the adaptation of the physical condition of man to his intellectual and moral faculties, or vice versa; another is the provision made by the Deity for the wants and comforts of man in the works of nature.
>
> Mr. D. Gilbert having consulted me on the subject, I told him that if you could be prevailed upon to undertake the former of these heads, it would be well disposed of, and accordingly he has authorised me to propose it to you. The expenses of publication will be defrayed out of the legacy, after which I suppose that there will be a sum of from £700 to £800 payable to the writer of each treatise. . . . [49]

Chalmers replied to the proposal, expressing his gratification at being associated "with so many eminent men in the accomplishment of so important a service."[50] He subsequently received a deed for the nomination from Davies Gilbert and replied to him directly on December 15, 1830, in a more formal acknowledgement of his assignment.[51] This assured the satisfaction of the wish expressed by the Archbishop of Canterbury in his letter to Davies Gilbert on August 26, 1830, that a Scottish writer be included in the group of contributors.[52]

49 Bishop of London to Chalmers on October 1, 1830, in Hanna, William, Memoirs . . . Thomas Chalmers, III, 308, 309.
50 Chalmers to the Bishop of London, no date, in Hanna, III, 309.
51 Chalmers to Davies Gilbert on December 15, 1830, in Correspondence, 20.
52 Archbishop of Canterbury to Davies Gilbert on August 26, 1830, in Correspondence, 10, 11.

For the division on the adaptations in nature to man's physical condition and wants the Bishop of London proposed that the author be either Dr. John Kidd of Oxford or Dr. Herbert Mayo, whose textbook on physiology had impressed the Bishop.[53] A letter from the Bishop indicated that the Archbishop of Canterbury recommended that the appointment be offerred to Dr. Kidd.[54] Dr. Kidd accepted the invitation to join in the project.

It appears to have been a suggestion of the Bishop of London that chemistry be a topic in the project.[55] Gilbert assented to his suggestion and indicated that chemistry should be considered to include "the Etherial or Imponderable Fluids or especially . . . Light, including Optics with the recent discoveries of polarization."[56] Gilbert offerred the names of Dr. Brewster, "who has distinguished himself in the Trans. of the Camb. Soc.,"[57] and Dr. William Prout for consideration as authorities in the field.[58] Dr. Prout was chosen and he accepted the appointment.

The Bishop of London at first believed that the portion

53 Bishop of London to Davies Gilbert on August 28, 1830, in Correspondence, 11.
54 Bishop of London to Davies Gilbert on November 18, 1830, in Correspondence, 24, 25.
55 Bishop of London to Gilbert on August 28, 1830, in Correspondence, 11.
56 Gilbert to the Bishop of London on September 2, 1830, in Correspondence, 12, 13.
57 This may have been David Brewster, LL. D., whose article on some optical properties of the Brazilian topaz was published in the second volume of the Transactions of the Cambridge Philosophical Society, Cambridge, 1827. He was an authority on polarization and other phenomena in the field of light. He was knighted in 1831. D. N. B., II, 1209.
58 Gilbert to the Bishop of London on September 2, 1830, in Correspondence, 12, 13.

of the work on natural history and related physiology could be done well by Mr. John L. Knapp, the author of the Journal of a Naturalist, but he later advised against the appointment of Mr. Knapp.[59] He then asked Mr. John G. Children of the British Museum to recommend a competent and suitable writer for the essay. Mr. Children revealed sometime later to the Rev. William Kirby that "with respect to the recommendation of yourself as the author of the essay in question, his Lordship forestalled me, and whilst your name was on my lips, pronounced it himself."[60]

On November 16, 1830, Mr. Children, writing on behalf of the Bishop of London, dispatched to Mr. Kirby an invitation to write an essay on "The Habits and Instincts of Animals." He explained the nature of the assignment in these words:

> In all the essays the main point to be kept in view is the demonstration of wisdom and design in the works of Creation, — the proof, in short, of the existence of an Intelligent and Omnipotent Creator, as derived from His works; and the instances, which must be taken from every class of the animal kingdom, must be of the most striking kind, and the inferences deduced from them strongly and logically enforced. . . .[61]

Mr. Kirby sent a reply to the Bishop of London in the following words:

> My Lord, — I feel highly flattered and honoured by the proposal transmitted to me by Mr. Children,

59 Bishop of London to Davies Gilbert in letters of August 28, 1830, and October 1, 1830, in Correspondence.

60 J. G. Children to Kirby on November 29, 1830, in Freeman, J., Life of William Kirby, 437, 438.

61 J. G. Children to Kirby on November 16, 1830, in Freeman, 435, 436.

> of the British Museum, from his Grace the Archbishop of Canterbury and your Lordship.
>
> Nothing, certainly, would be more gratifying to me than to employ my talents, such as they are, in the great cause of religion, especially in times like the present, the course of my studies having been a good deal directed to Natural History, especially to that department of it most fertile in proof of the power, wisdom, and goodness of God, as manifested in the habits and instincts of insects. Therefore, though I cannot hope
>
> 'That to the height of this great argument
> I may assert eternal Providence,'
>
> and produce an essay equal to the subject and fully corresponding to your Lordship's expectations; yet, if sufficient time is allowed me, I humbly trust, with the divine assistance, I might be able to embody and concentrate a number of facts and observations that would strikingly demonstrate the being of God, and illustrate his adorable attributes.[62]

The eight authors[63] were thus appointed, as far as available data reveals, and were instructed to proceed with the preparation of the treatises. The American Monthly Review seems to have given an accurate expression to popular anticipation over the treatises with these words:

> The bequest was a good conception and munificently carried into execution by the founder; and with all the talents of England to choose from in appointing the writers, and an ample pecuniary compensation, as well as high distinction, to stimulate to exertion those so selected, we have a right to expect in these treatises much of finished excellence.[64]

Public interest in the bequest and in the projected essays was carried into conversation and rumors with some

62 Kirby to the Bishop of London, no date given, in Freeman, 437.

63 Each author, except Chalmers, was a Fellow of the Royal Society. The appointees were four medical men and four clergymen.

64 American Monthly Review, IV, 203 (September, 1833).

misconceptions about the authorship. The Bishop of Cloyne wrote to nominate a young man named Graves as one of the authors.[65] Charles Long, Baron Farnborough, a relative of the deceased earl,[66] communicated on the matter, "I would strongly recommend that one part should be given to Mr. Locker who is a friend of mine . . . . "[67] The Literary Gazette of London on February 5, 1831, reported the following item from the meeting of the Linnaean Society:

> At the conversazione after the meeting, amongst other subjects connected with the literature and the arts, which were spoken of, it was stated that Professor Buckland, Mr. Charles Bell, Dr. Roget, and others, had nearly completed their works as competitors for the legacy left by the late eccentric Duke of Bridgewater, for the best essay on the structure of the earth and the human hand. The bare mention of the names of the above gentlemen will be sufficient to point out to most of the Readers of the Lit. Gaz., the particular branch of science undertaken by each, viz. Professor Buckland, geology; Mr. C. Bell, anatomy; and Dr. Roget, physiology.[68]

William Buckland promptly wrote to Davies Gilbert to point out the notice and to mention also the publication of other unfair references to "competitors" and "job hunting." He requested Gilbert to draft a statement of the nature

65 Correspondence, 3, 4.

66 J. A. Hamilton, K. C., in D. N. B., 1908, XII, 100, seems to be in error in his statement that Charles Long, Lord Farnborough, married the sister of the last Earl of Bridgewater. Farnborough's wife was Amelia Hume. W. P. Courtney's article on Sir Abraham Hume in D. N. B., 1908, X, 209, gives the proper connection. Francis Henry Egerton's sister, Amelia Egerton, was married to Abraham Hume. Their eldest daughter, Amelia Hume, became the wife of Charles Long. Thus Charles Long was the husband of the earl's niece, not of the earl's sister.

67 Farnborough to Davies Gilbert on August 7, 1830, in Correspondence, 7.

68 The Literary Gazette, 1831, 88 (February 5, 1831).

and the true circumstances of the appointments for early publication in a reliable newspaper or journal.[69] Davies Gilbert willingly described his management of the trust in a letter which he submitted to the editors of the Philosophical Magazine. The editors printed the statement in their issue of March, 1831.[70] Gilbert set forth an account of his careful discussions with the Archbishop of Canterbury, the Bishop of London, and a nobleman who was related to the testator — probably Baron Farnborough, to whom William Kirby "inscribed" his treatise[71] and who was later consulted when the authors wanted an extension of time on their work.[72] Their aid had been sought in order to keep "the whole transaction above even the suspicion of favouritism or partiality," for it was apparent that no matter how prudent and wise a selection were made "several gentlemen must be omitted, possessing the requisite qualifications, equally perhaps, with those who received the appointments."[73]

Davies Gilbert included a list of the authors, without giving the subjects of their assignments. These will be cited at the end of the present chapter with the titles as given in their volumes when published. Davies Gilbert did not hint that he needed any suggestion as to the intentions of the deceased earl or of the best means of executing the

69 Buckland to Davies Gilbert on February 8, 1831, in Correspondence, 20, 21.

70 The name of the last Earl of Bridgewater, appearing in the second paragraph of the statement, was erroneously printed in the magazine as Thomas Henry Egerton. Philosophical Magazine, 1831, 200 (March, 1831).

71 Falk, 216, 217; Kirby, Bridgewater Treatise, I, v; and the footnote numbered 66 within this chapter.

72 Roget to Gilbert on October 13, 1832, in Correspondence, 17.

73 Philosophical Magazine, IX, 201, 202 (March, 1831).

project which he had prescribed. Gilbert replied only to the discussion concerning the authors.

G. C. Boase related in the Dictionary of National Biography that not all the appointments made by Gilbert gave "satisfaction."[74] This must be intended to inform that the manner of dividing the work and not the persons assigned to it was under question, for C. R. Weld, in his History of the Royal Society, wrote as follows:

> With all the care and deliberation exercised by Mr. Gilbert, strengthened by the advice of the eminent Prelates mentioned above, his decision did not meet with general approbation. It was conceived by some that the testamentary provisions of the Earl of Bridgewater had been misinterpreted: — that in fact, this nobleman intended that one work should be written and not eight, and that, if one person could not be found to execute the laborious and highly difficult task, two or more learned scientific men were to be called in to assist in compiling a volume of the nature mentioned in the will. No fault was found (and they would have been hypocrites indeed who could) with the gentlemen nominated by the President of the Royal Society, but it was, as has been stated, considered that the wishes of Lord Bridgewater had not been carried out.[75]

Nearly two years were to elapse before any of the treatises reached the public. The authors were apparently not sure of the exact nature of the results desired from them. Chalmers spent several pages in his preface and his introductory chapter to explain away a barrier which his assigned topic seemed to place in the way of his plan of treatment.[76] It is likely that Whewell represented the uncertainty of the whole group when he inquired of Gilbert

74 D. N. B., 1908, VII, 1203.
75 Weld, C., History of the Royal Society, II, 450, 451.
76 Chalmers, Bridgewater Treatise, I, 16-30.

the extent of the treatise he was expected to prepare and the "degree to which [the series] are expected to be calculated for popular apprehension."[77] William Kidd assumed that the intention of the earl had been to provide "a popular rather than a scientific exposition of facts."[78] The others also attempted to give a popular treatment which would, however, not destroy the scientific merit of their work.

The only occasion on which the authors gathered in a group to consult seems to have been on October 11, 1832, after they had been confronted with some difficulty in finding a publisher for their work. Dr. Roget wrote to Davies Gilbert that all the authors attended the meeting "excepting Dr. Chalmers and Mr. Kirby who had previously signified their concurrence in what we should then settle."[79] Murray, the publisher, asked to be released from his agreement to handle the work and Longmans and Company had declined to accept a contract. Pickering then consented to publish the volumes of the Bridgewater Treatises.[80]

It is not clear whether the authors by this time realized that their works would extend to twelve volumes, instead of fitting into the two volume compilation envisaged by Davies Gilbert when he wrote to John F. W. Herschel.[81] The work was to be completed by the end of June, 1833.[82] That deadline

77 Whewell to Gilbert on October 17, 1830, in Correspondence, 19.
78 Kidd, Bridgewater Treatise, vii.
79 Roget to Gilbert on October 13, 1832, in Correspondence, 17.
80 Ibidem.
81 Gilbert to John F. W. Herschel on June 29, 1830, in Correspondence, 5, 6.
82 Roget to Gilbert on October 13, 1832, in Correspondence, 17.

was set after all the authors had requested permission to have more time on the preparation of their treatises. Roget mentioned that the Duke of Sussex, then the President of the Royal Society, and Baron Farnborough, of the family of the late Earl of Bridgewater, had agreed that the request was not unwarranted.[83] Even this grant of additional time was inadequate for several of the authors and especially for Dr. Buckland, whose treatise was a pioneer work on the relations of the new science of geology to theology.

There was no mention in Dr. Roget's report of any comparing of textual notes or of an exchange of outlines at the meeting of October 11, 1832, with a view to assuring a comprehensive treatment of the fields of science without duplication and overlapping. None of the published treatises contained any reference to collaboration or careful consultation among the authors. Roget's Bridgewater Treatise carried the notice that he did not treat of the physiology of the voice and the phenomena of hearing, because Sir Charles Bell had "announced his intention of introducing it in his Treatise on the Hand."[84] It is open to conjecture whether it was an "announcement" made in a letter to Dr. Roget, in a group discussion, or in some other manner. Both William Kirby and Dr. Buckland inserted references in their treatises to tell of omissions or changes they had made after having read treatises which were published before their own.[85] The Edinburgh Review of January, 1834,

83 Roget to Gilbert on October 13, 1832, in Correspondence, 17.
84 Roget, Bridgewater Treatise, II, 444.
85 Buckland, Bridgewater Treatise, I, 40, 579; Kirby, Bridgewater Treatise, I, civ, cv.

harshly criticized that the authors "had no previous communication, . . . had never seen each other's productions, but were merely put in possession of the Cabalistic Titles of their respective Essays."[86]

William Whewell's letter to his sister on February 16, 1831, told that he planned to write his dissertation during the "Long Vacation" in 1831.[87] More than a year later, in March, 1832, he complained that other engagements still crowded him away from that task.[88] In February, 1833, he wrote to his friend Julius C. Hare that the treatise was to appear within a fortnight.[89]

Charles Bell wrote that his periods of retirement to the natural scenery of the countryside were responsible for the best passages in his Bridgewater Treatise.[90] William Hanna, the biographer of Thomas Chalmers, said that Chalmers did the work on his Bridgewater Treatise in the summer of 1832.[91]

During his work Dr. Buckland was repeatedly disappointed by the need to postpone the publication of his treatise. New descriptions and persistent difficulties in connection with the illustrative plates kept intruding new delays in the author's way, while reports and rumors about the treatise

86 Edinburgh Review, LVIII, 425 (January, 1834).
87 Whewell to Mrs. Douglas, in Douglas, Mrs. S., Life and Selections from the Correspondence of William Whewell, 1881, 138.
88 Whewell to Mrs. Douglas, in Douglas, 143.
89 Whewell to Archdeacon Hare, in Todhunter, Isaac, William Whewell, An Account of His Writings with Selections . . . ., II, 160.
90 Edinburgh Review, CXXXV, 425 (April, 1872); Pichot, Amédée, Life and Labours of Sir Charles Bell, 156, 159.
91 Hanna, III, 309.

whetted the desire of the public to have it. Caroline Fox mentioned in her Journal a visit of Dr. Buckland to her home. Dr. Buckland spoke informally to the company gathered in the drawing room. They listened with keen interest to his account of the formation of the earth and his explanation of the geological map which he had prepared as a frontispiece for his Bridgewater Treatise.[92]

Charles Lyell wrote to Professor Fleming of Aberdeen in January of 1835, saying, "Buckland's Bridgewater Treatise is only promised to us at Easter."[93] Nearly a year and a half later, on June 1, 1836, he wrote to Sir John F. W. Herschel, complaining, "As for Buckland's 'Bridgewater,' we are tired of waiting for it, as it has been reviewed in the 'Quarterly' two months. He says it will be out in six weeks."[94]

Buckland was, of course, aware of the exasperation aroused in the public mind by the frequent and long postponements. While addressing the British Association sometime in 1836, he sought to explain some of the reasons for the delay. His biographer reported his remarks as follows:

> 'Let any person,' he says, 'the least conversant with books of a similar description; let any person who knows what it is to have drawings, many of them from microscopic objects, made by artists, of new and unfamiliar subjects — let him consider that five or six different artists have been employed — that all their errors had severally to be corrected, that these engravings consist of seven hundred and five figures — then I repeat that he alone who has had a full experience

92 Fox, Caroline, ed. Pym, Horace, Memoirs of Old Friends, Being Extracts from the Journal and Letters of Caroline Fox . . . . , 1882. This is entered at 'August 31, 1836.'

93 Lyell to Professor Fleming on January 7, 1835 in Lyell, Life, Letters and Journals of Sir Charles Lyell, I, 445.

94 Lyell to Sir John F. W. Herschel on June 1, 1836, in Lyell, I, 466.

> of the difficulty will be able to appreciate the causes of the delay. For my own part I am astonished it has been finished so soon; and of this I assure you, that such is the intricacy of the subject, such is the tiresomeness of the details, that were the work to be done over again, no power on earth should induce me to undertake it.' [95]

In an introductory notice, Dr. Buckland named the artists who made the drawings for his treatise as Messieurs Fisher, Byfield, and Zeitter.[96] It was reported that in his extremely conscientious efforts Buckland spent the total of the 1000 pounds, allotted as his share of the legacy, upon the preparation of the illustrative plates.[97] His was one of the three treatises with an index; the others were those of Roget and Kirby.

When Francis Buckland edited a third edition of his father's treatise, in 1858, he added a memoir of his father which told of the preparation of the volumes as follows:

> During the long period that Dr. Buckland was engaged in writing the Bridgewater Treatise, my mother sat up night after night, for weeks and months consecutively, writing to my father's dictation; and this, often till the sun's rays, shining through the shutters at the early morn, warned her husband to cease from thinking, and the wife to rest her weary hand.[98]

Whewell's treatise on astronomy and general physics was the first to reach the public, appearing early in the spring of 1833.[99] Those of Kidd and Chalmers followed

95 Gordon, Mrs. Elizabeth, Life and Correspondence of William Buckland, 193, 194.
96 Buckland, Bridgewater Treatise, I, ix.
97 Allibone, I, 277; Edinburgh Review, LXV, 15 (April, 1837); Monthly Review, 1836, Part II, 351 (November, 1836).
98 Buckland, Bridgewater Treatise, third ed., xxxv, xxxvi.
99 Athenaeum, 1833, 184 (March 23, 1833); Whewell to Archdeacon Hare, in Todhunter, I, 160.

quickly in that order.[100] By the middle of the same year Bell's treatise was ready.[101] The works of Prout and Roget came from the press in 1834.[102] The appearance of Kirby's treatise was delayed until 1835 by the work on the second volume.[103] Buckland's work was published by midsummer of 1836, the last of the series to be completed.[104]

The list of the eight authors, their titles, and the price of their volumes is listed here in the order in which they stood in the series:[105]

1. Thomas Chalmers, D. D., Professor of Divinity in the University of Edinburgh.

   On the Power, Wisdom, and Goodness of God, as manifested in the Adaptation of External Nature to the Moral and Intellectual Constitution of Man. Two volumes. 16s.

2. John Kidd, M. D., F. R. S., Regius Professor of Medicine in the University of Oxford.

100 Athenaeum, 1833, 247 (April 20, 1833); Athenaeum, 1833, 396 (June 22, 1833); Literary Gazette, 1833, 339 (June 15, 1833).

101 Athenaeum, 1833, 427 (July 6, 1833); Edinburgh New Philosophical Journal, XV, 403, 404 (October, 1833).

102 Athenaeum, 1834, 516 (July 12, 1834); Monthly Review, 1834, I, 349 (April, 1834); Pickering's catalog, 1834, attached inside front cover of Prout, Bridgewater Treatise; Prout, Bridgewater Treatise, title page; Roget, Bridgewater Treatise, title page.

103 Kirby to Professor Hooker on August 30, 1834, in Freeman, 463, 464; Kirby, Bridgewater Treatise, title page.

104 Lyell to Sir John F. W. Herschel on June 1, 1836, in Lyell, I, 466; Lyell to his father on October 4, 1836, in Lyell, I, 473.

105 No information has been found which would indicate who determined the order in which the treatises were numbered in the series nor the basis on which the arrangement was decided. The prices are from Pickering's catalog, attached inside the front cover of Kirby, Bridgewater Treatise, second edition.

On the Adaptation of External Nature to the Physical Condition of Man, Principally with reference to the Supply of his Wants and the Exercise of his Intellectual Faculties. 9s. 6d.

3. William Whewell, M. A., F. R. S.,
Fellow of Trinity College, Cambridge.

Astronomy and General Physics, considered with reference to Natural Theology. 9s. 6d.

4. Sir Charles Bell, K. G. H., F. R. S.

The Hand: Its Mechanism and Vital Endowments as Evincing Design. 10s. 6d.

5. Peter Mark Roget, M. D., F. R. S.,
Secretary to the Royal Society.

Animal and Vegetable Physiology, considered with reference to Natural Theology.
Two volumes. 1 pound 10s.

6. William Buckland, D. D., F. R. S., Canon of Christ Church, and Professor of Geology in the University of Oxford.

Geology and Mineralogy, considered with reference to Natural Theology.
Two volumes. 1 pound 16s.

7. William Kirby, M. A., F. R. S.,
Rector of Barham.

On the Power, Wisdom, and Goodness of God, as manifested in the Creation of Animals and in their History, Habits, and Instincts.
Two volumes. 1 pound 10s.

8. William Prout, M. D., F. R. S., Fellow of the Royal College of Physicians.

Chemistry, Meteorology, and the Function of Digestion, considered with reference to Natural Theology. 15s.

The Theology of the Bridgewater Treatises

The authors of the Bridgewater Treatises were appointed to illustrate the power, wisdom, and goodness of God. The bequest of the Earl of Bridgewater did not appear to call for a proof of the reality of His existence.[1] Chalmers stated that "the object of the joint compositions which enter into this work, is not properly to demonstrate the being but the attributes of God, and more especially His power and wisdom and goodness."[2] He subsequently noted, in a compromising expression, that "whatever serves to indicate the character, serves also to confirm the existence, of the Divine Being."[3]

Several of the authors, not being satisfied that God's existence was universally or adequately conceded, specifically undertook to demonstrate the existence of God. Prout thought he saw this larger purpose in the performance of his task. He wrote that "the intention of these treatises, is to point out the various evidences of design, among the objects of creation; and to deduce from them the existence, and the attributes of the Creator."[4] Prout and Roget began their treatises with careful statements of the design argument, as though it contained more than a demonstration of God's power, wisdom, and goodness.[5]

1 Chalmers, Bridgewater Treatise, I, frontispiece; Philosophical Magazine, IX, 201 (March, 1831); Presbyterian Review, VI, 1 (November, 1834).
2 Chalmers, I, 51.
3 Chalmers, I, 55.
4 Prout, Bridgewater Treatise, 9.
5 Prout, 1-9; Roget, Bridgewater Treatise, I, 1-34.

Roget began by explaining that the mind of man, in trying to make intelligible its observation of events, has customarily considered the relations of phenomena under the categories of cause and effect and of means and ends.[6] In the fields of natural science, men have advantageously employed the concepts of cause and effect without, however, presuming to prove that such a principle as causation has an objective existence. The concepts have been helpful in man's efforts to describe his observation of regularity in the sequence of specific events.[7]

Man acquired a conviction of the existence of external objects and of changes in their condition from impressions communicated to him through his senses. He has found that, by a conscious effort of his will, he can induce certain changes in the natural world. To some of these changes or effects he has ascribed the notion of purpose or end. Further, man has observed in nature the occurrence of effects highly similar to those which have resulted from his own intelligence and will. He has been led to infer, then, that other beings having a similar physical appearance and producing similar effects by their actions are also exerting the same kind of intelligence and will which he believed himself to possess. By this sort of procedure, Roget explained, man has arrived at a belief in purposed ends and in the existence of intelligent agents with whom the purposes arose.[8]

The physical world was seen to contain effects which

6 Roget, I, 5.
7 Roget, I, 25.
8 Roget, I, 25, 26.

possessed the character of ends and which were too great, too intricate, or too extensive to have been brought about by men. The conclusion was reached that they must have been due to an intelligent will and power superior to that possessed by man.[9] Roget pointed out that in the world and among its resident creatures men have observed "studied arrangements," "preconceived adaptations," "multiplied evidences of intentions," and "signal proofs of beneficent design."[10]

Whewell, Chalmers, and Buckland also remarked on the nature of the inference,[11] but the most vivid and concise statement was probably that of Prout, which is here quoted at length because of its relevance to the whole argument of the treatises.

> An act, performed by ourselves, when directed to a certain end, we term an act of design. Among the objects of nature, we see the same end, attained by the employment of the same means, we ourselves employ. We are conscious of the will and the power which are requisite for the accomplishment of our own act; and are satisfied regarding the impossibility of that act, without our own or similar agency. We thence infer, that without some external agency, (implying a will and a power, similar to the will and the power exerted by ourselves), an act, similar to our own act, could not have been accomplished. Our belief then, in the agency of an intelligent Creator is founded, —
>
> On our recognition of the identity of effects produced in external nature, with effects produced by ourselves; from which identity of effect, we immediately infer identiry of purpose, — the existence of design, without reference to a designer:
>
> On our consciousness that the purpose effected by us proceeded from ourselves, the designers; when we conclude, that the design manifested in the

9 Roget, I, 27.
10 Roget, I, 3.
11 Chalmers, I, 49-51; Whewell, Bridgewater Treatise, 345, 347; Buckland, Bridgewater Treatise, I, 578.

external nature must have had a like origin, — that the manifestation of design, is demonstrative of the existence of a designer:

> On the pervading character of the design shown among the objects of nature; in which design, man recognizes the creation of the objects designed; and is thus led to infer the existence of a Creator. Now the faculty of reason which enables man to recognize the Creator of the objects around him; enables him to recognize in that Creator, the Creator of himself, and of his faculties. In reasoning, therefore, from his own acts to those of the Creator of the Universe, though conscious that he is reasoning from the finite to the Infinite; from weakness to Almighty Power; — yet, when he reflects, from whom he has derived his faculty of reason, man feels assured that his own reasoning, when it coincides with the reasoning evinced by his Creator, can be no other than the same. Nor founded, as that assurance is, on the constitution of the human mind, can such assurance be impugned; without impugning Him, by whom the human mind has been so constituted.
>
> Thus the argument of design, though not based on necessity, in the strict sense of the term, is of a validity equal to that of our knowledge of the existence of, and of our connexion with, an external world. Speculative men may deny the existence of all things external to themselves; may even deny their own existence; but while they continue to act like other men, it is not easy to imagine them sincere. We at least, discard all such speculations, as worthless fallacies, and contend for the common-sense view of the existence and origin of things; — that design is design, whether exemplified in the works of man, or in those of his Maker . . . . [12]

Whewell defended the validity of the inference with this statement:

> We conceive then that it is so far from being an unsatisfactory or unphilosophical process by which we collect the existence of a Deity from the works of creation, that the process corresponds most closely with that on which rests the most steadfast of our convictions, next to that of our own existence, the belief of the existence of other human beings. If any one ever went so far in scepticism as to doubt the existence of any other person than himself, he might, so far as the argument from final causes is concerned, reject the being of God as well as that of man; but

12 Prout, 5-7.

> without dwelling on the possibility of such fantasies, when we consider how impossible it is for men in general not to attribute personality, purpose, thought, will to each other, in virtue of certain combinations of appearances and actions, we must deem them most consistent and reasonable in attributing personality and purpose to God, in virtue of actions which constitute the universe, full as it is of combinations from which such a suggestion springs.[13]

Confident that they had set the belief in the existence of God on a firm epistemological foundation, the authors proceeded to set out the array of data which gave testimony of His attributes. It was deemed reasonable to expect that in a world where God governs — in the world which He created — there should be some signs characteristic of His work and His purposes.[14] Prout wrote that man can approach God "only by studying His works."[15] "Consequently, who ever has most studied His works, will be the best qualified — nay, will be alone qualified, to form an adequate conception of Him."[16] Kirby reminded his readers that "the Scripture expressly declares that the invisible things of God may be understood by the things that are made" and acknowledged that man could "have recourse to the works of creation as well as to revelation to lead [him] to the knowledge of the Creator."[17]

The contemplation of the earth and the heavens has been known in many generations to inspire men with thoughts of awe and worship for the creator of such wonderful phenomena. As knowledge of the natural world increased, men were impressed

13 Whewell, 346, 347.
14 Chalmers, II, 285; Whewell, 1; Roget, I, 1, 2; II, 639; Buckland, Bridgewater Treatise, I, 7-9, 502, 588; Kirby, Bridgewater Treatise, I, xvii, xlvi, xlvii.
15 Prout, 557.
16 Prout, 557.
17 Kirby, I, xlvi.

with the harmony in the relations of the parts.[18] The "order and regularity" which was evident in nature suggested "the operation of a calm and untroubled intelligence presiding over the course of events."[19]

This apprehension of a presiding intelligence has entered the minds of men without the use of syllogistic thought.[20] Whewell explained that when man has studied the ways of nature and observed "the existence of order, law, variety in constancy, and fixity in change; of relations of form and space, duration and succession, cause and consequence," in natural events, he is irresistibly impressed by "the thought of superintending intelligence."[21]

In the second chapter of his introduction Whewell pointed out that the "Laws of Nature are . . . rules describing the mode in which things do act."[22] He nowhere clearly stated in his treatise whether he felt that the laws had an objective existence prior to and regulating the "things" in nature or whether he conceived them to be man's formulations of the observed order of events and relationships in the natural world. The former appears to have been his notion. In his fourth chapter in the section on "Religious Views" he stated:

> What we call a general law is, in truth, a form of expression including a number of facts of like kind. The facts are separate; the unity of view by which we associate them, the character of generality and of law, resides in those relations which are the object of the intellect. The law once apprehended by us, takes in

18 Whewell, 295.
19 Whewell, 296.
20 Whewell, 293.
21 Whewell, 299.
22 Whewell, 6.

> our minds the place of the facts themselves, and is said to govern or determine them, because it determines our anticipations of what they will be. But we cannot, it would seem, conceive a law, founded on such intelligible relations, to govern and determine the facts themselves, any otherwise than by supposing also an intelligence by which these relations are contemplated, and these consequences realized. We cannot then represent to ourselves the universe governed by general laws, otherwise than by conceiving an intelligent and conscious Deity, by whom these laws were originally contemplated, established, and applied.[23]

Whether or not one wishes to construe this as granting the laws an existence independent of the mind of the man who apprehends them, the important thing to notice is that Whewell recognized in the general order and regularity in nature an evidence of intelligence prior to, and productive of, the order and regularity.[24]

Prout devoted his first two brief chapters to a discussion of the prevailing regularity in the operation of the "forces" and the material things of the world.[25] Roget told of "the one pervading principle of order" which was seen to insure in the natural world "the same regularity in the phenomena, the same simplicity in the law, and the same uniformity in the results."[26] Above all variation and the purported irregularity in the world, Buckland saw "ultimate proofs of method and design, evinced by the uniformity of the laws of matter and motion."[27] The "universal prevalence of law, method, and order assuredly attests the agency of some presiding and controlling mind."[28]

23 Whewell, 300, 301.
24 Whewell, 9, 293-308.
25 Prout, 24-30.
26 Roget, I, 9.
27 Buckland, I, 49.
28 Buckland, I, 46.

Chalmers, also, admitted the value of the laws of nature as evidence of a ruling intelligence. He saw that the reduction of "two or more subordinate to simpler or anterior laws" did not destroy the theistic argument. Rather, in showing a more pervasive regularity, it gave evidence of a greater number of particular examples of conformity to general order and harmony.[29] He suggested that the distribution of matter throughout the universe had been done in a way which made possible the appropriate relations of law to matter and of matter to law. He explained:

> It is not so much the endowment of matter with certain properties, as the arrangement of it into certain parts, that bespeaks here the hand of an artist . . . . It is not so much in the establishment of certain laws for matter, that we discern the aims or the purposes of intelligence, as in certain dispositions of matter, that put it in the way of being usefully operated upon by laws.[30]

Without a suitable disposition of matter, even the operation of the laws could not prevent a chaos.[31]

Whewell and Prout also wrote of the importance of the disposition of matter. Prout, in explaining the chemical properties of matter, gave a brief discussion of the admirable relations of the properties and the quantities of the materials in the universe.[32] Whewell emphasized the importance to be attached to the specific magnitudes which are given to the components of the universe.[33] The intelligence behind the universe undertook not only "the establishment of the laws of

29 Chalmers, I, 62, 63.
30 Chalmers, I, 34, 35.
31 Chalmers, I, 37.
32 Prout, 172-176, 188.
33 Whewell, 9, 109, 110, 144.

the elements," but also "the combination of these laws and the determination of the distribution and quantity of the materials on which they shall produce their effects."[34]

The Bridgewater authors in this manner demonstrated that the general order, constancy, and harmony which prevailed in the universe were validly apprehended by the mind of man to be the marks of an intelligence which was responsible for the origin and operation of the world.

Another sort of argument received more attention from the eight authors. They gave most of their efforts to a demonstration of the manifold adjustments of particular parts of the natural world to the peculiar circumstances surrounding them. "The chief then, or at least the usual subject-matter of the argument for the wisdom and goodness of God, is the obvious adaptation wherewith creation teems, throughout all its borders, of means to a beneficial end."[35] Whewell presumed that men would willingly recognize "the nourishment, the enjoyment, the diffusion of living things . . . to be a suitable" end or motive for guiding the divine intelligence in making the adjustments and contrivances which occur in nature.[36] Bell, Roget, and others agreed.[37]

Whewell felt impelled to apologize that the study of cosmical arrangements gave little direct evidence of adaptation towards the production of "the support and comfort of sentient

34 Whewell, 360.
35 Chalmers, I, 27. See also Buckland, I, 539.
36 Whewell, 16.
37 Bell, Bridgewater Treatise, 280; Roget, I, 35-37; Buckland, I, 293, 301; Kirby, II, 92, 93.

nature," but he sought to show that the study revealed something of the benevolent design which was probably more obvious in other spheres of nature.[38] The examples of the circular form of the orbits of the bodies in the solar system, the stability of the system, and the laws of motion were employed by Whewell to demonstrate the presence of design in the world known to astronomers.[39] He explained:

> Surely the obvious impression . . . arises . . . that the solar system, with its adjustments, is the work of an Intelligence, who pereeives, as self-evident, those truths, to which we attain painfully and slowly, and after all imperfectly; who has employed in every part of the creation refined contrivances, which we can only with effort understand; and who, in innumerable instances, exhibits to us what we should look upon as remarkable difficulties remarkably overcome, if it were not that, through the perfection of the provision, the trace of the difficulty is almost obliterated.[40]

Whewell discussed the "great number of quantities and laws" in nature which "appear to have been <u>selected</u> in the constitution of the universe." "By the adjustment to each other of the magnitudes and laws thus selected" the world possesses a constitution peculiarly fitted to support living beings.[41] Under no other arrangement of the quantities and the qualities would life, as now known, be possible on the earth.[42]

As a result of the earth's position in the universe, events in the world are set within an annually recurring

38 Whewell, 149, 150.
39 Whewell, Book II, <u>passim</u>.
40 Whewell, 169.
41 Whewell, 141, 142.
42 Whewell, 141, 142.

pattern of regular order.[43] A more frequent series of changes exists within the annual pattern so that the earth receives alternately prevailing conditions of light and darkness. A balance of many laws and magnitudes was required to establish the length of the year and the day as they apply to the earth.[44]

The relations existing between the mass of the earth and that of other bodies of the solar system show a fine and intricate contrivance.[45] Any change in one or more of the many factors related to the adjustments for the equilibrium of terrestrial magnitudes and forces would drastically upset the present stability.[46] A modification of the force of gravity to any appreciable degree would seriously affect conditions and objects on the earth, for

> . . . all the forces, both of involuntary and voluntary motion which produce the present orderly and suitable results by being properly proportioned to the resistance which they experience, would be thrown off their balance; they would produce motions too quick or too slow, wrong positions, jerks and stops, instead of steady, well conducted movements. The universe would be like a machine ill regulated; everything would go wrong; repeated collisions and a rapid disorganization must be the consequence.[47]

Friction was cited as a force which illustrates the utility and wisdom of present arrangements on the planet. "It operates where it is wanted, it is absent where it would be prejudicial."[48] Whewell did not understand all its connections, but in noticing that it occurred only at those

43 Whewell, 21-23.
44 Whewell, 21-41.
45 Whewell, 42-51.
46 Whewell, ibidem.
47 Whewell, 43, 44.
48 Whewell, 248.

points "where the general functions, analogies, and relations of the universe require it," he was impressed that it was present in "the system of the world for a purpose."[49] The mobile or the static condition of every object on the face of the earth depends on the effects of friction in ways too numerous to mention.[50]

Perhaps it is in matters of climate that man is most conscious of the adjustments which affect the conditions prevailing upon the earth. The world's climate is much dependent on its shape and motions.[51] The rays from the sun strike the globe with variations of intensity from place to place and from time to time. The spherical form of the earth and its oblique position in its orbit result in a variety and a stability of climate which are remarkable to contemplate.[52] The revolution of the earth on its axis is the immediate cause of the daily recurrence of periods of light and darkness.[53] It might be hastily assumed that the elliptical pattern of the orbit of the earth would cause it to suffer greater heating at moments when it is nearest the sun. This danger has been effectively circumvented by an increased velocity of the earth's motion with its greater proximity to the sun.[54]

Upon the earth are a multitude of other influences which operate to modify the conditions of climate. Among these are the functions of the atmosphere and water. The atmosphere permits the passage of the rays of the sun, but it reduces

49 Whewell, 246.
50 Whewell, 239-245.
51 Prout, 230 ff.
52 Prout, 230, 231.
53 Prout, 232, 233.
54 Prout, 231, 232.

their intensity.[55] The atmosphere at every part of the globe modifies the extremes of heat by rising to permit cooler currents of air to move in at the earth's surface.[56] As the air becomes warmer, it also absorbs an increasing amount of moisture.[57] The action of mists, fogs, and clouds is adjusted to terrestrial temperatures and to other requirements of climate.[58]

The atmosphere is employed as a conduit for conveying water from the reservoirs of the ocean to the masses of land. The process of evaporation lifts the water into the atmosphere, which is able to keep it suspended and carry it for miles. The presence of the moisture in the atmosphere helps to prevent the dehydration of created things on the earth, but it cannot minister to their need for water internally. To assuage the thirst of the earth's inhabitants an adjustment has been made to collect the water into clouds and to deliver it in refreshing showers to the earth.[59] All the supplies of water for the land masses are ultimately provided through this procedure of evaporation,[60] although Kirby earnestly insisted from a reading of the Scriptures, that the waters derived from the ocean by evaporation were of small measure compared to the waters originating from "the principal reservoir . . . under the earth."[61] The waters borne by the by the atmosphere are deprived of their salty inclusion as they are lifted from the oceans and are thus better fitted

55 Prout, 237, 238.
56 Prout, 269, 270, 276.
57 Prout, 283 ff.
58 Prout, Book II, Chapter V, Section II, passim.
59 Prout 283 ff.
60 Kidd, Bridgewater Treatise, 123; Buckland, I, 557.
61 Kirby, I, 24, 25.

to promote the growth of vegetation and animal life.[62] The preparation of geological strata of varying hardness and porosity has contributed to the conservation of showers and the better distribution of their advantages to large areas and long periods.[63]

Kidd, Whewell, and Prout discussed the subject of water and its adaptations. The importance of the relative size of the oceans and the land masses was cited as an important sign of adjustment in terrestrial equilibrium.[64] Laplace's discussion of the danger of general inundations of the land which would result from any marked increase in the content of the oceans was noted by Prout and Whewell.[65] Kidd and Prout wrote of the wise design which was evident in the presence of salt in the sea waters, the action of the tides, the polar ice caps, and the disposition of the areas of the seas.[66] The saline content of the sea waters was thought to be intended for lowering the freezing point of the waters, retarding evaporation, increasing buoyancy, and maintaining chemical stability.[67]

The wide distribution of water contributes to the importance of its properties in relation to heat absorption, radiation, and reflection.[68] The action of the water in relation to heat shows a peculiar "deviation from a general law [which produces] a very beneficial accomodation to the wants of man."[69]

62 Buckland, I, 570.
63 Buckland, I, 70, 71, 556 ff.
64 Whewell, 53; Prout, 172, 192, 193.
65 Whewell, 52; Prout, 197.
66 Kidd, 174; Prout, 195, 196.
67 Prout, 195, 196.
68 Prout, 238, 239, 246-251, 259 ff.
69 Kidd, 120, 121.

> Water, within very narrow limits of temperature, is a solid, or a liquid, or a gas; and yet these very narrow limits of temperature, neither more nor less, are precisely those, which exist upon the surface of our globe; where they are the natural, and the necessary results of its situation in the universe; and of the general laws, which govern the distribution of light and heat. Had the properties of this body been other than what they are; or had the general temperature of our globe been different; water would have existed altogether in the solid, or in the gaseous state; and its most important properties would have been unknown. Hence, it seems almost impossible to arrive at any other conclusion, than that the temperature of the earth, and the properties of water on its surface, have been mutually adjusted to each other.[70]

Water is most useful on the earth in its liquid state, although it has valuable uses as a solid and as a vapor.[71] To assist in maintaining water as a liquid a wise adjustment has been made to give it chemical barriers at its freezing and vaporizing points.[72] Thus its change from one form into another is prevented from occurring abruptly. Like most substances, water expands with an increase of its temperature and contracts correspondingly with a decrease in temperature. By a singular aberration from this function, a change occurs at a temperature just above the freezing point of water. Instead of continuing to contract, water begins to expand when its temperature drops to 40 degrees Fahrenheit.[73] This circumstance has a remarkable effect on the climate of the earth.[74] Whewell aptly treated this point in the following statement:

> These laws of the effect of the temperature on water are truly remarkable in their adaptation to the beneficial course of things at the earth's surface.

70 Prout, 167.
71 Kidd, 119.
72 Kidd, 119, 120; Prout, 239.
73 Prout, 258.
74 Kidd, 120-123; Prout, 255-261.

> Water contracts by cold; it thus equalizes the temperature of various times and places; but if its contraction were continued all the way to the freezing point, it would bind a great part of the earth in fetters of ice. The contraction then is here replaced by expansion, in a manner which but slightly modifies the former effects, while it completely obviates the bad consequences.[75]

Prout believed that this peculiar behavior of water at the point of freezing was "the most remarkable instance of design in the whole order of nature."[76]

The study of chemistry led Prout to marvel at the wonderful adjustments in the general harmony of the world of elements, mixtures, and compounds. Although each element has its own structure, many of them seem to have been designed not for their own existence, but primarily for beneficial combination with others.[77] The example of common table salt shows a valuable compound made from two noxious elements which nowhere occur in an uncombined state in nature.[78]

The present constitution of the world depends for its stability on the presently existent properties of hydrogen and oxygen, upon their happy combinations, and upon the countless operations which are possible with their assistance or participation.[79] These two highly combustible gasses, when combined at the temperature effective upon the earth's surface, form a liquid which is incombustible, a circumstance which no logic could have predicted.[80]

75 Whewell, 84, 85.
76 Prout, 259.
77 Prout, 137, 183, 184.
78 Prout, 112, 113, 183, 184.
79 Prout, 115.
80 Prout, 18, 184.

Prout carefully discussed the multiple adaptations which occur in matter. Chemical forces operate to determine what elements are to combine and the results of their combinations. Beyond these forces he said there is a cohesive property given to matter, which results in the tendency of every molecule to collect with like molecules "into symmetrical groups."[81] Lacking this property, "different molecules of the same matter would have been dispersed throughout nature, as accident, or other circumstances, might determine."[82] The earth's present constitution would be impossible without the construction of the molecule and its endowment with the combination of properties it now possesses.[83] Prout did not conceive that matter had to have the properties which now attach to it. He explained:

> Although we can form no idea of what matter would be, without its molecular properties; there is yet nothing in these properties which can induce us to believe, that they are <u>necessary</u> to the mere <u>existence</u> of matter.[84]

Having viewed the multitude of marvelous and beneficial adjustments in every part of the world of chemistry, Prout proposed that the only acceptable explanation for the existence of phenomena in their present state was that an intelligent agent was responsible.[85] To him the evidence of design and "happy adjustment" appeared to be so obvious and overwhelming that none but a rank-skeptic could refrain from acknowledging them to be "evidences of anything else

81 Prout, 103. See also Buckland, I, 45, 46, 574.
82 Prout, 103.
83 Prout, 103, 104.
84 Prout, 99.
85 Prout, 101. See also Buckland, I, 578.

than design."[86] He employed a form of the cosmological argument to urge that

> if the present molecular constitution of matter has not always existed, it must have been produced at some time, by some cause superior to itself. Now this cause must have operated either accidentally and by chance; or voluntarily and under the influence of a will.[87]

Prout therefore made the following proposals:

> First, that matter has not always existed in its present form: secondly, that it could not have existed in its present form by chance: thirdly, and consequently, that it must have been the work of a voluntary, and intelligent Being.[88]

Geological studies of the earth contributed convincing data to the same impression. Buckland and Whewell joined Prout in employing scientific knowledge to show that the earth has not existed from eternity. The recently proposed nebular hypothesis of Laplace had served to indicate the need for an initial establishment of the matter of the world by an external power prior to the state presumed by the theories of its development.[89] Whewell also accepted the idea of a "resisting medium" dispersed throughout space, a doctrine which gave him a further reason to believe in a creation from a non-mechanical and external cause.[90]

Since the time of its creation the earth has sustained a succession of gradual and of violent changes, giving it many varieties of conditions from time to time.[91] Eventually

86 Prout, 98, 168.
87 Prout, 101.
88 Prout, 98.
89 Whewell, 185-189; Buckland, I, 19, 40.
90 Whewell, 207.
91 Bell, 218, 219; Buckland, I, 11.

it was capable of supporting organic creatures, which were brought into being as new forms.[92] In the long ages following the appearance of life, the earth continued to be subjected to movements of its land masses by erosions and quakes. Every new and different period of the earth's career was accompanied by distinctive types of organic structure, usually of a more and more complex system of organization, each type being adapted to its contemporary conditions.[93] The benefits accruing to living beings at each stage from the many prior changes are "sufficient evidence of prospective wisdom and design" with future creatures of a higher and higher position in view.[94] The continuity of the pattern of changes and of adaptations through every epoch supplies "a chain of connected evidence, amounting to demonstration, of the continuous" existence, unity, wisdom, and power of God.[95]

The existing plant life of the earth abounds in an environment which has been most suitably prepared to nourish it.[96] The periodical character of weather conditions and the periodical functions of plants are adapted to one another so intimately that any alteration of the length and succession of the seasons would destroy the vegetation which covers the earth.[97] This is so whether one prefers to think that the terrestrial conditions were adapted to plant life or that plant life was adapted to the state of the earth.[98] Whewell rejected the hypothesis that plants of many varieties existed

92 Buckland, I, 58, 59.
93 Sedgwick's Address to the Geological Society of London, quoted in Prout, 214; Buckland, I, 107.
94 Buckland, I, 44.
95 Buckland, I, viii.
96 Whewell, 28 ff., 142, 143.
97 Whewell, 23.
98 Whewell, 20, 21.

at a former time and that only those suited to the earth's present circumstances had been able to survive.

> If [one] were to suppose that plants were originally fitted to years of various lengths, and that such only have survived to the present time, as had a cycle of a length equal to our present year, or one which could be accomodated to it; we should reply, that the assumption is too gratuitous and extravagant to require much consideration; but that, moreover, it does not remove the difficulty. How came the functions of plants to be periodical at all? Here is, in the first instance an agreement in the form of laws that prevail in the organic and in the inorganic world, which appears to us a clear evidence of design in their Author.[99]

> Any supposition that the astronomical cycle has occasioned the physiological one, that the structure of plants has been brought to be what it is by the action of external causes, or that such plants as could not accomodate themselves to the existing day have perished, would be not only an arbitrary and baseless assumption, but moreover useless for the purposes of explanation which it professes, as we have noticed of a similar supposition with respect to the annual cycle. How came plants to have periodicity at all in those functions which have a relation to light and darkness? This part of their constitution was suited to organized things which were to flourish on the earth, and it is accordingly bestowed on them; it was necessary for this end that the period should be of a certain length; it is of that length and no other. Surely this looks like intentional provision.[100]

The position of the earth with relation to the sun has provided the amounts of light and heat which are peculiarly suited to the sustenance of living things.[101] The atmosphere and the soil are adjusted to meet the needs of plant life and the influences arising from the earth's constitution and its position in the solar system.[102] The Creator was not thoughtless in His work.

99 Whewell, 30
100 Whewell, 37, 38.
101 Whewell, 19, 115-117.
102 Whewell, 19, 20, 256.

> [The Creator did not] cast his living creatures into the world to prosper or perish as they might find it suited to them or not; but fitted together, with the nicest skill, the world and the constitution which he gave to its inhabitants, so fashioning it and them, that light and darkness, sun and air, moist and dry, should become their ministers and benefactors, the unfailing causes of their well being.[103]

Roget described the adaptation of plant structure and economy to the conditions of their life. Their need for food is met by the system of roots for absorbing material from the soil, the system for the transportation of the juices upward to the leaves, and the process in which the mechanism of the leaves employs light and air for the vital chemical functions.[104] The distribution of leaves is arranged in a position around the stem of the plant to permit a high degree of exposure to light, in which position they also serve to shed the moisture from dews and rains at such distance from the stem as will make the moisture accessible to the root tips.[105] The roots also protect the plant from the winds, providing it with a firm attachment to the soil.[106]

Recognizing that approximately a hundred thousand species of vegetables were known, the Bridgewater authors marvelled at the fine display of contrivances requisite to insure the survival of each variety and to maintain its distinctive features.[107] Each species has its peculiar place in the whole economy of nature and is possessed of those adjustments which support its existence and functions.[108] Prout declined to

103 Whewell, 20.
104 Roget, I, 65; II, 20, 27, 28.
105 Whewell, 115-117; Roget, II, 21.
106 Roget, I, 80.
107 Roget, I, 95; Buckland, I, 96.
108 Kidd, 216, 217; Roget, I, 51, 52; Buckland, I, 96.

give the reason why so many varieties exist within the same climatic region, but he advised that the variety permits nature to avoid monotony and makes God's wisdom, power, and goodness more conspicuous.[109] A reason for the abundance and variety of vegetation becomes discernible when one notices that the whole animal world is dependent upon the products derived from the nutritive functions of plant life.[110]

"In no part of creation are the Power, Wisdom, and Goodness, of its beneficent and almighty Author more signally conspicuous than in the various animals that enliven and inhabit our globe."[111] Intelligible and impressive attestations of God's attributes are found in the fitness of the earth to support animal life; in "the infinite diversity of their forms and organs; the nice adaptation of these to their several functions; the beauty and elegance of a large number of them; the variety of their motions; [and] their geographical distribution."[112]

The condition of the earth and that of the animal life upon it were planned with adequate attention to the needs of living things. The careful adjustments of the parts of the animal frame to the mass of the earth, of respiration to the density of the atmosphere, of vision and growth to light and heat, and of a vast number of other curious and felicitous provisions cannot be laid to chance.[113] Where the animal life is so completely fitted to the environment, it is incumbent

109 Prout, 371, 372.
110 Roget, II, 56; Prout, 382, 383.
111 Kirby, I, 1.
112 Kirby, ibidem.
113 Whewell, 20, 49; Bell, 4, 5, 8, 15; Buckland, I, 310.

on man to recognize that "either the structure and functions of the animal must have been formed to correspond with the condition of the elements, or the elements must have been controlled to minister to the necessities of the animal."[114]

Prominent examples of adaptation exist in the lavish variety of animal life with which the Creator has filled the world throughout its great diversity of climate and topography. In every instance, the peculiar needs of the animal are met by a profusion of adjustments which demonstrate intelligent provision.[115] Each species has been formed with regard for its appointed functions and limits and it has been placed in an arena prepared for the exercise and prosperity of its faculties.[116]

The Bridgewater authors were convinced that each species in the vegetable and animal kingdom was distinct. Within a species variations could occur as a result of such factors as feeding, climate, and breeding.[117] The variations might even become permanent within a species.[118] They could never be great enough, however, to produce a new species, although they might be adequate in some cases to make an individual bear a greater likeness to some members of another species than to some within his own species.[119] Variations never occurred beyond certain prescribed limits and were not to be considered as sufficient explanation of the appearance of

114 Bell, 216.
115 Roget, I, 14; Buckland, I, 76; Kirby, I, 56.
116 Bell, 4, 5, 37, 216.
117 Kidd, 329, 331, 332; Bell, 142, 143.
118 Kidd, 330.
119 Ibidem.

new species.[120] The authors thought that not even the mating of two species could produce a new organ or a change of species.[121]

Geological studies indicated that each species had its own beginning. Some species, which were no longer needed in the economy of nature, have perished with the end of their contribution to the whole system.[122] The idea, then, of an eternal succession of all species, either backwards or forwards in time, was insupportable.[123] Roget also made a point of rejecting the hypothesis that organized matter contained an "inherent tendency to perfectibility," which would be adequate to account for all its forms and manifestations.[124] It was likewise denied that environment or a desire and effort on the part of the creature could have produced the changes which mark one species from another.[125]

The higher species were usually recognized to have appeared after the lower,[126] although Buckland wrote of retrograde changes from a complex to simpler forms[127] and affirmed that geological records gave no evidence of the existence of any plant life anterior to the existence of animal life.[128] Each known instance of the appearance of a change in species has been preceeded by a prospective preparation for the change. Forms preceding the completion of the change have often possessed characteristics in no

120 Kidd, 328, 329; Roget, II, 636.
121 Kidd, 332; Bell, 143.
122 Kirby, I, 18.
123 Buckland, I, 54, 585.
124 Roget, II, 636-638. See also Prout, 441.
125 Bell, 38, 142, 143.
126 Bell, 219, 220; Roget, I, 54, 55.
127 Buckland, I, 294. See also Roget, I, 398.
128 Buckland, I, 18.

way useful to them or to any individual until the change was fully effected many generations later.[129] The condition of the animal has not produced its organization; the organization has determined the condition of the animal.[130]

The study of nature attests the need for a Creator's hand in the appearance of each new species. The creation of organic forms has been a successive operation towards species of increasing complexity of organization.[131] In the arrangement of the various forms into a classification from lower to higher types, definite steps always occur between the species and leave no doubt that each species is distinct. The chain which links each species to the next, in showing the identity of the Creator's design, does not obliterate their distinguishing characteristics.[132] The appearance of more and more complex and increasingly 'perfect' organized species should not lead one to presume that God has grown in power. The gift of life is greater than all the other endowments and adaptations which He has made subsequently.[133] His power and the magnitude of His effort have not increased.

The dependence of animals upon vegetable life is so striking in its careful adjustment that Roget declared that the only purpose he could assign for the existence of plant life was the support of that higher order of the creatures — the animals.[134] The balance of the constituents in the atmosphere is assisted by the function of the plants in

129 Bell, 143, 146; Roget, II, 630.
130 Bell, 146, 147.
131 Bell, 219, 220; Roget, I, 54, 55.
132 Roget, II, 636; Buckland, I, 380.
133 Bell, 35, 219-220.
134 Roget, II, 56.

expelling oxygen which animals need in their vital processes, in turn expelling carbonic acid gas which is so vital to plant life. A special adjustment of this sort compels man to admire the wisdom of God.[135] Every animal receives its food from the vegetable kingdom, eating either the vegetables or other animals which have been nourished by vegetables.[136]

The structure of animals is contrived with close reference to the nature of their food.[137] The jaws and teeth of those which exist on plant life are signally different from the jaws and teeth in carnivorous types. Herbivorous species have teeth suited for grinding, and all other organs also are fitted to the type of food the animal must eat. Animals which exist on flesh have teeth which most suitably grip their food, tear it, and cut it out in proper size. Most of them have feet with claws to match their type of nourishment and mode of life.[138]

The mechanical operations of digestion in the animal are amazingly coincident with the exact and elaborate chemical operations, nowhere else present in nature, which are needed to complete the preparation of food for use by the animal body. This sort of relation can hardly be expected from mere accident. Two things, neither of which exists elsewhere alone in nature, happen to exist together in the very place where their functions make animal life possible.[139] Prout explained the implication of this phenomenon in these words:

135 Roget, II, 35, 36; Prout, 543, 544.
136 Kidd, 203.
137 Kirby, II, 98, 175, 197.
138 Ibidem.
139 Chalmers, I, 34,35; Prout, 545-547.

> The co-existence of things so dissimilar and having no kind of mutual relation, can be explained only on the supposition that a will exists somewhere; and also a power to execute that will. The existence is thus unavoidably acknowledged of a Being, who knowing every pre-existing chemical property of matter, and willing to direct these chemical properties to a specific object, has contrived for that purpose an apparatus admirably fitted to attain His object. Such is the explanation — the only possible explanation, of the subserviency of mechanism to chemistry, in the processes of organic life. And what is this explanation, but the argument of design, in terms that seem absolutely irresistible?[140]

Prout referred to the existence of milk as an undoubted evidence of prospective design. Although most other items of animal food may be conceived as having their own place in nature and a right to exist for themselves, this can hardly be said of milk. It is obviously produced expressly as a food. It is secreted by an apparatus having no other use and adapted specifically to secrete milk. Prout was convinced that nothing less than design could explain the production and use of milk.[141]

It was often objected by atheists and others that the use of animal food contradicted the doctrine of a benevolent God. Benevolent design, they said, could not be admitted to exist for a world in which weaker and harmless animals were the prey of larger and stronger beasts. The Bridgewater authors, in trying to vindicate the goodness of God, thought of many ways to explain the predicament. In their treatises they offered the following reasons for the existence of the "carnage" and its attendant pain:

(1) It is necessary to the attainment of a greater

140 Prout, 546, 547.
141 Prout, 481, 482.

or a more durable 'good.'[142]

(2) It gives animals the opportunity for the satisfying exercise of their faculties and the joy of contest, permitting them "a larger amount of enjoyment than appears to have been compatible with any other system."[143]

(3) It permits animals of the most advanced organization to obtain food without the labor of assimilation which would be required if they ate the same materials that nourish lower species.[144]

(4) Death having been ordained to take its toll on earth's creatures, the loss of life by conquest is quicker and more benevolent than that attended by lingering decadence and pain.[145]

(5) It prevents the accumulation of dead matter on the earth's surface.[146]

(6) It assists in maintaining the balance among the various types and forms of living creatures.[147]

(7) It permits the greater multiplication of life, all within limits which are properly controlled.[148]

(8) It permits the animal kingdom, "in some sort, [to] preach the Gospel of Christ," or more specifically "the great doctrine of vicarious suffering."[149]

142 Roget, II, 67, 68; Buckland, I, 129.
143 Roget, II, 69. See also Roget, I, 46, 47; II, 67, 68. Buckland, I, 129.
144 Kirby, II, 29; Prout, 544.
145 Roget II, 624; Buckland, I, 130, 131.
146 Kirby, II, 69; Prout, 544.
147 Roget, I, 47; Buckland, I, 132, 133; Kirby, I, 200.
148 Roget, I, 46, 47; Buckland, loc. cit.; Prout, 385, 386.
149 Kirby, II, 62, 63.

Valuable as all these contributions are, they may fail to convince some that a benevolent and powerful God should will, or even need, to employ an evil or malevolent instrument in accomplishing a benevolent end. Another weakness of their argument appears in the way they relate the sixth and the seventh points listed above. Several of the authors argued that some of the creatures multiplied so fast that, without a natural check, they would soon exceed the bounds which the Creator intended them to have.[150] Therefore, God had to set other animals to consume them. Then came the brilliant explanation, by argument in a circle, that the reason why God had to allow some species multiply so rapidly and prolifically was to ensure the survival of an adequate number despite the destruction of many by their natural enemies. Another presentation of the same explanation was the affirmation of the need for producing some animals in great numbers to feed the higher animals, which, however, had been created with their carnivorous appetites in order to keep the former from multiplying too rapidly.[151]

The study of the structure and co-ordination of animal parts occupied much of the attention of the authors. Zoologists discovered that all parts were so related that if as much as only one bone of an animal were discovered, it was often enough to indicate the animal's type of life, its general features of structure, or its precise identity.[152] "Each limb, and fragment of a limb" in its own species and in the variations it possesses in other species, affords "fresh proofs of the

150 Roget, I, 47; Buckland, I, 132, 133; Prout, 392, 393.
151 Roget, I, 47; Buckland, loc. cit.; Kirby, II, 29, 61, 62.
152 Kidd, 328; Bell, 66, 276; Buckland, I, 83, 84, 109.

infinitely varied, and inexhaustible contrivances of Creative Wisdom."[153] In the circulatory system there are numerous examples of design. The arteries are arranged throughout the animal body in precisely the way which promotes life, as no other conceivable system can do. The placement of valves in the veins and their constamt operation are the result of design.[154]

Roget pointed out the wonderful instrument of vision, "where the relation of every part to the effect intended to be produced is too evident to be mistaken."[155] It adjusts to perceive objects of small and large magnitude, at close and distant range.[156] The eye contains refinements of function which enable it to over come difficulties of which man has learned by the construction of optical instruments. The eye has a construction which enables it to become achromatic, correct spherical aberration, and adjust its refracting powers to the distance of the object perceived.[157] Furthermore, its delicate apparatus has been placed in a position which contributes to its protection and its utility.[158]

"The clearest evidence of . . . provident design may be collected from observing the order in which the nascent organs are successively brought forwards, and added to the growing fabric . . . " of the whole creature.[159] In the development of each individual of every species of animal life, the various organs appear and grow to their maturity by a series

153 Buckland, I, 164. See also Kirby, I, 173.
154 Roget, I, 30, 31; II, 281.
155 Roget, II, 445, 446.
156 Roget, II, 476.
157 Roget, I, 32.
158 Roget, I, 32.
159 Roget, II, 601.

of changes which brings them to a state of competence in time to perform their appointed office. Each part goes through periods of transition before attaining its permanent and useful condition. All temporary conditions needed for its development are provided in the time and manner most fitting to the requirements of the growing part and its relations to the whole organism. Only prospective design could prepare such intricate and appropriate contrivances.[160]

Even in their functions as fully grown creatures, the animals are not left to chance and accident. The Creator has endowed them with instincts and patterns of behavior which induce them to fulfill their functions. By the directing power of instincts, animals seek their nourishment and safety while, simultaneously, promoting the general harmony of the system of creation.[161] The Creator has willed that amid all the variety and apparent discord in the system of nature order and beauty should prevail.[162] All parts of the animal creation are interdependent and under His wise guidance; all serve together to accomplish His ends, one of which is the prosperity and the happiness of each of the creatures with sentient faculties.[163] In His wisdom, He employs different means in different circumstances to "attain the same end; in His power, He . . ." gives effect to that purpose and contrivance; and in His goodness, He "causes every varied mean to subserve the more convenience and comfort" of His creatures.[164]

160 Bell, 143-147; Roget, II, 600, 601, 617, 618; Kirby, II, 27.
161 Kidd, 244; Whewell, 261; Roget, II, 573, 574; Kirby, I, 9, 138, 139.
162 Kirby, I, 142, 143.
163 Roget, I, 35-37, 407; Buckland, I, 101, 293, 301; Kirby, I, 163, 188; II, 110, 224.
164 Kirby, II, 119, 120.

Kirby proclaimed that the animals, in their various stations, thus praised the "Almighty and Beneficent Creator" and called upon "man, the rational head of the creation, to take up the strain and lead the general choir."[165]

Man holds a superior place among the creatures which inhabit the earth. He maintains his place as a result of his mind.[166] The intellect is not considered to be the sole reason for man's position. The endowment of the mind with the hand as a ready instrument for the execution of its purposes has made man superior to all other creatures. Having such a mind and such an instrument, adjusted to function admirably together, man has been able to adapt "to an incomparably greater variety of objects and an infinitely more expanded sphere of action" than is possible for any other creature with life.[167] He has been able, through the employment of his intellect and hands, to dominate animals of greater physical strength, endurance, and speed.[168]

In his treatise on the hand, Bell gave detailed descriptions of the various adaptations which were made in the structure of man's body to permit the use of his hands in their unique versatility. By comparative studies he indicated the manner in which each bone and muscle has to be arranged with a due consideration for its work and the work of all other parts of the whole organism.[169] Only the rankest sort of

165 Kirby, I, 138, 139.
166 Bell, 38; Kirby, II, 519; Prout, 407.
167 Roget, I, 536.
168 Kidd, 11, 12, 22; Bell, 279.
169 Bell, 18.

skeptic could ascribe such a happy co-ordination of parts and functions to mere chance. Kidd quoted Galen's description of the functions of the hand and the relations of such parts as the prehensile thumb, the hard nails, and the soft pads.[170] Man's whole body has been attuned to the use of his marvelous hands.

Many of the most vital functions of the human body have been set to operate without man's conscious effort. They have not been left entirely under the command of his reason. They function without his attention, so that no lapse of consciousness can incur his destruction.[171] Man's heart does its work and his lungs inhale their precious load, whether he be awake or in sleep. These and many other vital operations continue so that man's life may be preserved while his attention is devoted to other objects.[172]

The earth bears the fullest evidence of having been prepared in advance as a suitable residence for man. Its conditions of atmosphere, light, heat, water, mass, climate, vegetation, and animal life have been adjusted to serve his security and enjoyment.[173] "The magnitude of the earth determines the strength of our bones, and the power of our muscles."[174] The atmosphere conveys needed oxygen to man to permit the extraction of carbon from the body through his wonderfully contrived respiratory and circulatory systems.[175] Man's ears, his larynx, and the phenomena of sound transmission

170 Kidd, 34 ff.
171 Bell, 10.
172 Bell, 10; Roget, II, 361.
173 Bell, 7, 25; Kidd, 278, 279.
174 Bell, 7.
175 Kidd, 152.

through the atmosphere contain mutual adjustments which were, to the Bridgewater authors, indisputable proofs of purpose and contrivance.[176]

Among other of the uses of the atmosphere are the cooling of the body in hot climates, the driving of ships in ocean navigation, and the delivery of water in the form of refreshing showers.[177] In the operations of the atmosphere Kidd noticed "the multiplicity of beneficial effects, of very different characters, produced by one and the same agent; and often at one and the same moment."[178] Bell stated:

> . . . The depth of the atmosphere [must] determine the condition of our fluids, and the resistance of our blood vessels; the common act of breathing, the transpiration from the surfaces, must bear relation to the weight, moisture, and temperature of the medium which surrounds us.[179]

In their peculiar utility to man the phenomena of heat were cited as evidences of design. The importance of heat is noted in the observation that any considerable change in the temperature of the human body is fatal.[180] As an accessory to man's physical condition, heat is needed for the preparation of his foodstuffs.[181] Man employs heat in the manufacture of bricks, the reduction of metallic ores, the making of glass, and in a multitude of other processes which support his civilized state.[182] A beneficial coincidence of needs with the means of meeting them is seen in the provision of several

176 Kidd, 139, 151, 152; Whewell, 123, 124; Bell, 211-214.
177 Kidd, 134, 147, 151.
178 Kidd, 151.
179 Bell, 7.
180 Kidd, 96, 97.
181 Kidd, 98.
182 Kidd, 98, 99.

sources for obtaining and applying heat locally. Man has procured heat from focussing the sun's rays, acids, friction, and electricity.[183] He has found fuel in forest, in turf, and in mine.[184]

The co-ordination of the properties of light and the functions of the eye is a further strong evidence of design by an intelligence which operated in the creation of both light and the powers of vision.[185] With the gift of the eye, the Creator also endowed man with "a sense of beauty, the love of art, [and] the pleasure arising from the contemplation of nature."[186] Whewell made the following observation on the subject of light:

> . . . Without the air we should see nothing, except the objects on which the sun's rays fell, directly or by reflection. It is the atmosphere which converts sunbeams into daylight, and fills the space in which we are with illumination.[187]

The regular withdrawal of light from man's environment by the alternation of day and night induces man to cease from toil for periods of rest without which his physical condition would soon be seriously and detrimentally disturbed.[188]

Man's dependence upon water in his existence has given him an opportunity to observe the wise design of the benevolent Creator in making water almost everywhere available for his use.[189] Chemical study has shown how large a portion of his

183 Kidd, 102-104; Prout, 92 ff.
184 Kidd, 104-106.
185 Whewell, 258, 259; Kidd, 44; Roget, II, 476.
186 Whewell, loc. cit. See also Kidd, 91, 92, 203; Prout, 244.
187 Whewell, 127.
188 Kidd, 86, 87.
189 Buckland, I, 70, 71.

body is constituted of water and how severe are the results of a privation of water.[190] The fluid ministers to comfort, efficiency, and social converse when employed for bathing.[191] Man requires plenteous supplies of water for laundering, drinking, cooking, medicines, ink, textile manufacturing, leather tanning, metallurgy, and in an almost limitless number of other occupations.[192] One can hardly overlook the value of water for purposes of navigation also.[193]

The preparation, distribution, and variety of the mineral substances have been arranged in manners which serve man's needs very readily and variously.[194] The soils of the earth, instead of consisting of single and pure elements, distributed over separate areas, are composed of a number of elements in useful mixtures.[195] This makes them available for agriculture. A description of all the minerals derived from the earth and their useful qualities could hardly fail to impress the observer with the wisdom and the beneficence of the Creator. The endowments of exceptional hardness, malleability, ductility, low heat of fusion, and the like permit the formation of innumerable types of tools and assistants to labor and enjoyment.[196] Minerals exist not only in great variety and quantity but also in conditions which make them available to man's discovery and use.[197] Through long periods and a number of processes of collection and deposit, they have been

190 Kidd, 108.
191 Kidd, 112-118.
192 Kidd, 108-112.
193 Kidd, 119; Prout, 196.
194 Buckland, I, 44, 98, 99.
195 Kidd, 153, 154; Buckland, I, 69-70.
196 Kidd, 180-185; Buckland, I, 4.
197 Buckland, I, 98, 524 ff., 553.

gathered into veins and layers which lay ready by the time on man's appearance on the earth.[198]

Kidd observed a special property of much building stone which man finds to be of great utility. The stone, upon being at first uncovered and exposed to air, is soft enough to permit its being shaped by masons and sculptors. By continued exposure to the atmosphere it acquires a hardness which, existing earlier, would have made it less amenable for shaping, but which serves with the passage of time to protect it from destruction by weathering and erosion.[199] Iron is advantageously adapted to man's use, not in being made durable, but in being subject to corrosion. The community as a whole benefits from the corrosion of iron, for men are kept in employment at mining, smelting, pouring, casting, forging, transporting, and installing new iron to replace that which has corroded. If iron were more durable, fewer men could be employed in iron work.[200]

Common salt, which has so many and such indispensable uses, is distributed almost everywhere.[201] Kidd stated that its abundance "coincides with its extensive utility."[202] He and Prout made the same observation concerning coal and the diamond. Coal and diamonds are composed of the same element. The diamond, though useful, is not so useful to man as coal is, and it is therefore a beneficial contrivance that has provided that the diamond is not so plentiful as coal.[203] The earth

198 Buckland, I, 553-555. See also Kidd, 196.
199 Kidd, 160, 161.
200 Kidd, 196.
201 Kidd, 200; Buckland, I, 71.
202 Kidd, 200, 201.
203 Kidd, 171; Prout, 172, 173.

gives man a supply of precious and semi-precious stones whose durability and beautiful colors make them appropriate as ornaments, whose moderate use is "both allowed and right."[204]

The plant life of the earth contributes munificently to the needs and comforts of man. From plants man derives the wood he needs for building his home and straw or leaves for covering the roof. Wood is also used for ships, tool handles, furniture, fences, fuel, and a host of other necessities. Various species among the trees possess helpfully diverse characteristics, as the strength of the hickory, the flexibility of the willow, and the lightness of the pine.[205] Other products from the vegetable kingdom give man dyestuffs, paper, ropes, cloth, and potash.[206] The blossoms of the flowers make life more pleasant with their array of colorful and fragrant loveliness.[207] Kidd noted that flowers contribute to the general health of the body by alluring children to the exercise of picking them.[208] It would be unfair to overlook the value of plants in providing medicines and medicinal agents for man's welfare.[209]

The most obvious contribution of plant life to man is in the form of foods which have been generously and extensively and variously prepared for him. The abundance and the variety in the foods derived from plant life are so great that man is given more than he needs in quantity and quality. Nature has been adjusted to give man luxuries beyond his needs.[210]

204 Kidd, 168.
205 Kidd, 236-240.
206 Kidd, 212, 215, 232-237.
207 Kidd, 202, 203; Kirby, I, 189, 190.
208 Kidd, 203.
209 Kidd, 225-232.
210 Kidd, 215, 225.

The teeth and the digestive system of man have been constructed to permit man's consumption of vegetable food, but a number of wonderful contrivances have been added to allow him to consume animal food also.[211] The animal kingdom gives meats, fish, eggs, milk, cheese, butter, and honey to man's diet.[212]

Animals have been liberal benefactors in giving man pelts, furs, silk, wool,aand leather for clothing.[213] They provide wax, glue, ivory, pearls, parchment, and other products for his use.[214] Some of the larger animals carry man from place to place or transport his burdens.[215] There are also animals which contribute "in no small degree to our innocent pleasure and amusement."[216]

The presence of the dog is a good example of adaptation. The dog has saved man from death in blizzards, storms, and seas; aided him in the chase and in herding; given him protection from other animals; and played the role of affectionate companion.[217] The earth has been filled, for man's enjoyment, with beautiful birds of song, the humming bees, attractive beetles, and bright butterflies.[218] Buckland affirmed that:

> it is impossible to contemplate a disposition of things, so well adapted to afford the materials essential to supply the first wants, and to keep alive the industry of the Inhabitants of our

211 Kidd, 223; Roget, II, 225.
212 Kidd, 264-267; Kirby, I, 113.
213 Kidd, 270 ff.
214 Kidd, 272; Kirby, I, 258, 259.
215 Kidd, 245, 246; 248-258.
216 Kirby, II, 500.
217 Kidd, 260-262; Kirby, I, 65.
218 Kirby, II, 370.

> earth; and entirely to attribute such a disposition to the blind operation of Fortuitous causes.[219]

Buckland noticed that the whole creation with its attendant life was not prepared solely for man's enjoyment. Every species of sensible being was created to enjoy its own place in the whole order of nature. Each species has its own rights and is not merely an instrument.[220] Many animals existed before man's arrival on the scene and others appear to be of no use to him.[221] Nonetheless, the terrestrial economy was created with man in view and all its parts were fitted in an arrangement suited to his enjoyment of life.[222] The adaptations by which the earth has been equipped to support the animal life which has had such a "preeminent utility to mankind in every state and stage of life"[223] are indelible proofs of God's power, wisdom, and goodness.

The existence of mind in man requires the existence of an intelligent source. Chalmers believed that it took no erudite excursions through logical argument to convince man "that blind and unconscious matter cannot by any of her combinations, evolve, the phenomena of mind."[224] All reasoning requires the recognition of such "major propositions," or "intuitions," which have a perceived validity anterior to any process of proof.[225]

219 Buckland, I, 547.
220 Buckland, I, 101.
221 Buckland, I, 100, 101.
222 Bell, 279, 280; Buckland, I, 99, 101, 555; Kirby, I, 174, 175.
223 Kirby, I, 1.
224 Chalmers, I, 50. See also Kirby, I, xxxi.
225 Chalmers, I, 49, 50.

The adaptations of mind to external nature may not be so numerous, conspicuous, nor impressive as the adaptations in the physical realms,[226] but they appear to give a more decisive testimony concerning the character of God.[227] It was in the creation of man to live in the world that He "communicated a transcript of Himself to the workmanship of His own hand."[228] Chalmers attempted to show that "the mind is rightly placed in a befitting theatre for the exercise of its powers."[229]

In his description of mental phenomena, Chalmers explained that the mind of man is disposed, prior to experience of the natural phenomena, to "count on the uniformity of Nature, or even to anticipate the same consequents from the same antecedents."[230] Experience neither informs nor assures the observer of the regularity in Nature's behavior, although it can instruct as to the "terms of [Nature's] unalterable progressions."[231] This circumstance allows man "to retain in his memory a faithful transcript of the past" and "to look with prophetic eye upon the future."[232] It also teaches man "that the God of Nature never recedes from His faithfulness."[233]

Kidd made no statement about the disposition of man to depend on the regularity in the sequence of events in the external world. He did point out, however, that man's reason could not suitably operate on sense data from the external world unless the data were "presented to the [senses] with

226 Chalmers, I, 51.
227 Chalmers, I, 54, 55.
228 Chalmers, I, 53.
229 Chalmers, I, 56.
230 Chalmers, II, 141.
231 Chalmers, II, 143.
232 Chalmers, II, 146, 147.
233 Chalmers, II, 146.

a certain degree of regularity."[234] Man can form no adequate conception of truth nor choose a proper course of behavior without relying on the constancy of the sequences in natural events."[235]

The correspondence between man's rational understanding of natural phenomena and the constancy and regularity in nature discloses another significant evidence of adaptation. Much of man's fund of knowledge is derived from the observation of events. There have been, however, some areas of reality which eluded apprehension until man approached them along the paths of logic. In every science, progress has depended to some degree on the formation of logically derived hypotheses which experiment and observation later verified to the profit of man's fund of knowledge. The adaptation of the mental powers to the material environment makes this procedure possible.[236]

Man's life in society — the adaptation of mind to other minds — has given productive fruits also.[237] The admiration of society in general for the man of mental attainments has been an influence of real strength in extending man's ability to live and thrive in his natural environment.[238] Society also provides that corresponding to the diversities of sciences there are minds of diverse talents and interests available for the varied tasks which no man could encompass alone.[239]

Kidd remarked that it is a further requirement for the

234 Kidd, 276.
235 Chalmers, II, 149.
236 Chalmers, II, 156 ff.; Prout, 10-13.
237 Chalmers, I, 173, 174.
238 Chalmers, II, 164-174.
239 Chalmers, II, 174-182.

proper operation of man's mental faculties that "the senses of men in general should be similarly affected, when acted upon by the same causes."[240] Without this provision, knowledge in society might be chaotic and impossible of general application. One man could not then communicate with assurance to other men the results of his experience nor receive theirs.[241]

Another adaptation was discussed by Bell and Roget, though in nearly opposite terms. Bell called it a "perfect proof" of design that the mind's perception of ideas corresponded with "the qualities of external matter."[242] Whatever be the manner of the connection between the external object and the mental impression, Bell affirmed that the perception of the object was accompanied by "the conviction of its real existence — a conviction independent of reason."[243]

When he discussed the functions of perception, Roget explained that the mental images of the objects have "no real resemblance or correspondence" either with the objects perceived nor the sense impressions communicated to the mind at the perception of the objects.[244] One can judge from a reading of Roget's chapter on perception, however, that he would hardly deny that similar objects give rise to similar mental impressions and do so with unfailing regularity, with the result that man can make reliable judgments concerning external nature and his own behavior in relation to the objects of the natural world.[245]

240 Kidd, 276.
241 Kidd, 276, 277.
242 Bell, 173, 174.
243 Bell, 173, 174.
244 Roget, II, 513, 514. See also Bell, 270.
245 Roget, II, 508-536 passim.

Each of man's five primary senses aids his mental life and serves to relate it to the external world. Perhaps it will be sufficient to instance only one of the senses here. The organs of speech and hearing are employed so intimately in man's intellectual career that Whewell observed that "man's bodily frame was not created without regard for his intellect."[246] He inferred that the "curious and complex machinery of the tongue, the glottis, and the larynx" were specifically contrived for speech and the enhancement of man's mental activity."[247] Chalmers said:

> The power of speech is precisely . . . an adaptation. Whether we regard the organs of utterance and hearing in man, or the aerial medium by which sounds are conveyed — do we behold a pure subserviency of the material to the mental system of our world.[248]

The relation of man's moral nature to the conditions of his life in the world gives additional evidence of the attributes of God. The moral life is so connected with the mental and physical life of man that the Creator of the latter must have been the source of man's moral nature also.[249] Chalmers felt that the moral phenomena in man's life were a clearer and more acceptable evidence for the moral character of God than could be found anywhere in the material world, which latter was most suited in theistic studies to assert the existence of God.[250]

The most forceful argument "for the moral character of

246 Whewell, 123, 124, 257.
247 Whewell, 257.
248 Chalmers, II, 75, 76.
249 Whewell, 263, 373.
250 Chalmers, I, 51-55.

God" is the fact that man has a conscience which demands that he differentiate between the right and the wrong and that he follow the line of duty.[251] In every man there exists a faculty which "approves and disapproves, acquits or condemns the workings of . . . other faculties."[252] The conscience holds a place of supremacy over all the other faculties and impulses of man.[253] Students of moral phenomena agreed that the principle of conscience is universal, whatever differences existed in their opinions about the source and the particular judgments of the conscience.[254]

The character of this principle and its universal authority over men show that it is not the result of any course of behavior or training.[255] It has been given by the Creator who set it in man for a purpose.[256] It is a witness to God's own righteousness and love of the good that He has given man this faculty which condemns deceit and cruelty while approving and upholding virtue.[257] Chalmers wrote of the conscience and the theistic argument as follows:

> However difficult from the very simplicity of the subject it may be to state or to reason the argument for a God, which is founded on the supremacy of the conscience still, historically and experimentally, it will be found, that it is of more force than all other arguments put together, for originating and upholding the natural theism which there is in the world. . . . The felt presence of a judge within the breast, powerfully and immediately suggests the notion of a supreme Judge and Sovereign, who placed it there.[258]

251 Chalmers, I, 5, 90; Whewell, 265.
252 Whewell, 263, 264.
253 Chalmers, I, 75; Whewell, 265.
254 Chalmers, I, 75, 107; Whewell, 263.
255 Chalmers, I, 95.
256 Chalmers, I, 86; Whewell, 264.
257 Chalmers, I, 85, 107; Whewell, 267, 268.
258 Chalmers, I, 90.

The second argument used by Chalmers to demonstrate the goodness of God is that concerning the adaptation of virtue to the feelings of pleasure and gratification. The accomplishment of a good task and "the thought of having done ... right" result in a pleasurable state of mind, while there is "discomfort, amounting to bitter and remorseful agony, in the thought of having done . . . wrong."[259] This coincidence of virtue and pleasure is an adaptation accomplished through the power and wisdom of "a benevolent and righteous God."[260] In making "malice and falsehood carry in them the seeds of their own wretchedness," God has benevolently created man so that his "perfect goodness and perfect happiness are at one."[261]

The operations of habit tend to result in the benumbing of the conscience and in the moral reprobation of the man who falls to temptation and wills to enter "on a career of vice."[262] Nevertheless, it betokens the goodness of God, Chalmers thought, that the operation of habit also assists unto righteousness the man who has once rejected the beguilements of temptation and the invitation to trespass in wicked paths.[263]

Man's life in society gives him continued opportunity to exercise his conscience. The circumstances in which the individual man lives are so arranged that what is external to his mind contributes to dissuade him from making judgments tinged with error and "partialities of interest and passion,"[264] to encourage obedience to conscience, and to awaken the

259 Chalmers, I, 112.
260 Chalmers, I, 117.
261 Chalmers, I, 140, 141.
262 Chalmers, I, 154, 155.
263 Chalmers, I, 158.
264 Chalmers, I, 178, 179.

conscience which vice has lulled into inactivity.[265] In the intercourse of society, one can notice the adaptation of the "external material world to the moral constitution of man" in the phenomena of hearing and related speech and music, in the phenomena of vision and related writing and colors and symmetry.[266] Kirby remarked that the hand is adapted for communicating "as a moral organ" with the minds in the external world. In its moral operations the hand mirrors the soul in expressions like petition and anger, performs the good and evil which men do, sustains conversation by signs, and serves in giving the benediction and in "the laying on of hands."[267]

Society also gives man a place and an inducement to grow in virtue. Kirby believed that the appointment of various animals to particular areas of the world is a sign of God's benevolent provision for man's social welfare. By separating the animals into local areas, God has made it necessary for men to trade with one another for products which are not available everywhere.[268] God has so adjusted the relations of man and society that happiness and prosperity result from virtuous conduct in society. One of the clearest indications of this adjustment is observed by the frustrations which appear in society when civil legislation interferes with the ordained operations of affection.[269] Kidd thought that God has assured the stability of society by making man's perversity to be expressed in various ways in different members of society so that all would not be avaricious, or otherwise intemperate,

265 Chalmers, I, 179-182.
266 Chalmers, I, 200, 223; II, 8, 75-82; Kidd, 44.
267 Kirby, II, 215 ff.
268 Kirby, I, 57, 58.
269 Chalmers, II, 187; Whewell, 292, 293.

in the same points.[270]

It must not be presumed that God is to be called good because He has adapted man's environment to contribute to man's enjoyment. Man's virtue is more important than his happiness, and God has willed that happiness be a reward of virtue.[271] The goodness of God is not a sentimental liberality. Nor is it a mere "placid undistinguishing tenderness" for man. His goodness comprehends all moral excellence — including Truth, Justice, and "that strong repugnance to moral evil which has received the peculiar denomination of Holiness."[272] He is not a merely an indulgent Creator; He is Creator and righteous Sovereign.[273]

A defect of much of the thinking in natural theology, Chalmers believed, was the failure to comprehend justice and righteousness in the idea of God's goodness.[274] This weakness led to a fatal difficulty in relation to the problem of suffering.[275] Some thinkers had employed a form of "arithmetic" to make "summations of the good and the evil" in society with such results as supposedly proved that the good outweighed the evils and that the problem of suffering could be dismissed.[276] Next they promised an immortality to man so that he could be sure that amends would be made to compensate him eventually for the discrepancies which occurred in his life on earth, if he endured suffering in any form.[277] Chalmers branded this as a futile example of reasoning in a circle.[278]

270 Kidd, 72.
271 Chalmers, II, 70, 71. See also Bell, 280.
272 Chalmers, II, 66.
273 Chalmers, II, 66, 102.
274 Chalmers, II, 102, 103.
275 Chalmers, II, 106.
276 Chalmers, II, 106.
277 Chalmers, II, 107.
278 Chalmers, II, 108.

Chalmers suggested that "in the vast majority of cases, the deviation from happiness can be traced to anterior deviations from virtue."[279] When the theologian sees that "apart from death and accident and unavoidable disease, the wretchedness of humanity is due to a vicious and ill-regulated morale," he is closer to a proper solution of the problem of suffering.[280] Suffering which is the wages of sin is as much an evidence for the righteous goodness of God as is happiness which is the reward of virtue.[281] Chalmers then expressed the conviction that the existence of evils in society is a sign of the "moral perversity of man."[282]

Kirby repeatedly mentioned man's depravity. He believed that variations in the races of men were caused by their sin, the lowest or most primitive types having descended farthest from man's previous good estate.[283] He taught that one purpose which was in view in the creation of the monkey "seems to be to hold the mirror to man, that he may see how disgusting an object he becomes when he gives himself up to vice and the slave of his passions."[284] He thought that other animals, like the sloth, the bee, the ant, the beaver, and the dove, were intended to teach moral lessons to man.[285] It was Kirby's opinion that before the Fall of man no pests existed. God must have created them after the event as signs of His displeasure and instruments of His will.[286]

279 Chalmers, II, 113.
280 Chalmers, II, 113-115.
281 Chalmers, II, 116.
282 Chalmers, II, 121.
283 Kirby, I, 82, 87, 324, 325; II, 520.
284 Kirby, II, 517.
285 Kirby, II, 517, 518.
286 Kirby, I, 12-16, 324, 325.

Body lice and similar parasites are more than punitive. They are also instruments of cleansing and reform. "They abound only on those whose habits are dirty, in whom they may prevent diseases which their habits would otherwise generate, as well as stimulate them to greater personal cleanliness."[287] Some visitations by animal pests bring, with the infliction of the sentence of punishment, "that change of mind and, conversion of the heart, that will reconcile the sinner to God" and insure his entrance at "the gates of Peace and Rest" when death has ended the state of probation.[288] Bell judged that the health of the soul was assured through the disciplines conveyed through "the weakness of the frame . . . and afflictions of life."[289] These disciplines draw out man's virtue and increase his affections for his "spiritual Protector."[290]

Many afflictions which appear to be evils often turn out to be the means not only of spiritual good but also of temporal benefit or improvement. Pain is a protective agent and an instigator to healthful activity.[291] Pleasure, to be discernible to the consciousness, would seem to imply the existence of some measure of its contrasting feeling.[292] The bite of the mosquito may be an aid to health.[293] Increased fertility has been known to be one consequence of the scourge of locusts.[294] The hurricane which devastates a community and brings death to some, Prout suggested, may be the deliverer from a greater suffering by its purification of the atmosphere.[295]

287 Kirby, II, 316.
288 Kirby, I, 93, 331.
289 Bell, 280, 281.
290 Bell, 281.
291 Bell, 165-168.
292 Bell, 166, 167.
293 Kirby, II, 323, 324.
294 Kirby, I, 93.
295 Prout, 363, 364.

With the sense of right and wrong which the Creator has given him, man perceives that in this world justice does not always have its command obeyed and that oppression often prevails. Chalmers counselled that this is not a world of unmitigated happiness and contentment, as some natural theologians seemed to wish to prove. The conscience of man informs him that justice is foiled and virtue violated if death preserves the wicked from receiving the due reqard of their deeds.[296] An inference guides man to the conviction that a future state exists. The anticipation arises not from a hope of reward, but from a fear of judgment, even upon himself.[297] Without this possibility "the moral constitution of man is stript of its significancy and the Author of that constitution is stript of His wisdom and authority and honour."[298]

Another "proof for the immortality of the soul, founded on adaptations," is the circumstance that in nature there exists a counterpart object or opportunity for the satisfaction of every design or faculty which occurs in conscious creatures.[299] Man has a yearning for knowledge and a thirst for a more full understanding of the fields of science. The time allotted to him in this life is hopelessly brief for fulfilling that desire.[300] Man has "aspirations in his heart for which the universe" offers no satisfaction.[301] Man, alone among the animals, finds that in this world some of his faculties are denied their gratification.[302]

296 Chalmers, II, 122-125.
297 Chalmers, II, 226.
298 Chalmers, II, 127.
299 Chalmers, II, 127-133; Kidd, 140, 141.
300 Roget, II, 639, 640; Prout, 413, 414.
301 Chalmers, II, 131.
302 Chalmers, II, 131; Roget, II, 639, 640; Prout, 414.

The only suitable answer to this difficult problem is the assurance of immortality for man, lest "the noblest of nature's products here below . . . turn out to be the greatest of her failures"[303] and God's righteousness be mocked.[304] Man, who has an apprehension of the work of the eternal God, must somehow be destined to escape the common mortality of lesser creatures.[305] Beyond the borders of this material world man will be allowed to grow into the perfections which are outlined in his present life by the design of God,[306] or he will be tormented by the punishments which he has incurred by his wickedness on earth.[307]

The Value of Natural Theology

In presenting the claims of natural theology, the Bridgewater authors mentioned various of its useful functions or results. From a study of their explanations and proposals, one might say that natural theology is useful because

(1) It suggests the possibility of God's existence,

(2) It reveals His works in the world,

(3) It assures man of God's providence,

(4) It reveals some of God's attributes,

(5) It evokes man's adoration for God,

(6) It exposes the gulf between man and God, and

(7) It leads man to consider God's revelation in Scripture.

303 Chalmers, II, 133.
304 Roget, II, 640; Prout, 414.
305 Prout, 414, 415.
306 Chalmers, I, 171; Roget, II, 580; Prout, 7, 414.
307 Kidd, 342-344.

1) Natural theology has been effective in leading men to consider the possibility of the existence of God.[308] The study can be an inducement to the creature, urging his attention to the evidence available in nature. Man is obliged to explore all the evidence available to him, if he as much as suspects that his life is owed to a divine benefactor.[309] Man makes himself guilty if he fails through negligence or stubborn self-satisfaction to investigate the possibility of God's existence.[310] The demonstrations offered by natural theology may not be adequate of themselves to settle the question satisfactorily to every mind, but at least they carry the weight of the suggestion of God's being.[311] Each new suggestion and each new glance at the evidence make the claim of the question more demanding.[312] The first value, then, of natural theology is that it takes man at the beginning of the search for God and gives him a start in the right direction.[313]

2) Having the suggestion of God's being in mind, man has looked at the world and discovered relationships and purposes behind some events and facts which previously appeared as separate and unconnected phenomena. A pattern and a regularity became evident where accident and disorder had formerly seemed to prevail.[314] Evidences of harmony and order have led to a conviction that a Great Intelligence rules in the natural world.[315] The belief in a governing, intelligent Being has given the

308 Whewell, 1.
309 Chalmers, II, 270 ff.
310 Chalmers, II, 280.
311 Chalmers, II, 281.
312 Chalmers, loc. cit.
313 Chalmers, II, 282.
314 Whewell, 305, 306.
315 Whewell, 255; Buckland, I, 595, 596; Kirby, II, 220.

minds of men insights into events which had been otherwise beyond rational explanation and has injected meaning into sequences which had formerly been viewed as no more than chance coincidences.[316] The nature of things has become more comprehensible as the idea of an intelligent Creator and Governor has influenced man's thinking about the world.[317] The careful investigation of nature brought forth wonderful "records of the operations of the Almighty Author of the Universe, written by the finger of God himself."[318]

3) The contemplation of the vast reaches of the universe and the tremendous number of provisions needed for its operation may at first impress man with the notion that he is lost in the midst of a system where he is of no appreciable importance and that the Governor of the Universe cannot care about him.[319] A further study of the careful administration of the Creator over the minute creatures who fill the world assures man, on second thought, that God does not let any part of His creation escape His concern and care.[320] The lesson of the design in nature proves that man is far from insignificant; he is of preeminent importance in the scheme of things. Indeed, his condition as a superior creature has been a gift from His Creator, and man may be confident that God will not neglect nor overlook the highest of His creatures.[321] Natural theology thus assures man of God's providential care.

It is pertinent at this point to consider the manner

316 Whewell, 1.
317 Whewell, 1; Buckland, I, 9; Kirby, I, xlvi.
318 Buckland, I, 7, 8.
318 Whewell, 280.
320 Whewell, 283, 284, 293; Kirby, I, 360.
321 Kirby, I, 225; Prout, 7.

of God's working in the world of nature. He is the author of its laws, the creator of its constituents, and the disposer of its parts and properties.[322] Prout suggested that in ordaining the laws which govern the events of the physical world, God apparently chose to limit His power, one result being that He could then show His wisdom by overcoming the difficulties He imposed on Himself.[323] Perhaps Prout intended to explain that God therein chose to limit His action, determining to act in an orderly rather than in some haphazard fashion. Whewell observed that God has not actually been limited by the laws, for He has ordained not only the laws but the properties and the dispositions of matter which determine how and where the laws can be effective.[324] God does not contrive in the same way as man employs contrivances to surmount difficulties which confront him.[325] God's employment of means is only by a loose analogy to be considered as contrivance; He not only chooses the means but creates, according to His will, the material and the properties of the material upon which the means are to operate. In another sense it may be said that all creation is a means to Him and not a mass of difficulties to be overcome by a succession of contrivances.[326]

The operation of the laws of nature implies the constant activity of God. Law requires an agent.[327] God may be affirmed to be everywhere and always active, if laws are constantly and universally operative.[328] All laws and all

322 Whwewll, 357 ff.
323 Prout, 20, 24, 25, 56, 57.
324 Whewell, 357.
325 Whewell, 360; Bell, 5.
326 Whewell, 357-362.
327 Whewell, 361.
328 Whewell, 361, 362.

second causes are under His active will and guidance.[329] Kirby rejected the notion of fatalism and the neglect of precautions against accident, while assuring his readers that the will of God is accomplished in particular events as well as in general effects.[330] God's manner of governing the universe by laws does not prevent His rule from being immediate. He does not work "by insulated interpositions of divine power exerted in each particular case" to abrogate the laws,[331] or interrupt them miraculously.[332] Although Kirby suggested at times that God dispensed with or suspended the laws as He willed to do so,[333] the general opinion of the authors did not concur in the idea. Neither does God have to bend the laws to suit His purposes.[334]

God can 'suspend' a law by making new combinations of laws which have the effect of overcoming the result usually expected from the operation of the single law when it prevailed.[335] He also uses the general laws and magnitudes in new combinations to support and effect His purposes. In this way He acts immediately in events and yet does not violate nor suspend His laws in doing so.[336]

4) Another benefit conferred by natural theology is its testimony about the attributes of God. Prout asserted that man may know God only from His works and he presumably meant those in the natural world.[337] Buckland believed that natural

329 Whewell, 365; Kirby, I, 54.
330 Kirby, I, 54, 362, 363.
331 Whewell, 356.
332 Kirby, I, 362, 363.
333 Kirby, I, xci; II, 279.
334 Prout, 436.
335 Ibidem.
336 Whewell, 365; Kirby, I, 362, 363; Prout, 436.
337 Prout, 557.

theology could give "a rich and abundant harvest . . . with endless evidences of . . . wisdom, and power, and goodness of the Creator."[338] The effort of each of the Bridgewater authors was directed to a demonstration of these attributes of God.

5) Kirby told his readers that the profusion of wonderful instances of adaptation and provision for the richest enjoyment of all animal life educed an emotion of gratitude and adoration in which man led all the creatures in glorifying Him, pronouncing "for all a general doxology."[339] Chalmers and Whewell had the clearer conviction that a moral implication was strongly evident in the investigations of natural theology. The "theology of conscience" pointed to the God who endowed man with a knowledge of right and wrong, a love of virtue, and a reverence for purity — the God Who must Himself be all Goodness, Virtue, and Holiness.[340] The perfect holiness of Him who planted in man "a reverence for moral purity and rectitude" obliges man to adore Him.[341]

6) When natural theology shows God's goodness and evokes man's adoration, it also shows by contrast the worthlessness of man.[342] The view of the Lawgiver brings to mind the violations of His Law and shows the gulf which exists between God and man.[343] The more sensible man becomes to his sin, the greater grows his feeling of guilt and insecurity,[344] for "there is nothing . . . in . . . nature, which countenances

338 Buckland, I, 591. See also Roget, I, 1, 2.
339 Kirby, II, 522, 523.
340 Chalmers, II, 98; Whewell, 267, 268.
341 Whewell, 252, 268.
342 Chalmers, II, 284.
343 Chalmers, II, 284, 285.
344 Chalmers, II, 290, 291.

such an imagination of the Deity, as that, in the relentings of mere tenderness, he would stoop to any weak or unworthy compromise with guilt."[345] Natural theology poses the problem of man's dereliction and sets up a longing for a restoration, but it fails to solve the problem.[346] This is a very important practical function of natural theology, although it is also a betrayal of its weakness.

Despite its great value, natural theology can give only a scanty and imperfect view of God's ways.[347] It is obviously not adequate to comprehend Him Who is more than a mechanic and a contriver.[348] It lacks the power to reform men's lives and build their character.[349] It does not adequately inform man of the future which is ahead of him.[350] Many academic theists deal with natural theology in a way which degrades God and mocks His righteousness and the conscience of man.[351] They suppress the demands of God's moral being and leave with their disciples no sense of discrepancy or want.[352]

On the other hand, the natural theology which sufficiently realizes the place of justice and goodness still lacks the solution to man's depravity. It is unable to discover any means of redemption.[353] It stirs man's fears without being able to allay them with a satisfactory answer.[354] It awakens man to terror but it cannot save him from the dangers of which it warns.[355]

345 Chalmers, II, 292.
346 Chalmers, II, 288.
347 Whewell, 2, 3.
348 Whewell, 379.
349 Whewell, vi, vii, 252.
350 Chalmers, II, 285; Buckland, I, 588, 589.
351 Chalmers, II, 286, 287.
352 Chalmers, II, 297.
353 Whewell, 377.
354 Chalmers, II, 285.
355 Chalmers, II, 288, 289; Whewell, 377.

7) The most profitable function of natural theology is that of leading men to consider God's direct revelation of Himself.[356] Man may be turned to the Scriptures for God's message after natural theology has aroused his interest in the possibility of God's existence or planted in his life an eagerness for redemption from the predicament of his guilt. Natural theology, instead of supplanting or constricting the Christian faith, as many have feared, should tend to focus man's attention on his need for the Gospel of Christ[357] and put him on the path towards reconciliation with his God.[358]

Several of the Bridgewater authors tried to allay the anxieties of those who feared that progress in natural science was detrimental to Christian convictions. Those who showed alarm over early discoveries in science, especially in the contemporary efforts in geology, were assured that the God who gave the Scriptures and who created the earth would not contradict His own truth when He gave man two sources of information about Himself.[359] The authors pointed out, however, that the Bible was not a textbook in natural science, and that to have made it a valuable guide for science in any age would have made it relatively worthless in all other ages. It was a revelation of God and not of scientific data.[360]

356 Kirby, I, xlvi.
357 Chalmers, II, 282.
358 Chalmers, II, 289.
359 Buckland, I, 8, 9, 594, 595; Kirby, I, xvii.
360 Buckland, I, 14, 15; Kirby, I, xlv, lii-liv.

III The Individual Treatises

The present chapter contains brief biographical notices about the authors of the Bridgewater Treatises and a survey of the contents of the individual works. The treatises are so similar in their theological character that any extensive analysis of the separate volumes would be tedious and unnecessarily repetitious.[1] It has been deemed most appropriate to discuss their method and contents in the chapter on their theology. It is intended here to give only a few points in reference to the scope of each treatise and a brief discussion of some distinctive subjects which were introduced by particular authors. If the present chapter should appear to be dull and mechanical, its brevity is a real advantage.

Thomas Chalmers and His Treatise

Thomas Chalmers was born on March 17, 1789, in Amstruther, Fife. After completing the course in divinity at St. Andrews University he began his ministry in the parish of Kilmeny, Fife, in 1803. While serving at Kilmeny he gave lectures in chemistry at St. Andrews and wrote an article on "Christianity" for the Edinburgh Encyclopaedia. He went to Glasgow in 1815 to become the minister at the Tron Church. In 1820 he removed

1 A list of contemporary reviews over the individual treatises is given in Appendix I as a guide to more lengthy discussions on the treatises.

to the parish of St. Johns in Glasgow, where he introduced with great success his scheme for the alleviation of pauperism.

Chalmers returned to St. Andrews University in 1823 as professor of moral philosophy. Five years later he removed to Edinburgh to become the professor of theology in the university. "On the borderland between philosophy and theology, embracing ethics and natural theology, he was thoroughly at home."[2] His Bridgewater Treatise, published in 1833, showed the impress of his special interests.

He became the Moderator of the General Assembly of the Church of Scotland in 1832. He was a leader in the disruption movement of 1843 over the problem of patronage. He was elected the first Moderator of the General Assembly of the Free Church of Scotland. He gave much energy to assure the financial support of the new church and, resigning his chair at the university, he assumed the duties of professor of theology for the Free Church. His death occurred suddenly in May, 1847, at Edinburgh.

Chalmers began his treatise on "the adaptation of external nature to the moral and intellectual constitution of man"[3] with a definition of his subject. By interpreting external

2 The information for this biographical notice on Thomas Chalmers was obtained from the article by the Rev. Professor Blaikie in D. N. B., II, 1358-1363. The quotation is from page 1360.
William Hanna's Memoirs of Thomas Chalmers may be consulted for a more complete record of the life of Chalmers.

3 The treatise, entitled On the Power, Wisdom, and Goodness of God as manifested in the Adaptation of External Nature to the Moral and Intellectual Constitution of Man, consists of two volumes, containing 290 and 302 pages respectively.

nature to mean "all that is external to the individual possessor of a human mind," he extended the range of his treatise to include both the natural world and society.[4]

Chalmers remarked in his introduction that the demonstration of God's wisdom and goodness was usually founded on the existence of numerous beneficial adaptations in nature. An effect depending on the concurrence of many distinct circumstances was considered to be a more impressive evidence of His power than a result deriving from only two or three contributing circumstances.[5] Chalmers suggested that another theistic argument could be constructed from the arrangement of matter throughout the world of nature. The intelligent character of God is more discernible "in the dispositions of matter, that put it in the way of being usefully operated on by the laws" than "in the establishment of certain laws for matter."[6] The laws of nature can neither create the matter nor endow it with its various properties. The operations of the laws of nature are contingent on the existence of given quantities of matter, with its various special properties, disposed throughout the universe.[7]

Mental phenomena could not be analyzed into a multitude of separate relations and connections and were usually considered to be inferior to physical phenomena as evidences of divine power and wisdom. Chalmers believed mental activity, in its subsistence on a small number of adjustments, to be actually superior as evidence of that divine wisdom

4 Chalmers, I, 22.
5 Chalmers, I, 27, 29.
6 Chalmers, I, 35, 37.
7 Chalmers, I, 38.

which can achieve its ends by the employment of the "fewest possible means, or by the simplest machinery."[8] The mental phenomena are chiefly valuable to natural theology as evidences of God's moral character.[9]

Chalmers devoted Book One of his treatise to a study of man's moral condition and its relations to natural theology. The supremacy of conscience,[10] the relations of virtue to happiness and of vice to discomfort,[11] and the functions of habit[12] were employed as illustrations of God's righteousness. Through several chapters Chalmers described the relations of man's moral affections and his life in society. Society has been adjusted to find its greatest prosperity when men follow their "own particular affections."[13] Chalmers discussed the right of the individual to own property and the function of civil law in protecting, not in establishing, the right which arose from man's moral constitution.[14] In a chapter on the economic welfare of society, he condemned the English tithe system and poor laws for violating man's natural affections.[15]

In Book Two Chalmers described the intellect of man and its relations to external nature. He cited many of the beneficial adaptations between mind and external nature and explained the place of emotions and the will in man's moral and mental life. He concluded with a chapter on the uses and the weaknesses of the theology of nature.

8 Chalmers, I, 62, 65.
9 Chalmers, I, 51-53.
10 Chalmers, I, 85.
11 Chalmers, I, 112, 113.
12 Chalmers, I, 154, 155, 158-161.
13 Chalmers, I, 236.
14 Chalmers, I, 240, 250-253, 256, 257.
15 Chalmers, II, 9-16.

John Kidd and His Treatise

John Kidd was born on September 10, 1775, in London. He received his early training at Bury St. Edmunds. In 1789 he received a king's scholarship at Westminster and four years later he was admitted to Christ Church, Oxford.

Kidd was the professor of chemistry at Oxford from 1803 until 1822, also serving from 1808 to 1826 as a physician at the Radcliffe Infirmary. He gave lectures in geology and mineralogy for several years and in 1809 published a two volume work entitled Outlines of Mineralogy. Dr. Kidd was appointed Regius Professor of Medicine at Oxford in 1822. His deep religious interest led him to publish "An Introductory Lecture to a Course in Comparative Anatomy, illustrative of Paley's Natural Theology," which appeared in 1824. His treatise in the Bridgewater series was published in 1833. From 1834 until his death in 1851, Kidd was the keeper of the Radcliffe Library at Oxford.[16]

Kidd prepared his treatise as a popular description of the adaptations in nature which make it suited to man's physical and mental condition.[17] He declined to argue that the facts proved God's existence or the nature of His attributes. He supposed that those who read his book would

16 The information for this biographical notice on John Kidd was obtained from the article by W. A. Greenhill in D. N. B., XI, 91, 92.

17 This is a small treatise of 375 pages. The title is On the Adaptation of External Nature to the Physical Condition of Man principally with reference to the Supply of His Wants and the Exercise of His Intellectual Faculties.

be theists who could, from the facts he provided, make the inferences and applications which the Earl of Bridgewater had intended.[18]

In the first part of his volume, Kidd discussed man's distinctive physical condition. After remarking on the development of the strength of the flexible human spine and its relation to family and social affections, he expounded on the human mind. Thirteen of the fifteen pages in the chapter on the hand he quoted from Galen's On the Uses of the Parts of the Body.[19] Kidd concluded the section on man's constitution with discussions of the nervous system and the brain,[20] the effect of mental attitudes on physiological functions,[21] the effect of physiological functions on mental activity,[22] and the vain ambition of Napoleon to gain control over men and nature.[23]

The second division of the treatise was devoted to adaptations in nature which affect man's physical condition. In the midst of an explanation of mineral adaptations, Kidd digressed to deal with the Mosaic Deluge. He objected to the practice of trying to support "the credibility of the sacred Scripture" with temporary hypotheses of scientific workers.[24] He saw the peril of resting the authority of the Scriptures on the scientific views of any age. The effort to defend the Scriptures by means of scientific interpretations of the

18 Kidd, vii, viii.
19 The quotations from Galen on the hand, and much other material, appeared in Kidd's introductory lecture on comparative anatomy before being incorporated into his Bridgewater Treatise.
20 Kidd, 43-66, 73-76.
21 Kidd, 67.
22 Kidd, 68.
23 Kidd, 78-80
24 Kidd, 181.

physical world obscured the moral support for the Scriptures and prepares the way for a crisis at "a period in the progress of science, when particular phenomena may be interpreted in a very different manner from that in which they are interpreted at present."[25]

Kidd rejected the view that the extinct species became extinct at the time of the Flood, for the Scriptures indicated that when God then destroyed His creatures He intended "to preserve species."[26] The failure of the geologists to discover unmistakable traces of the Mosaic Deluge may have resulted from God's desire to obscure the physical evidence "in order to exercise our faith in an exclusive belief of the moral evidence."[27]

Kidd discussed at length the utility of vegetable life to man [28] and man's use of the products of the animal kingdom.[29] In setting forth his explanations of the adaptations of the natural world to man's moral constitution, he observed that men, unlike most animals, are not driven by instincts to make invariable and specific uses of particular substances in the world. Man has been allowed to ponder over the materials in his environment and to choose from among them those which can be adapted to his various needs and comforts.[30] Kidd surmised that, whatever may have been the subordinate reasons for their existence, the objects in the natural world were mainly intended for man's use and convenience.[31]

25 Kidd, 182.
26 Kidd, 183.
27 Kidd, 184.
28 Kidd, 202-243 (Chapter VIII).
29 Kidd, 243-273 (Chapter IX).
30 Kidd, 281-284.
31 Kidd, 278, 279.

He allotted many pages to a consideration of Lucretius' knowledge of natural science, closely rivalling that of Kidd's day.[32] Aristotle's classification of animals was cited as being remarkably similar to that of Cuvier. Kidd mentioned the freaks which occasionally occur in the animal world and suggested that their appearance should remind men of God's power. Men ought to be assured — because the freaks occur so rarely — "of the beneficence of God."[33] Kidd invoked the authority of revelation to affirm that a future life lies ahead for the creature in whose interests God has prepared the earth.[34]

In an appendix of twenty eight pages Kidd gave a series of extracts on animal physiology from the works of Aristotle and Cuvier, arranged in parallel columns for ease of reference in comparing the similarity in the knowledge of two men separated by more than two thousand years in their observation of natural phenomena.[35]

William Whewell and His Treatise

William Whewell was born on May 24, 1794, at Lancaster. He received his university training at Cambridge, where he was second wrangler in 1816. In the next year he became a Fellow of Trinity College, Cambridge. He taught mathematics for some years and was elected in 1828 to the chair of mineralogy. His ordination to the priesthood in the Church

32 Kidd, 286 ff.
33 Kidd, 338.
34 Kidd, 342, 343.
35 Kidd, 247-375.

of England had occurred in 1825. He published his Bridgewater Treatise in 1833. Some of his other publications were on the theory of the tides, mathematics, mineralogy, and the possibility of the existence of inhabitants in other worlds. The History of the Inductive Sciences[36] and the Philosophy of the Inductive Sciences[37] were his major works. Having resigned from the professorship of mineralogy, he was elected in 1838 to the chair of moral philosophy, which he held until 1855. He was appointed Master of Trinity College in 1847. His death occurred on March 6, 1866.[38]

Astronomy and General Physics considered with reference to Natural Theology[39] was composed in three sections, comprising terrestrial adaptations, cosmical adaptations, and nine chapters on "Religious Views." Whewell first discussed the earth as a home for animal and vegetable life in the midst of many influences, many constant and many periodical.[40]

While explaining cosmical arrangements Whewell included a treatment of Laplace's nebular hypothesis and of a "resisting medium" dispersed throughout all space. He believed that the nebular hypothesis, however helpful it might be in other respects, failed to explain from whence the nebulae had their origin and their distribution in space.[41] Contemporary mathematical studies induced Whewell to believe

36 This was published in three volumes in 1837.
37 This was published in two volumes in 1840.
38 The information for this biographical notice on William Whewell was obtained from the article by Leslie Stephen in D. N. B., XX, 1365-1374. More extensive accounts of Whewell's life may be found in the biographies by Mrs. Stair Douglas and Isaac Todhunter.
39 This is a treatise of 381 pages.
40 Whewell, 17. See also pages 42 and 43.
41 Whewell, 188, 189.

in the existence of a plenum in the space between the solid bodies of the universe.[42]

In the section on "Religious Views" Whewell explained that the natural world contains many features which suit man's intellectual and moral status. In fact man's mental and moral condition are so closely related to the phenomena in his environment that the connection is an obvious evidence that the Creator of the physical world is also the Author and Governor of the moral realm of existence.[43] The tremendous size of the universe and the complexity of its relations give evidence that man cannot comprehend with his finite mind any bounds to the effects of the power and wisdom of God. The Creator, as far as man can discern, has unlimited power and wisdom.[44]

Man has discovered that the events in nature occur according to laws of nature. Whewell remarked that even before the purpose of the peculiar relations of the laws were perceived, man recognized the laws to be an indication of a superintending Intelligence.[45] The notion of an intelligence was suggested by the order in natural events.[46] The notion did not depend on a recognition of the specific ends achieved by the operation of the laws nor of the complexity of their interactions and adjustments.[47]

Whewell expounded his observations concerning the effect

42 Whewell, 193. Bell and Buckland did not accept the hypothesis for a plenum. (Bell, 174; Buckland, I, 32.)
43 Whewell, 255 ff.
44 Whewell, 272, 273, 278, 367, 372.
45 Whewell, 296.
46 Whewell, 299.
47 Whewell, 296, 299.

of inductive and of deductive habits of thought. Those relatively rare thinkers who have been the first to perceive a coherence in a group of events or facts have been often impressed with the regularity and order prevailing in the events or the body of facts.[48] They have noticed that their thoughts rose to the notion of a cause beyond the order.[49] The habits of thought which lead to the discovery of the laws of nature have tended to impress the pioneers of discovery "with the persuasion of a Divine Purpose and Power which had regulated the events which they had attended to, and ordained the laws which they had detected."[50]

The results of deductive habits of thought have often been of a contrary nature.[51] Those whose efforts were given to the tracing of the consequences of a "given" law have frequently devoted such attention to the law as a cause of the consequences that they have been deluded into overlooking the First Cause.[52] Whewell warned that logicians and men engaged in mathematical sciences are particularly liable to lapse into the error of substituting the laws of matter for God, who ordained the laws, the matter, and their relations.[53]

When natural philosophers have noticed the means which produce a specific result, they have sometimes gathered the impression that the result is an <u>end</u> or purpose which somehow determines the operation of the means which produce it.[54] The supposition of <u>end</u> or <u>final cause</u> has been

48 Whewell, 306.
49 Whewell, 307.
50 Whewell, 307.
51 Whewell, 324.
52 Whewell, 329.
53 Whewell, 332, 340.
54 Whewell, 342.

employed with practical success in determining that other human beings exist in the world and that they employ intelligence in causing specific effects in the world.[55] By the same paths of inference men have decided that many of the phenomena in the physical world possess the characteristics of ends and are to be referred to an anterior Intelligence.[56] Whewell defended the validity of the process of inference against the attacks of those who denied the existence of final causes because physical inquiry was possible without the use of the concept.[57] The worker in physical science does not look for causes but for means of change in the natural world.[58] The religious philosopher accepts the information about physical operations and, using the concept of final cause, refers the phenomena to God, the Author of the laws and the operations.[59]

The laws of nature are the courses which God has prescribed for His constant activity in the world.[60] He has determined the laws as the instruments of His power, wisdom, and goodness. He is active in every operation of the laws,[61] being the Author of their effects in a way not closely resembling any human contrivance or use of means.[62]

55 Whewell, 344, 345.
56 Whewell, 346.
57 Whewell, 348, 351.
58 Whewell, 353.
59 Whewell, 355.
60 Whewell, 356, 357, 362.
61 Whewell, 361.
62 Whewell, 360.

Charles Bell and His Treatise

Charles Bell was born in November, 1774, at Edinburgh. He studied medicine at the University of Edinburgh. Being a capable artist, he made the drawings which accompanied his medical writings, one of which was published during his student days. He removed in 1804 to London, where he gave lectures in medicine and art. He wrote and illustrated a volume on the relation of anatomy and emotional expression which went through several editions.[63]

Bell made the important discovery "that the nerves are not single nerves possessing various powers, but bundles of different nerves, distinct in office." He was able to show that the nerves exist in two great classes — the sensory and the motor. For his discovery he was later knighted. Bell published a book on Animal Mechanics at the request of Lord Brougham and was subsequently invited to cooperate with Lord Brougham in preparing an edition of Paley's Natural Theology.[64] The edition of Paley was ready in 1836, nearly three years after the appearance of Bell's Bridgewater Treatise on the hand. Charles Bell died in April, 1842.

Bell wrote his treatise to describe the place of the hand in relation to man's physical structure and the external

63 All the information for this biographical notice on Charles Bell, except the item indicated in the following footnote, was obtained from the article by Norman Moore in D. N. B., II, 154-157.
A more complete account of Bell's life may be found in The Life and Labours of Sir Charles Bell by Amédée Pichot.

64 Bell, x.

world.[65] Within the body of man, the bones, the muscles, the nerves, and all other parts have been arranged to permit the hand to exercise its special powers.[66] Suitable references were made by Bell to other animals whose structure and activity reveal the marvelous adaptations which exist to support the human hand.

The bones of the hand and arm have been arranged to contribute an amazing combination of strength, mobility, and elasticity to the hand.[67] The muscles are set to provide a balance of speed and power.[68] The utility of the different finger lengths,[69] the keen sense of touch,[70] the protection of the nerves in the cuticle,[71] and the roughened surface of the cuticle[72] were interpreted by Bell to indicate the existence of design.

In the last of the three sections appended after the "Conclusion," Bell remarked that the purpose behind the natural world and the adaptations within the world is the improvement of the soul of man.[73]

Peter Mark Roget and His Treatise

Peter Mark Roget was born on January 18, 1779, in Soho,

65 The treatise by Bell, The Hand, Its Mechanism and Vital Endowments as Evincing Design, is the smallest of the series. It contains 288 pages.
66 Bell, 18, 38, 44.
67 Bell, 81, 105.
68 Bell, 110, 115.
69 Bell, 105.
70 Bell, 132.
71 Bell, 181.
72 Bell, 187.
73 Bell, 281.

London. He was graduated from the University of Edinburgh with the M. D. degree in 1798. He lectured at Manchester during 1807 on animal physiology. He subsequently delivered similar lectures at Bloomsbury and London. He also won recognition for his work in mathematics, electricity, and other fields of science. He served as Secretary to the Royal Society from 1827 to 1849. His Bridgewater Treatise was published in 1834. After retirement from professional engagements, Roget worked on his Thesaurus of Useful Words and Phrases. It was published in 1852. Dr. Roget's death occurred in September, 1869.[74]

Roget wrote his treatise with a double purpose.[75] He desired to present "evidences of the power, wisdom, and goodness of God, which are manifested in the living creation" in a compendium useful for the study of natural history.[76] He included an introductory chapter on final causes to describe the nature of the proof for design in the natural world. He perceived the distinction between the evidence from regularity and order and that from diversity and complexity. The inanimate world abounds in manifestations of regularity in events, simplicity in law, and uniformity in results.[77] "One pervading principle of order" reveals the design of the Creator.[78] The animal world and the vegetable world, however, are filled with lavish variety and

74 The information for this biographical notice on P. M. Roget was obtained from the article by Major W. W. Webb in D. N. B., XVI, 149-151.

75 Animal and Vegetable Physiology considered with reference to Natural Theology is the most comprehensive treatise of the series. It contains a total of 1254 pages in two volumes.

76 Roget, I, viii-x.

77 Roget, I, 9.

78 Roget, I, 9.

interesting complexity in its coordinated parts.[79]

The phenomena of organic beings were treated thoroughly under four divisions. These were (1) mechanical functions, (2) nutrition, (3) reproduction, and (4) sensation and perception. In each type of function the Creator has used a wise diversity of means to serve the same ends. The lower species serve the welfare of the higher.[80] Each individual must succumb to death, but the Creator has provided for the survival of the species by the appearance of succeeding individuals in every species.[81]

William Buckland and His Treatise

William Buckland was born in 1784 at Axminster, Devonshire. He attended St. Mary's College, Winchester, from which he advanced to Corpus Christi College, Oxford. After receiving the B. A. degree he was admitted as a Fellow of Corpus Christi College. He was ordained as a priest in 1808. His interest in geology earned him the chair of mineralogy at Oxford when Dr. John Kidd retired from it in 1813. Upon receiving the new readership in geology in 1819, Buckland delivered a striking inaugural lecture which was later published with the title Vindiciae Geologiae. He published Reliquiae Diluvianae in 1823 to present the geological evidence for a universal deluge. His Bridgewater Treatise appeared in 1836. Buckland became the Dean of Westminster

79 Roget, I, 9, 10.
80 Roget, II, 35, 36.
81 Roget, II, 582.

in 1845. His death occurred in 1856 after a long illness.[82]

In his treatise[83] Buckland pursued the following lines of study:

(1) the problem of interpreting the Biblical story of creation in the light of the geological knowledge of his day.

(2) the orderly preparation of mineral deposits.

(3) the fossil remains of organic creatures stored in the strata of the earth's crust and the relation of old species to modern types.

After explaining to his readers that geological discoveries did not contradict the message of the Scriptures,[84] Buckland commented on three unacceptable attempts to relate the evidence from geology to the Deluge of Noah's time. The hypothesis that the strata were formed during the Flood did not adequately account for the great thickness and number of the strata.[85] A second hypothesis suggested that the strata were formed in the years between the creation of man and the Flood, at which latter event the dry land was inundated and the sea bed was pushed above the waters.[86] All geologists, however, agreed that the strata had been

82 The information for this biographical notice on William Buckland was obtained from the article by Robert Hunt in D. N. B., III, 206-208.
A more complete account of Buckland's life may be found in Mrs. Elizabeth Oke Gordon's biography of Buckland.

83 Buckland's treatise, Geology and Mineralogy considered with reference to Natural Theology, is in two volumes. The first volume contains the whole text of the treatise in 599 pages. The second volume contains the index, a comprehensive geological map, and some seven hundred illustrations with their explanations.

84 Buckland, I, 13-15.

85 Buckland, I, 16, 17.

86 Buckland, I, 17.

formed during long ages prior to man's existence.[87] A third hypothesis interpreted the "day" in the story of the Creation to be a period immensely longer than the twenty four hour day of modern duration. This proposition was of little help, Buckland remarked, because geology was tending to show that plant and animal life had appeared contemporaneously, not successively, on the globe.[88]

Buckland offered the suggestion that an indefinitely long interval occurred between the creation of the matter of the heavens and the earth, mentioned in the first verse of Genesis, and the orderly disposition of the matter, recorded in subsequent verses. During the intermediate span, great periods of time elapsed and the earth was subjected to many changes in its condition. The Biblical narrative of the days of the Creation described only the events more closely preceding the creation of man.[89]

The second line of inquiry encompassed the description of the order of the growth of the strata, the changes "in their mineral and mechanical condition," and disturbances from the intrusions of crystalline rocks, and the changes made for the support of living creatures during the several stages.[90] Buckland believed that the earth's solid state was at one time preceded by a fluid state.[91] After the cooling of the hard crust, turbulent forces wrought vast changes in the topography of the earth, eventually bringing it to a condition suitable for the support of life.[92]

87 Buckland, I, 13, 17.
88 Buckland, I, 18.
89 Buckland, I, 19, 28.
90 Buckland, I, 37.
91 Buckland, I, 40, 41.
92 Buckland, I, 49, 50, 53.

The major part of the treatise was devoted to the evidence derived from the fossils of the living forms which had been created and placed in the world. The fossils revealed that continuing changes in the earth's condition were matched by new contrivances to support animal and vegetable life and, occasionally, by the creation of new species.[93] The new species appeared in increasingly perfected forms,[94] always adhering to a uniform system of structure.[95]

Buckland frequently reiterated the several strains of evidence from geology for the design argument. He explained that the preparation and evolution of the earth indicated order, symmetry, law, and method.[96] The preparation of life to suit the earth's condition and the use of a variety of means to attain similar ends showed contrivance, adjustment, and adaptation.[97] An impressive design was perceptible in the uniformity of structure linking extinct with existing species,[98] a uniformity revealing the constant activity of the eternal God.[99]

William Kirby and His Treatise

William Kirby was born on September 19, 1759, at Witnesham. He received the B. A. degree from Caius College, Cambridge, in 1781, and the M. A. degree in 1815. From 1782 he was in charge of the parish of Barham, Suffolk, becoming

93 Buckland, I, 53, 76, 295.
94 Buckland, I, 107.
95 Buckland, I, 140.
96 Buckland, I, 49, 539, 540, 578.
97 Buckland, I, 76, 142, 186, 335, 380, 523, 538.
98 Buckland, I, 84, 140, 380, 414, 502.
99 Buckland, I, viii, 114, 140, 381.

the vicar in 1796. An excellent botanist, he specialized in the study of insects. He published many papers on entomology in learned journals. With William Spence he wrote the popular Introduction to Entomology, comprising four volumes. He was selected to prepare the Bridgewater Treatise on animal habits and instincts. He died at Barham on July 4, 1850, at the age of 90 years.[100]

Kirby opened his treatise with an introductory statement of eighty nine pages.[101] He quickly directed attention to the Scriptures as a source of evidence for the attributes of God, for the Bridgewater legacy had suggested the use of "all reasonable arguments," including those found anywhere in "the whole extent of literature."[102] The proper study of the character of God requires careful attention to the Word of His Revelation and the Works of His Creation. Neither can be understood apart from the other.[103] Although the Scriptures have been subjected to violence through wrong interpretation and ecclesiastical tyranny,[104] Kirby thought them to be valuable as a guide which prevented the student of the works of nature from thinking that natural forces adequately accounted for the phenomena of nature.[105] The deists had been blind to a necessary

100 The information for this biographical notice on William Kirby was obtained from the article by G. T. Bettany in D. N. B., XI, 199, 200.

101 The treatise contains 948 pages in two volumes. The title is On the Power, Wisdom, and Goodness of God as manifested in the Creation of Animals and in Their History, Habits, and Instincts.

102 Kirby, I, ix, xviii.

103 Kirby, I, xlvi, xlvii.

104 Kirby, I, xliv, xlii. Kirby's method of interpretation educed the striking explanation that the two parts of the Hebrew tabernacle represented heaven and earth. (Kirby, I, lviii, lix.) The cherubim were symbols of heaven and the forces by which God ruled. (Kirby, I,

part of the truth, Kirby explained, in their refusal to recognize the continuing power and initiative of God behind the existence and the operation of second causes.[106]

The sin of man introduced a new economy into the world. Insects were probably created as a punishment after the Fall.[107] It is unlikely that before man's trespass any animal could have eaten flesh. All must have eaten grass and herbs.[108] The extinct species probably lost their lives when God changed the condition of the earth to make life more difficult for man.[109] It seemed reasonable to suppose that they could not have lived and met destruction in ages long antecedent to man's creation. God would not have permitted the world to exist for great epochs with no rational creature in it to "glorify and serve Him."[110]

Kirby affirmed the existence of a vast subterranean ocean, the main source of supply for wells and rivers.[111] He supposed the same ocean to be the home of a number of animals of the saurian type.[112] Kirby thought that the Creator's lavish distribution of creatures, adapted to suit every variety of climate and circumstance over the face of the globe, justified the inference that He would not permit the whole of the interior of the earth to be without any inhabitant.[113]

lxxvii, lxxviii, xci, xcii.) Also, fire, light and air "seem to represent the Three Persons of the Holy Trinity." (Kirby, I, xcii, cii.)

105 Kirby, I, xxviii, xxxiii, xlviii, xci, cii, ciii.
106 Kirby, I, xxii, xxiv, xxxv, xxxvii, xci, cii, ciii.
107 Kirby, I, 15, 16.
108 Kirby, I, 9, 42.
109 Kirby, I, 17, 18, 41.
110 Kirby, I, 39.
111 Kirby, I, 24 ff.
112 Kirby, I, 32, 33.
113 Kirby, I, 33

Having disposed of preliminary matters, the author proceeded to give an account of the geographical distribution of animals and of the functions and instincts of the creatures of the various species. His descriptions of natural history are related, by occasional references, to corresponding passages of Scripture.[114]

William Prout and His Treatise

William Prout was born on January 15, 1785, at Horton, Gloucestershire. He received the degree of M. D. at Edinburgh in 1811. He settled in London and began to lecture and experiment in the field of chemistry. In 1815 he announced his observation that "the atomic weights of all the elements are exact multiples of either the atomic weight of hydrogen or half that of hydrogen." His view became known as "Prout's hypothesis." He specialized in studies in physiological chemistry and in 1823 revealed his discovery of free hydrochloric acid in the stomach. He was appointed to write the Bridgewater Treatise on chemistry and associated topics. He died at London on April 9, 1850.[115]

Prout began his treatise with a statement on the nature, the validity, and the contribution of the argument "that

114 Kirby, I, 74, 78, 143, 193, 362, 363; II, 72, 152, 233, 234, 432, 473, 522.

115 The information for this biographical notice on William Prout was obtained from the article by P. J. Hartog in D. N. B., XVI, 426, 427.

design, or the adaptation of mean to an end, exists in nature.[116] He discussed the chemical evidences of design, phenomena more abstruse than mechanical evidences. Prout believed that chemical operations, because they were less comprehensible than physical contrivances, were more effective proofs of God's wisdom and power.[117]

Prout employed the second portion of his treatise to relate the phenomena of meteorology to the design argument.[118] Following a review of the factors affecting climate, he commented on the apportionment of plants and animals to areas of the world suitable for their habitation.[119] He included a chapter on the adaptations made for man's residence on the earth and of the hope of a future life away from the shackles which bind man to the earth.[120]

The third division of the volume was devoted to a study of the nutrition of plants and animals.[121] With competence and thoroughness, Prout described the chemical phenomena of organic structure, nutritive substances, and the functions of the digestive, circulatory, and respiratory systems in plants and animals, matters which other of the Bridgewater authors had more briefly mentioned in their works.

116 Prout, 1. The treatise occupies a volume of 571 pages. The title is Chemistry, Meteorology, and the Function of Digestion considered with reference to Natural Theology.
117 Prout, 21
118 Prout, 188-415 (Book II).
119 Prout, 365-406.
120 Prout, 406-415.
121 Prout, 416-557 (Book III).

The Significance of the Bridgewater Treatises

The success of the seventeenth and eighteenth century scientists in describing and explaining the phenomena of nature had disturbing effects on religious beliefs. By the beginning of the eighteenth century many thinkers had come to suppose that as a source of knowledge about God and His ways the Scriptures could be superseded by the more obvious and rational evidences of God's "true revelation" in the stones, trees, animals, and forces of the natural world.[1] Man's reason was confidently thought to be capable of discovering God's ways without help from divine revelation. Men hoped that the study of nature would yield up a rich harvest of accurate knowledge about the relations of man to God and His world and, at the same time, avoid the conflicting doctrines of the contentious denominational families of Christendom.[2] Particular theologies which offended common sense with claims of prophecies and miracles were often regarded as outworn superstitions.[3]

The new faith in the ability of reason to interpret nature and uncover God had more than one aspect. The enthusiasts for science did not so much oppose revealed religions as neglect them as antiquated substitutes for the real path to truth.[4]

1 Becker, Carl, "Historical Antecedents of the Declaration: The Natural Rights Philosophy," chapter II in The Declaration of Independence, 36, 37, 39.
2 Becker, 74; Fulton, W., Nature and God, 18.
3 Becker, 39-41, 51; Fulton, 20, 41.
4 Bloch, Leon, La Philosophie de Newton, 555, cited in Becker, 48; Fulton, 42, 44; Storr, V. F., Development of English Theology in the Nineteenth Century, 30, 31.

From the dynamics of Newton the devotees of science constructed a mechanical view of the world.[5] With science and its laws they undertook to supplant revelation and its God.

The shaking of the religious opinions of the times caused others to interpret Newtonian science for a different purpose. They tried to enlarge on Newton's statements of the theistic implications of the discovery of law in natural events.[6] In the "Scholium" at the end of his Principia Mathematica, Newton had given his views in a statement whose "sense is that of the design argument."[7] The origin of the marvelous order in nature he ascribed to "the counsel and dominion of an intelligent and powerful Being."[8] From his philosophical contemplation of the world and its phenomena he perceived that God is eternal, infinite, omniscient, omnipotent, benevolent, and most perfect.[9]

Maclaurin cited Newton's view that "the contrivance and fitness of things for one another" constitute an obvious argument for the existence of God.[10] His essence could not be comprehended by man's reason, but His attributes were declared to be clearly visible "in his admirable works."[11] Newton tried to avoid the utterance of expressions which detract from the conception of God's initiative, free action,

5 Dampier-Whetham, W.C.D., A History of Science and Its Relations with Philosophy and Religion, 187.
6 Becker, 47.
7 Dampier-Whetham, 187, 188.
8 Cajori, F., ed., Newton, Isaac, Mathematical Principles of Natural Philosophy and his System of the World, 543, 544. See also Dampier-Whetham, 185.
9 Cajori, 545; Maclaurin, C., An Account of Sir Isaac Newton's Philosophical Discoveries, 381, 382.
10 Maclaurin, 381.
11 Maclaurin, 382.

and "perfect liberty" in the government of the world. Maclaurin pointed out this effort of Newton as follows:

> Sir Isaac Newton is particularly careful always to represent him as a free agent; being justly apprehensive of the dangerous consequences of that doctrine which introduces a fatal or absolute necessity presiding over all things.[12]

Churchmen "laid firm hold of the Newtonian conception of the universe as an effective weapon against infidelity."[13] Upon his appointment to deliver the first Boyle lectures in 1692, Richard Bentley used data from Newton's works in an effort to demonstrate the existence of God and some of His attributes.[14] In the previous year John Ray had published his widely read book, The Wisdom of God manifested in the Works of Creation.[15]

During the eighteenth century, the design argument became exceptionally popular in Great Britain.[16] A host of books and pamphlets were published to demonstrate the existence of beneficial adaptations in nature.[17] The success of the argument even supported the publication of many works on physico-theology

12 Maclaurin, 382, 383.
13 Becker, 76.
14 Mossner, E. C., Bishop Butler and the Age of Reason, 35; Whittaker, E. T., Space and Spirit, 95.
15 White, A.D., A History of the Warfare of Science with Theology in Christendom, I, 42.
16 Cohen, M.R., Reason and Nature, 289; McGiffert, A.C., Rise of Modern Religious Ideas, 41, 42, 52; Macran, F.W., English Apologetic Thought, 41, 42, 75.
17 Flint, R., Theism, 338; Hunt, J., Religious Thought in England in the Nineteenth Century, 48; McGiffert, 52.
Some of the more valuable works were Grew's Cosmologia Sacra (1701) and Derham's Physico-Theology (1712). Bernard Nieuwentyt's Het Gebruik der Werelt Beschouwingen, &c. was translated into English in 1718 and 1719 by John Chamberlayne with the title, The Religious Philosopher. Richard Blackmore's long poem on the design argument, Creation, A Philosophical Poem in Seven Books appeared in 1797.
It must not be supposed that the design argument was

in Germany and France.[18] Becker declares that "the sermons of the century [were] filled with [the design argument] — proving the existence and goodness of God from the intelligence which the delicately adjusted mechanism of nature exhibited."[19]

The classical volume on the design argument appeared in the opening years of the nineteenth century. Summing up the work of his predecessors and following largely the outline of Nieuwentyt's book,[20] William Paley in 1802 completed his Natural Theology.[21] Paley gave a clear and skillful statement to material which others had delivered in cumbrous fashion.[22]

The clarity of Paley's presentation of the design argument and a rapidly growing public interest in the findings of science insured the popularity of his volume. The pronouncements of men of science, were being discussed at the beginning of the nineteenth century by classes which formerly had left such topics to the intellectuals.[23] Astronomy and the new science of geology were rising in favor, the latter probably having much the greater appeal.[24] Ten editions of Paley's

a creation of the eighteenth century. It has a history dating back to Cicero and the Greek philosophers. For a summary of the history of the argument consult Fulton, 25-40, 219-261; Hicks, L., Critique of the Design-Argument, 47-296; or Flint, 387, 390.

18 Flint, 338; Fulton, 239.

19 Becker, 76, 77.

20 A series of letters and editorial comments in the Athenaeum of 1848 established the charge that Paley drew heavily from Nieuwentyt's book. Athenaeum, 1848, 803, 907, 933; Jackson, W., The Philosophy of Natural Theology, 47; Stephen, L., History of English Thought in the Eighteenth Century, I, 409 note.

21 The full title is Natural Theology; or, Evidences of the Existence and Attributes of the Deity, collected from the Appearances of Nature.

22 Cave, A., Introduction to Theology, 170; Jones, F. W., Design and Purpose, 36; Macran, 75; Stephen, I, 408.

23 McGiffert, 41, 42; Merz, J. T., A History of European Thought in the Nineteenth Century, II, 324; Walker, K., Meaning and Purpose, 24.

24 Benn, A. W., The History of English Rationalism in the Nineteenth Century, I, 370; Dampier-Whetham, 269.

Natural Theology were published by 1809, twenty editions by 1820. Many annotated editions were published during the nineteenth century.[25] The book was widely read and discussed by several generations of the public, giving further impetus to the study of natural history.[26]

Many other authors, wishing to participate in the success of the design argument, or desiring to dispel the popular suspicion against geology,[27] offered similar works to the public.[28] Prize essay awards were founded to encourage the authorship of good volumes on the evidences from natural science.[29] Public interest increased and no one seemed to be seriously impressed with the philosophical objections which Hume and Kant had cited against the "proof."[30]

When the public heard of the munificent bequest of the Earl of Bridgewater and the selection of the distinguished

25 Allibone's Dictionary of English Literature, 1488; British Museum Catalogue, Vol. P-Pasb, (1893), 112.

26 Barzun, J., Darwin, Marx, Wagner, 70; Brougham, H., A Discourse of Natural Theology, 2; Cave, 171; Kidd, J., "An Introductory Lecture to a Course in Comparative Anatomy, &c.," 1.

27 Cave, 171; Merz, II, 324, 325; Benn, I, 372; Shearman, J.N., Natural Theology of Evolution, 26.

28 Among these were Crombie, A., Natural Theology (1829); Duncan, J., Botano-Theology (1825); Fergus, H., Testimony of Nature (1833); and Gisborne, T., Testimony of Natural Theology to Christianity (1818). See Whewell, xiii.

29 Hunt, 48; Fownes, G., Chemistry, as Exemplifying the Wisdom and Beneficence of God, vii, viii.

30 Beckwith, C. A., The Idea of God, 103; M'Ewen, B., in Hume, D., Dialogues concerning Natural Religion, xiv; Henderson, L. J., Order of Nature, 48, 49; Powell, B., Order of Nature, 199, 200; Pringle-Pattison, A.S., Idea of God, 4; Waterhouse, E., Philosophical Approach to Religion, 85, 86.
Hume's criticisms are contained in his Dialogues concerning Natural Religion. Those of Kant are in his Enquiry ... Into the Grounds of Proof and his Critique of Pure Reason. See below at pages 134 to 137.

writers for the Bridgewater Treatises, great interest was aroused over the volumes even before their appearance.[31] A generation which held an increasing respect for the views of scientists grasped eagerly at these works. An American journal said that "perhaps for many years, no works have come from the press, which have received more consideration from educated men, than the Bridgewater Treatises."[32] The nature of their titles and the orthodox reputation of the authors gave the treatises an appeal for the religious souls who wanted to find support for their faith in an era when doubts had been stirred up by surges of rationalism and skepticism.[33] The high scientific reputation of the authors gave the volumes a recommendation to those who trusted the evidences of the natural sciences more readily than the testimony of the Church and the Scriptures.[34]

The Bridgewater authors took up the argument which Ray, Derham, and Paley had competently presented. Without changing the character of the argument in any appreciable degree, they supported it with new and expanded masses of evidence. Thinkers had noted that the advances in science called for revisions or additions to Paley's valuable book on natural theology soon after its appearance. George Clark had issued a supplement to it as early as 1806.[35] Paxton published an edition with notes in 1826, about the time when the Society for the

31 American Monthly Review, IV 203 (September, 1833); Edinburgh Review, LVIII, 422(January, 1834); Jones, F. W., 41.
32 Southern Literary Messenger, V, 211 (March, 1839).
33 Beckwith, 111.
34 Hitchcock E., in The American Biblical Repository, IX, 103 (January, 1837); Southern Literary Messenger, V, 211 (March, 1839).
35 British Museum Catalog,Volume XXXVIII (1944), 670.

Diffusion of Knowledge "was strongly urged to publish an edition of Dr. Paley's popular work, with copious and scientific illustrations."[36] The publication of the Bridgewater Treatises admirably met the demand for a competent, up-to-date presentation of the design argument. The material was presented by experts in each of the areas of study, giving the argument the "imprimatur of science."[37]

A. D. White cited the Bridgewater Treatises as marking the culmination of an era in the use of the design argument in natural theology.[38] Another writer has remarked that they "represent the ultimate exploitation of the argument from design."[39] More valuable than the enthusiastic praises of contemporaries was White's judgment that the treatises were not only "well done," but were distinctly an improvement "in matter, method, and spirit" over "all that had appeared before."[40]

The thorough and authoritative work of the Bridgewater authors immediately gave the treatises the foremost place among volumes on the design argument.[41] They treated exhaustively all the material which had been known to belong to the design argument. In fact, Chalmers was commended for having added a new field of evidence to the argument by his fine treatment of the relations of nature and society to the

36 Brougham, H., Discourse of Natural Theology, 2. The society was reluctant, through fear of religious controversy, to sponsor the proposed edition. Eventually Brougham enlisted the aid of Sir Charles Bell, and the two men undertook the task.
37 Jones, F.W., 40, 41. See also Mossner, 203.
38 White, I, 43.
39 Mossner, 203.
40 White, I, 43.
41 Merz, II, 325, 326; Walker, J.B., God Revealed in the Process of Creation, 39.

mental and moral constitution of man.[42] The reviewer for the Athenaeum wrote that "since the days of Bishop Butler, no single work has appeared displaying more profound philosophy, clearer and more cogent reasoning, or a larger share of the pure 'religion of the heart' than this treatise by Dr. Chalmers."[43] The same reviewer praised Chalmers' chapter on the uses of natural theology as "the most masterful proof of the necessity of revelation that exists in our language."[44]

The work of the eight authors was so effective that it nearly precluded public attention to later works on the same subject. When the edition of Paley by Brougham and Bell was announced in 1836, a writer in the Edinburgh Review remarked that the popularity and value of the Bridgewater Treatises would limit the circulation of Brougham's book.[45] Other writers from time to time noted that with the Bridgewater Treatises in the hands of the public, the design argument had given its maximum service. Little more could be done to increase its effectiveness.[46]

The demand for the treatises was so large that it became quickly apparent that the one thousand copies prescribed by

42 Edinburgh Review, LXIV, 276 (January, 1837); Fulton, 240. A writer for the Select Journal expressed his astonishment at finding Chalmers, in the Bridgewater Treatise, "asserting over and over again that certain phenomena in nature demonstrate the power, wisdom and goodness of God" after having strenuously declared in his article in the Edinburgh Encyclopaedia that attempts to form an opinion of God's attributes from "the works of nature or providence" are "not only foolish but mischievous." Select Journal of Foreign Periodical Literature, II, 50 (1834). The article cited is in the Edinburgh Encyclopaedia, edited by David Brewster, Volume VI, 355-396.

43 Athenaeum, 1833, 396 (June 22, 1833).

44 Athenaeum, 1833, 397 (June 22, 1833).

45 Edinburgh Review, LXIV, 302 (January, 1837).

46 Mossner, 203; Walker, J.B., 39.

the Earl of Bridgewater were inadequate. The success of Whewell's treatise, which was the first to be published, appears to have encouraged the publisher to venture a first edition of fifteen hundred copies of Chalmers' treatise.[47] Before the year was out a second edition, of an additional fifteen hundred copies of Chalmers' treatise was required. New printings of the volumes by Whewell and Bell also had to be ordered.[48] In 1834 the publishers issued a third edition of the treatise by Chalmers. Later the author expanded his material and arranged it into his series of volumes on natural theology.[49] Nevertheless, its sale as a Bridgewater Treatise continued. Other editions were printed in 1839, 1840, and 1853.

When Buckland's two volumes were ready for the printer, the publisher was so animated by the "celebrity of the Treatises"[50] and by the discussions in anticipation of the treatise by Buckland that he ordered five thousand copies. Within a few months a further order of the same number was required.[51] Louis Agassiz translated the treatise into German for publication in Switzerland in 1839.[52] Two French translations were made, one being an abridgement.[53]

The fame and merit of the Bridgewater Treatises led to the publication of a German edition of the whole series in 1837

47 Hanna, W., Memoirs of Thomas Chalmers, III, 309.
48 Edinburgh New Philosophical Journal, XV, 403, 404 (October, 1833).
49 Hanna, III, 309.
50 Monthly Review, 1836, Part II, 330 (November, 1836).
51 Fox, Caroline, ed. Pym, H.N., Memoirs of Old Friends, 4; Lyell's letter to his father on October 4, 1836, in Lyell, Life, Letters and Journals of Sir Charles Lyell, Bart., I, 473; Monthly Review, 1836, Pt. II, 330 (November, 1836).
52 Buckland, third edition, I, lxxx.
53 Catalogue Generale ... de la Bibliotheque Nationale, Paris, 1904, XX, 1202. See also Appendix II below.

and 1838.[54] Almost immediately after the appearance of the treatises in England they were published in the Unites States by Harpers of New York and by Carey, Lea, and Blanchard of Philadelphia. American interest in the treatises seems to have been no less enthusiastic than that in Britain.[55] The series was subsequently included in Bohn's Scientific Library, published by Bell and Daldy of London.

In summary, it may be said that in the United Kingdom Chalmers' treatise went into seven editions and that of Kidd into six. Whewell's volume extended through at least eight editions. Nine editions of Bell's treatise were issued. There were four editions for the treatises by Roget, Buckland, and Prout. Kirby's treatise was printed in three editions.[56]

Undoubtedly some credit for the success of the volumes was due to their value as treatises on natural science. Especially was this the case with the productions of Roget and Buckland. Two years after Buckland's death in 1856 his treatise was carefully revised by a group of geologists and the volumes served as works of reference for several generations of students. Professor Boyd Dawkins of Owens College, Manchester, remarked that he still had them in his classroom for the use of his pupils as late as 1894.[57] When

54 Kayser, Christian Gottlieb, ed., Neues Bucher-Lexicon enthaltend alle vom 1833 bis ende 1840 gedruckten Bucher und nebst nachtragen und Berichtigungen fruherer erscheinungen, Leipzig, 1841. Part II, 137; Graesse, Jean, ed., Tresor de Livres Rares et Precieux ou Nouveau Dictionnaire Bibliographique, Dresden, 1858, I, 539.

55 Southern Literary Messenger, V, 211 (March, 1839).

56 See Appendix II for a full list of the editions of the Bridgewater Treatises.

57 Gordon, E. O., Life and Correspondence of William Buckland, 55.

the Bridgewater Treatises were published, a number of writers praised them at least as much for their scientific merit as for their theological soundness.[58]

The recognition of the value of their science need not be taken as a denial of their theological utility. It may better be said that their authors put at the service of theology the best scientific attainments and insights of the day. Bishop De Luca rejoiced that the authors of the Bridgewater Treatises had brought science back from hostility to the service of religion.[59]

The effect of the treatises on religious feeling and thought was very significant. Contemporary writers, including many who disagreed with the scientific conclusions of the authors, referred to the Bridgewater Treatises as "highly meritorious works,"[60] nobly fulfilling the hopes that the earl must have entertained for them.[61] They were famous, widely read, "quoted on all occasions as undoubted standards of excellence,"[62] and reassuring.[63]

Beckwith has affirmed that "it is impossible to over-estimate the profound and quieting impression made by these

58 Edinburgh Review, LX, 146 (October, 1834); Lyell's letter to his father on October 4, 1836, in Lyell, I, 473; North American Review, XLII, 470 (April, 1836); Ibidem, LIX, 110 (January, 1842): Southern Literary Messenger, V, 211 (March, 1839); Wilson, G., "Chemistry and Natural Theology," in Religio Chemici, 30, 31.

59 Annali delle Scienze Religiose, I, 5 (July-August, 1835); Ibidem, I, 204, 205 (September-October, 1835).

60 North American Review, XLII, 470 (April, 1836).

61 Best, S., Afterthoughts on Reading Dr. Buckland's Bridgewater Treatise, 1; Crabbe, 17; Hicks, 268.

62 Southern Literary Messenger, V, 211 (March, 1839).

63 Best, 1; Cave, 171; Monthly Review, 1836, II, 330 (November, 1836); Mossner, 203; Walker, J. B., 39.

works on disturbed and thoughtful minds."[64] Even L. Hicks, who was so quick to ridicule the treatises, said that "unquestionably" the "extremely popular" Bridgewater Treatises were actually valuable works of good influence in their day.[65] F. W. Jones believes that after the Bridgewater authors gave scientific approval and evidence to the argument which theologians had formerly employed, it became "the accepted belief of all educated people that the whole realm of nature . . . was designed in perfection and with purpose underlying its every phase."[66]

In 1880 Asa Gray explained the attitude of the period in which the treatises appeared. He confided that believers were sure that they had an invincible argument with which to conquer the doubter and the caviller, compelling them to join in the faith of the theist.[67] Writers for the Monthly Review and for the American Biblical Repository had openly announced the prevalence of the same confident mood. The believer no longer needed to fear defeat in debates over the being of God. No more could the skeptic retort that the design argument was employed only by writers who failed to understand science and philosophy. The issue was settled. The design argument was considered, by nearly all who were interested, to be conclusive and irrefutable.[68]

64 Beckwith, 111. It should be noted that in employing the phrase "these works" Beckwith referred to the Bridgewater Treatises and Paley's Natural Theology.
65 Hicks, 268.
66 Jones, F. W., 40, 41.
67 Gray, Asa, Natural Science and Religion, 86. See also Waterhouse, 86.
68 Hitchcock, in the American Biblical Repository, IX, 103 (January, 1837); Gray, 86; Monthly Review, III, 219 (October, 1834).

The treatises did not escape without some adverse criticism. An early objection was that the expansion of the project into a series of eight treatises with twelve volumes had violated the intention of the Earl of Bridgewater. The earl must have wanted a popular work. The series was so large that few people cared to read it all. Indeed, the price of the eight treatises — a total of seven pounds, sixteen shillings, and six pence — put the set beyond the means of a large group of readers. On reviewer boldly declared that less of the legacy should have been paid to the authors. He believed that a large sum should have been retained to defray the publishing costs of a smaller work which could have been distributed among all classes of the public at a very low purchase price.[69]

A further bad effect of the enlargement of the project was the division of the work among so many authors. Several reviewers professed amazement and some disapproval at the assignment of the strange trilogy of topics which Prout had to include in one treatise. The manner of dividing the subjects led the individual authors to encroach on the domain of others of the group. Kidd was criticized for trespassing flagrantly on Bell's work on the hand and on topics about moral and mental phenomena which belonged to Chalmers' treatise. He was also accused of infringing on the topics assigned to Whewell, Roget, Buckland, Kirby, and Prout.[70] Many repetitions occurred and individual writers even

69 Edinburgh Review, LVIII, 424 (January, 1834).
70 Athenaeum, 1833, 248 (April 20, 1833); Literary Gazette, 1833, 339 (June 1, 1833).

contradicted one another within their works.[71] Kirby's invasions into the field of geology were accompanied by such fantastic conjectures that men who had sympathetically greeted the treatises were horrified and thrown into despair, lest his extravagances in a field of study admittedly not his own throw discredit on the other treatises or seriously prejudice the relations of scientific thought and theology.[72]

After reading the earliest treatises, writers for the Edinburgh Review and Fraser's Magazine complained that an editor should have gone over the work of the contributors. It should have been his task to combine all the contributions into a single comprehensive treatise. It would still have been possible to use his services if it were thought best to preserve eight distinct treatises. An editor would have prevented the duplication of material. Glaring contradictions could have been amended or removed, and the public might have been saved from the long and extraneous digressions by Chalmers, Kidd, and Kirby.[73]

Chalmers was thought to have offended by discoursing on the Malthusian theory, the English tithe system and poor laws, and the definition of his range of investigation.[74] As has

71 Bell and Buckland disagreed with Whewell regarding the plenum. (See above at page 92.) Whewell and Buckland disagreed with Kirby's opinion about a subterranean ocean. (See above at page 36.)

72 Athenaeum, 1835, 663 (August 29, 1835); Southern Literary Messenger, V, 211 (March, 1839); Hitchcock, in the American Biblical Repository, IX, 93, 103 (January, 1837).

73 Edinburgh Review, LVIII, 424 (January, 1834); Fraser's Magazine, VIII, 273 (September, 1833). The reviewer for the British Critic thought that repetition was no more than a slight disadvantage in the treatises when compared with the great advantage of allowing the individual authors the liberty of independent study and expression. [British Critic, XIV, 240(October, 1833).]

74 Athenaeum, 1833, 397 (June 22, 1833); Gentleman's Magazine, CIII, Part II, 54-56 (July, 1833).

been already noted, Kidd went out of his way to deliver a denunciation of Napoleon and gave much space to references from Lucretius and Aristotle.[75] He was accused, with much justification, of having roamed "from one subject to another, often having but little connection with the point from which he started."[76] Many of the unpopular points of Kirby's composition were on matters which he need not have mentioned at all. An editor could, perhaps, have dissuaded him from his unfortunate expressions of opinion on underground waters, the doctrine of sin, and Biblical interpretation.[77]

The reviewer for Fraser's Magazine was delighted to see Kirby's references to the Scriptures. He had taken occasion in several issues of the magazine to castigate Davies Gilbert and his advisors for having failed to assign a writer to make demonstrations of God's power, wisdom, and goodness from the Scriptures. He accused them of having ignored the wish of the earl that "the whole extent of literature," of which the Scriptures were chief, be used as a source of evidence.[78] When Kirby's treatise appeared, the reviewer thought that some effort had finally been made to fulfill the larger requirement of the earl's bequest.[79]

75 See above at pages 88 and 90. No reviewer seems to have noticed that Kidd, in using so much material from Galen, Lucretius, and Aristotle, may have been trying to abide by the earl's suggestion that demonstrations be drawn from "discoveries, ancient and modern, and the whole extent of literature."

76 Literary Gazette, 1833, 339 (June 1, 1833). See also Athenaeum, 1833, 247, 248 (April 20, 1833).

77 See above at pages 102 and 103. Note also the Literary Gazette, 1835, 417, 418 (July 4, 1835); Athenaeum, 1835, 663 (August 29, 1835); and Southern Literary Messenger, V, 211-214 (March, 1839).

78 Fraser's Magazine, VIII, 65, 80, 259; Ibidem, XVI, 730.

79 Fraser's Magazine, XII, 415 (October, 1835).

Kirby's use of the Scriptures caught the attention of Bishop De Luca in Rome and drew two interesting comments from him. In discussing Kirby's treatise for the Annali delle Scienze Religiose, the bishop took exception to the statement that "in the dark ages before the Reformation, superstition held the place of true and reasonable religion." He rebuked Kirby for the indiscretion shown by the statement, but he made no hint of an effort to refute its implications.[80] When he noticed that Kirby interpreted the distribution of animals to be an indication of God's will that men live in a great brotherhood, the bishop thought that he saw a good opportunity. He declared that the Protestant scientist — and clergyman — had discovered in natural science an evidence that God intended all men to be members of the Catholic Church, that is, the Roman Catholic Church.[81]

Whewell's remarks on the effects of inductive and deductive habits of thought also raised a controversy.[82] Mathematicians were indignant at the suggestion that concentration on their particular methods and attitudes could lead them to ignore the reality behind the phenomena in nature.[83] Charles Babbage, the Lucasian Professor of Mathematics at Cambridge, was prompted to reply to Whewell's imputations. He prepared a small volume which he entitled The Ninth Bridgewater Treatise: A Fragment, in compliment to the high reputation of the Bridgewater Treatises.[84]

80 Annali delle Scienze Religiose, III, 15, 16 (July-August, 1836). The statement is in Kirby, I, xliv.
81 Annali delle Scienze Religiose, III, 28, 30 (July, August, 1836).
82 Whewell, 303, 304.
83 Gilbert's letter to Whewell on April 29, 1833, in Gilbert, Correspondence, 29; Babbage, C., Ninth Bridgewater Treatise, x; Todhunter, I., William Whewell, I, 97, 98.
84 This was published by John Murray in London in 1836.

Babbage endeavored to show how the study of mathematics rather than defeating the aims of religion could serve those aims.[85] He used the example of the calculating machine to demonstrate that apparent deviations from natural law could be subsumed under a greater order which enhanced the notion of God's wisdom and power.[86] Babbage also discussed fatalism, free will, immortality, and the occurrence of miracles.

Thomas Hill, subsequently the president of Harvard University, in 1849 published a small volume on mathematics and the design argument as a supplement to Babbage's book. He, too, paid tribute to the Bridgewater Treatises by incorporating the name into the title of his book — Geometry and Faith: A Fragmentary Supplement to the Ninth Bridgewater Treatise. It may be pertinent to remark that writers on natural theology after 1833 showed their great debt to the Bridgewater Treatises by frequent references to them as a source for authoritative and comprehensive information.[87] Even Darwin used a sentence from Whewell's treatise for insertion at the front of his Origin of Species.[88]

85 Lyell's letter to Herschel on June 1, 1836, in Lyell, I, 466; Athenaeum, 1837, 436 (June 17, 1837).

86 Babbage, 30-49 (Chapter II). For a review of the volume consult the Athenaeum, 1837, 436 (June 17, 1837).

87 Contemporary reliance on the Bridgewater Treatises can be noted in many works, among them the following: Beaven, J., Elements of Natural Theology; Best, S., Afterthoughts on Reading Dr. Buckland's Bridgewater Treatise; Brown, J. M., Reflections on Geology; Buchanan, J., Faith in God and Modern Atheism, &c.; Burnett, C. M., The Power and Wisdom of God; Crabbe, G., An Outline of a System of Natural Theology; Harris, J., Man Primeval and The Pre-Adamite Man; Hitchcock, E., The Religion of Geology, &c.; Smith, J. P., On the Relations between the Holy Scriptures and some Parts of Geological Science; McCosh, J., Method of Divine Government.

88 See below at page 131.

The most influential of the Bridgewater Treatises in the thought of their day was unquestionably that by Buckland. In writing on geology he was dealing with a subject which was under keen discussion. Great divergence of opinion existed in the public mind over the researches of geologists. Before Buckland's work came from the press it had been made famous by the popularity of the other Bridgewater Treatises, the high reputation of the author as a geologist, and the public interest in speculations by the students of geology.

The principal point in discussions of geology in relation to theology pertained to the age of the earth. The geologists were being compelled to recognize that the age of the earth far exceeded the approximate six thousand years assigned to it in prevailing religious notions. Faithful church people were pleased to have geologists assure them that the earth had not existed from all eternity. They were dismayed, however, when the geologists asserted that the beginning of the earth's history was much more remote than Archbishop Ussher's estimate had indicated. Buckland tried to solve the problem of interpretation, as has been already related, by interposing a long interval between the events recorded in the first verse of Genesis and those described subsequently.[89] The formation of geological strata which he had formerly ascribed to the Deluge was pushed back to a time antecedent to the "days" of the Creation.

Many clergymen and devotees of geology were astounded by Buckland's decisions. A. D. White remarked in his History of the Warfare of Science with Theology that Buckland's

89 See above at page 100.

"ability, honesty, and loyalty to his profession," that is, to the Christian ministry, gave him a measure of authority which made his departure from his former views an especially significant and influential event in the history of science and theology.[90] Protests and denunciations arose swiftly from men who were trying to hold to the old orthodox positions against the advances by the iconoclastic science.[91] The attempts to refute Buckland's conclusions had slight effect among serious thinkers of the time. The adverse criticisms proved to be, as Charles Lyell said of some of the early reviews, "mere fleabites."[92]

Buckland's interpretation of the Creation narrative had won the approval of Dr. Chalmers and the professors of Hebrew and Divinity at Oxford.[93] Charles Lyell, who had longed to instruct the public mind on the evidence from geology,[94] was pleased with the results of Buckland's work. He felt that the rapid sale and wide popularity of the Bridgewater Treatise on geology was likely to "do much good in spreading correct notions."[95] When Dr. J. Pye Smith published his book on geology and the Scriptures, he referred to Buckland's treatise by saying, "I cannot too much recommend the diligent

90 White, I, 231, 232. See also Benn, A. W., History of English Rationalism, I, 372, 375.

91 Gordon, 196. The protests often appeared in the form of such pamphlets as the following: Brown, J.M., Reflections on Geology; Cockburn, W., A Letter to Prof. Buckland; Cockburn, W., The Bible Defended Against the British Association; Gurney, J.J., Letter to a Clerical Friend; Mackay, S.A., The Age of Mental Emancipation.

92 Lyell's letter to his father on October 4, 1836, in Lyell, I, 473.

93 Buckland, I, 22 ff.; Lyell's letter to Dr. Fleming on January 7, 1835, in Lyell, I, 446; Monthly Review, 1836, II, 332 (November, 1836).

94 Benn, I, 375.

95 Lyell's letter to his father on October 4, 1836, in Lyell, I, 473.

study (not an indolent running over) of this admirable work to all who desire to gain true and accurate information."[96]

The treatise received much attention from reviewers and, on the whole, was recommended very favorably by them. Wilhelm Hoffmann, writing for a German journal, commended Buckland for having demonstrated that geology and theology can serve together. Hoffmann assured his readers that Buckland had performed his task without making a mere geological theology or a theological geology.[97] The article in the Monthly Review praised Buckland's treatise for presenting "one of the most wonderful, impressive, and delightful magazines of facts and reasonings ever given to the world — the whole detailed and described with unsurpassed felicity of language."[98] In the Presbyterian Review the comment was made that "it is not difficult to see that [Dr. Buckland's] volumes will be among the most popular works in science, and the most highly prized in the noble literature of natural theology."[99] These opinions were hardly too lavish. Buckland's observations did carry much weight, and they were influential in subsequent decades as men tried to frame acceptable explanations about the relations of geological evidence to the Scriptures.

Two changes in public feeling and thought at the middle of the nineteenth century reduced the popularity of the design argument — the desire for warmth in religious

96 Smith, 170 note.
97 Litterarischer Anzeiger fur christliche Theologie und Wissenschaft uberhaupt, 1838, No. 48, 384 (August, 4, 1838).
98 Monthly Review, 1836, II, 330 (November, 1836).
99 Presbyterian Review, IX, 236 (January, 1837).

belief and the Darwinian controversy. In the second quarter of the century a number of leaders in the church were seeking a more effective way of assuring men of God's power, wisdom, and goodness than the course of argument afforded.[100] Although the doubter might be convinced and the skeptic silenced by the design argument, the intellectual victory did not result in their conversion. It has long been doubted that the Bridgewater Treatises, or their predecessors, won any disciples for Christ.[101] Indeed, some students of the period have believed that the attempts to prove the existence of God from order and adaptation in nature did more harm than good by giving rise to the suggestion that His existence was highly doubtful.[102]

The Bridgewater Treatises, except for a few chapters in Chalmers' volumes, made their demonstrations invariably to the intellect of man. Their authors had been instructed to demonstrate God's power, wisdom, and goodness. The verdict of contemporaries was that they succeeded admirably in that duty. The earl must have hoped, however, that some men would be drawn to a saving faith by his bequest. Any practical weakness which the Bridgewater Treatises had in their day was due to their failure to speak to the real needs and longings of men. They seem to have been written from the notion that infidelity and doubt are weaknesses of the mind — whereas they are more likely to be diseases of the heart.[103]

100 Hunt, 274; Macran, 30.
101 Walker, J. B., vi; Westminster Review, VIII New Series, 322, 323 (October, 1855); Waggett, P. N., "Influence of Darwin upon Religious Thought," in Darwin and Modern Science, 492.
102 Westminster Review, loc. cit.
103 Benn, I, 220; Baillie, J., Roots of Religion, 228, 229; Walker, J. B., vi.

By their failure to address the spirit and soul of man, the Bridgewater Treatises were unsuccessful in arousing real enthusiasm and conviction. A writer in the Westminster Review in 1855 alluded to the slight change of emphasis in religious thought at the middle of the century as follows:

> There are rather more signs of life on the side of the philosophy of religion. There is in this direction an increasing recurrence to psychology . . . indicating a disposition towards the facts of human nature, rather than to the letter of the book. We hear less and less of "the historical evidence" and the "argument from design," of Paley and the Bridgewater Treatises.[104]

The crippling blow to confidence in the theology of the Bridgewater Treatises was struck by the new theory of the evolution of species which was coupled with the name of Charles Darwin.[105] Lamarck's efforts to explain evolution on the basis of the use and disuse of parts were sharply debated and condemned at the beginning of the nineteenth century. The opinions of Geoffrey St. Hilaire also, though to a lesser degree, brought adverse criticism. The matter seemed to be settled when Georges Cuvier, the outstanding naturalist of the time, rejected the hypothesis of the transmutation of species.[106] When the Bridgewater authors discussed the matter in their treatises, they insisted that species are distinct and fixed. In their position they concurred with the dominant opinions of the scientific world.[107]

104 Westminster Review, VII New Series, 208 (January, 1855).
105 Dampier-Whetham, 334; Fulton, 49; Jones, F. W., 42.
106 Morgan, T. H., Critique of the Theory of Evolution, 27-29, 32; Hobson, E.W., Domain of Natural Science, 429-434; Wallace, A. R., Darwinism, 3; White, I, 63, 64.
107 Simpson, J.Y., Landmarks in the Struggle Between Science and Religion, 174, 175; Wallace, 8. See above at pages 46 to 48.

In 1844 the British public was introduced to a discussion of the evolution of species in a small book published anonymously under the title Vestiges of the Natural History of Creation.[108] Several editions of the volume were rapidly sold out. Although much of its contents was incorrect and many of the ideas in the book were improperly presented, the volume holds an important place in the history of the idea of evolution. It stirred up swift and frenzied controversy. Biologists rushed to defend the old orthodox views and obtained much ready assistance from geologists. Harsh criticisms and denunciations appeared in such reputable journals as the Edinburgh Review, the North British Review, and the British Quarterly.[109] In their eagerness to resist the radical doctrines contained in the book, many men of science exaggerated their claims and dangerously distorted the evidence of their facts. A decade later a reviewer remarked that the conscription of scientific results by the theists in this crisis began to awaken some minds to the peril of allowing theological tenets to restrict their research and the interpretation of results. The zeal of the theists had the effect of pushing the more cautious scientists towards a materialistic interpretation of data.[110]

Whewell was urged by friends and scientific colleagues to reply to the book. He sensed the strong rancorous feeling which had been aroused by the discussion over the book and was reluctant to enter the controversy while so many of the

108 Benn, II, 8-14; Merz, II, 318. 319. When the twelfth edition appeared in 1884, the authorship of the volume was ascribed to Robert Chambers of Edinburgh.
109 Merz, II, 319.
110 Westminster Review, VIII, New Series, 323 (October, 1855).

contenders were speaking with unbecoming rashness. He consented to announce his views on the question by compiling appropriate extracts from his Bridgewater Treatise and his two large works on the inductive sciences for publication in a small volume which was entitled Indications of the Creator.[111] He made a great point of indicating that all the material in the compilation had been written years in advance of the controversy and could be accepted as the expression of dispassionate study over the questions which were subsequently put under the heat and strain of open debate.[112]

The united verdict of all the great naturalists of the period eventually pushed the doctrines of the Vestiges of Creation into disrepute. The book is said to have had almost no effect on the thinking of naturalists.[113] Curiously, its influence on the popular mind was strong. Many thinkers were given cause to feel strong doubts about the belief in the special creation and fixity of species. Although science seemed to be victorious in its defence of theology, many minds were not wholly reassured by the results of the disputations.[114] Darwin judged that the book did "excellent service . . . in calling attention to the subject, in removing prejudices, and in thus preparing the ground for the reception of analogous views."[115]

The opening engagement in the real war over the permanence of species occurred on July 1, 1858, with the reading of two

111 Todhunter, I, 155, 156.
112 Whewell, W., Indications of the Creator, viii.
113 Wallace, 4.
114 Le Conte, J., Evolution and Its Relation to Religious Thought, 34; Wallace, 4; White, I, 66.
115 Darwin, C., Origin of Species, 1901, xxiv.

papers on organic evolution at the meeting of the Linnaean Society.[116] The studies of Alfred Russell Wallace and Charles Darwin led them independently to offer the hypothesis that new species had been evolved from earlier types by the action of natural selection and heredity in assuring the survival and propagation, respectively, of favored variations in the struggle for existence among the crowded residents of the organic world.[117] Wallace described the new hypothesis in these words:

> The theory itself is exceedingly simple, and the facts on which it rests — though excessively numerous individually and coextensive with the entire organic world — yet come under a few simple and easily understood classes. These facts are, — first, enormous powers of increase in geometrical progression possessed by all organisms, and the inevitable struggle for existence among them; and, in the second place, the occurrence of much individual variation combined with the hereditary transmission of such variations. From these two great classes of facts, which are universal and indisputable, there necessarily arises, as Darwin termed it, the "preservation of favoured races in the struggle for life," the continuous action of which, under the ever-changing conditions both of the inorganic and organic universe, necessarily leads to the formation or development of new species.[118]

In 1859 Darwin published a careful and intelligible statement of his hypothesis in a volume entitled The Origin of Species by Means of Natural Selection or the Preservation of Favoured Races in the Struggle for Life. Darwin's tone was very moderate as he suggested that the action of natural selection was the effective agency in the appearance of new species.[119] In his book he nowhere denied the existence of God.

116 White, I, 66.
117 Darwin, 1901, 159-163; Romanes, G. J., Darwin and After Darwin, 259-261; Wallace, 10-13.
118 Wallace, 122.
119 Darwin, edition of 1859, 6, 61, 81.

Science and theology had to that time so firmly supported one another in the interpretation of organic phenomena — an alliance which the Bridgewater Treatises largely assisted in strengthening[120] — that naturalists were not able to look dispassionately at Darwin's view of the organic world. They believed that the old views of morphology were a necessary part of the Christian theology which had annexed the old morphology to its doctrine of the Creation. The firm and long alliance of science and theology made it difficult for men to reject incorrect views of science without disastrously undermining their faith in the system of theology with which their science had become associated.[121]

Conservative naturalists and orthodox churchmen rushed to quell the Darwinian hypothesis, while several good naturalists and a few adventurous spirits embraced the new heresy.[122] Darwin was denounced for the worst degrees of infidelity and blasphemy, but he remained unbelligerent. He declined to enter any open discussion of the theological implications of his hypothesis. As new editions of his book went to press, he continued to include the following quotation from Whewell's Bridgewater Treatise:

> But with regard to the material world, we can at least go so far as this — we can perceive that events are brought about not by insulated interpositions of Divine power, exerted in each particular case, but by the establishment of general laws.[123]

120 Mossner, 211.
121 Dampier-Whetham, 298, 334-336; Le Conte, 45; White, I, 71, 72.
122 White, I, 70 ff.
123 Whewell, 356. Mossner said that this quotation was inserted in the 1860 and subsequent editions by Darwin. (Mossner, 212.) It appears, however, in a copy of the 1859 edition which is in the National Library of Scotland.

In his final chapter he ventured to conjecture that the Creator had implanted the possibilities for all the evolved forms into the first forms of life at their creation.[124]

It is hardly necessary in this place to describe the interesting history of the struggle of Darwiniam for its existence and its eventual selection by naturalists as the most plausible scientific explanation of the appearance of new species. Valuable accounts have been prepared by J. Barzun, A. D. White, and others.[125] The two great results of the Darwinian controversy — in addition to the growth of hostility between churchmen and naturalists — were (1) the destruction of the belief that each species had been given its existence by a specific act of creation and (2) the repudiation of the old forms of the teleological argument which emphasized the presence of specific contrivances and adaptations in nature.[126]

The Darwinian explanation of the evolution of species made it possible for men to describe many organic phenomena in terms wholly naturalistic. Events and circumstances for which supernatural powers formerly had been cited as causes became explicable on other grounds. Darwin and his disciples pointed out the natural processes which accounted for the objects and events in the physical world. They established as a reputable theory the explanation which Whewell had conceived, expressed in his Bridgewater Treatise, and

124 Darwin, 1859, 490.
125 Barzun, 29-124; Dampier-Whetham, 297-303; White, I, 49-86.
126 Dampier-Whetham, 334; D'Arcy, C. F., Science and Creation, 68.

denounced as a "gratuitous and extravagant" assumption.[127] Scientists, with Laplace,[128] began to assert that they had no need of the hypothesis of divine activity in their description of phenomena in the natural world. Benn has ascribed to Buckland's Bridgewater Treatise credit for assisting in "the transition from a purely theological view to a purely scientific view of the world."[129] The nature of the transition was well portrayed by Dampier-Whetham in these words:

> The principle of natural selection seemed to weaken immeasurably the old "argument from design" of the Christian apologists. Adaptation of means to ends in plants and animals received a naturalistic interpretation, which if not complete in the deepest recesses of the problem went far towards a superficial solution. No longer was it necessary to invoke an intelligent and beneficent Artificer to explain the details of the bodily structure or the protective markings on a butterfly's wings. If there was still need of a Creator, it seemed likely that He had turned away and left the great machine to spin down the ringing grooves of change.[130]

The triumph of Darwinism stifled the appeal of the theologian to the innumerable multitude of adaptations among the particular objects in nature.[131] Theists could no longer

127 Whewell, 30. Romanes, in writing his sketch of the history of modern ideas of organic evolution, referred to the remarkable failure of thinkers prior to Wallace and Darwin to see the evidences of natural selection in their proper light. He thought that "most remarkable of all is the fact that Dr. Whewell . . . should not only have conceived the idea of natural selection, but expressly stated it as a logically possible explanation of the origin of species, and yet have stated it merely for the purpose of dismissing it with contempt." (Romanes, I, 257.)

128 Ball, W.W.R., History of Mathematics, quoted in Dampier-Whetham, 193.

129 Benn, I, 372.

130 Dampier-Whetham, 334.

131 Matthews, W.R., The Purpose of God, 63; Lindsay, J., Recent Advances in Theistic Philosophy of Religion, 173; Morris, J., A New Natural Theology, 25.

insist that the suitable relations had to be ascribed either (1) to chance, or (2) to special and distinct contrivance.[132] Science had found another explanation and had made it appear most plausible. The annual period of vegetables and the length of the solar year on the earth were probably not fitted to one another by a particular feat of contrivance. It appeared to be very likely that the vegetables now flourishing are survivors from among many which may have had various degrees of ability to fit their cyclical pattern to the length of the solar year.[133] Darwinism deprived natural theology of its parade of evidences of particular adaptation in biology. Asa Gray explained the new situation with an apt sentence when he said: "The field which we took to be thickly sown with design, seems, under the light of Darwinism, to yield only a crop of accidents."[134] There were some theists, however, who continued outside the realm of biology to demonstrate designed adaptations in nature, as Josiah Cooke did in the field of chemistry.[135]

Students of natural theology, finding their most appealing and impressive argument so severely challenged, began to consider the criticisms of Hume and Kant, as few teleologists seem to have done with any seriousness before 1859.[136] Hume had proposed two sorts of criticism concerning the teleological argument. He questioned whether teleology actually existed in the universe and also inquired critically into

132 Le Conte, 325; Laird, J., Theism and Cosmology, 261; Matthews, 55, 56.
133 This is the explanation which Whewell rejected. Whewell, 28-32.
134 Gray, 85.
135 Cooke, J., Religion and Chemistry, vii; Cave, 172.
136 See above at footnote #30 of the present chapter.

the nature of the conclusions which could be drawn from the existence of teleology in nature. His observations of the first class are as follows:

1. Thought is only one of the many operative factors in the universe and it should not be used alone as the basis for interpreting nature.[137]

2. The order and regularity in nature may be a necessary property of its matter and in no way dependent on an external cause or agency.[138]

3. With a finite number of particles of matter and infinite time, the operation of chance will permit the matter to assume all possible combinations, including that which it presently occupies.[139]

4. The action of natural forces will ensure the adaptation of the parts and relations of all existing things by causing the destruction and removal of those which are not properly adjusted.[140]

5. The presence of pain, distress, and destruction in the world is an evidence that teleology does not give a suitable interpretation of the world.[141]

Hume offered the following criticisms of the attempts to demonstrate the nature of God from the appearance of teleology in nature:

6. The analogy used in the argument is weak because the activity and inventions of men are hardly to be compared

137 Hume, 39-42.
138 Hume, 36, 37.
139 Hume, 104.
140 Hume, 109.
141 Hume, 126-131.

very closely with the effects observed in nature.[142]

7. The finite effects and evidences of design cannot be used for proving that the divine attributes are infinite.[143]

8. The design argument reveals a deity who is very anthropomorphic in character.[144]

9. The argument does not remove the possibility that the deity may have formed the present world imperfectly and has since abandoned it,[145] or that he made the present system after many less successful attempts at world-making.[146]

10. The design argument cannot be used to prove the benevolence of the deity when so much evil, terror, and pain prevail in the world.[147]

Immanuel Kant described the teleological argument to be weak in the following respects:

1. The design argument cannot independently give adequate logical proof of the existence of the deity. It depends on the assistance of the cosmological argument, which is in turn dependent on the ontological argument.[148]

2. The design argument is not sufficient to demonstrate the perfection and completeness of any of the divine attributes.[149]

3. The deity who is portrayed by the evidences of teleology, if one reasons from analogy to human works, is

142 Hume, 32, 33, 72, 73.
143 Hume, 74.
144 Hume, 60-62.
145 Hume, 79.
146 Hume, 76.
147 Hume, 133-137, 142, 143.
148 Kant, I., Critique of Pure Reason, tr. Mueller, 1881 217, 218; Kant, I., Enquiry, Critical and Metaphysical, into the Grounds of Proof for the Existence of God, tr. Richardson, 1836, 536, 540, 541.
149 Kant, Critique, 533, 539.

not a creator but an architect who is to some degree hampered by the material available in the universe.[150]

Nearly all these objections were discussed by thinkers in the second half of the nineteenth century as they sought to salvage the valuable elements of the design argument. Theists confessed that the argument could not demonstrate that God possessed infinite wisdom, infinite power, infinite goodness, or the perfection of any attribute.[151] They did not pretend that the argument could stand alone as a single. sufficient proof of God's existence. It served co-ordinately with the ontological, cosmological, moral, and other arguments.[152]

The theists also acknowledged the strength of the criticism that the design argument depends on a weak analogy, if it proceeds from the similarity of the effects observed in nature to the inventions of man. They replied that their argument, however, does not proceed from the supposition that contrivances in nature are the same as those of men. In both types of effects, nevertheless, there is one common characteristic among other dissimilar circumstances. Many of the effects in nature have the same marks of order and adjustment which are present in the many products of man's intelligent activity. The analogy on which the design argument depends is, therefore, subject to no such weakness as that imputed to it.[153] Fisher, Martineau, and others

150 Kant, Critique, 538; Kant, Enquiry, 140.
151 Martineau, J., A Study of Religion, I, 327.
152 Lindsay, 175-177. It is sometimes considered that the moral argument is a part of the design argument. (Matthews, 41, 42; Tennant, F. R., Philosophical Theology, II, 89, 90, 100.)
153 Flint, 158 ff.; Martineau, I, 320, 321; Morris, 30, 38. See also Matthews, 67, 68.

cited Mill as an authority in claiming the design argument to be a valid inductive argument.[154]

The old notion of a divine Architect, managing from the outside a world whose refractory materials and circumstances confronted him with problems and difficulties, had to be relinquished. The conception of God as the Contriver and Inventor of new devices and adjustments grew manifestly more unnecessary and incongruous in theistic thought. It became obvious that God did not have to tamper in the cosmical scheme to effect the appearance of new species for new conditions on the earth, if adaptations were made by the process of natural selection from favored variations.[155]

Some thinkers also protested that the Divine Architect of the old forms of the design argument had not so much shown His power and wisdom as His weakness by the contrivances which He devised. The need to resort to contrivance obviously meant that the governing agent had run into difficulties — an impossible circumstance for an Almighty Creator.[156] Seth Pringle-Pattison presented a good description of the old conception in the following sentences:

> In truth the traditional form of the argument seems to represent the Creator as originating a material which has no relation to his purpose — which has no formative nisus in itself — and which

154 Fisher, G. P., Grounds of Christian and Theistic Belief, 32; Martineau, I, 321; Mill, J.S., "Theism," in Three Essays on Religion, 169, 170. Martineau noted in the same place that Mill's view on this point was not widely accepted.

155 Storr, 60; D'Arcy, 3, 4; James, W., Varieties of Religious Experience, 74; Pringle-Pattison, 425; M'Ewen, in Hume, lxxxii, lxxxiii; Smith, N.K., Commentary on Kant's 'Critique of Pure Reason,' 538, 539.

156 Mill, loc. cit., 176, 177; Flint, 177, 178.

> has therefore to be moulded into accordance with his ends, and directed in its course, by a supplementary exhibition of the divine wisdom. It is as if the existence of the material were referred simply to the divine power — treated as a result of the fiat of omnipotence — the superinduction of order and plan being a subsequent operation of the divine wisdom, specially calculated to serve as a proof of the divine existence.[157]

Prout seems to have anticipated the objection that the contrivance is a symptom of God's weakness and lack of foresight. He had ventured to suggest that God deliberately set up the difficulties for Himself so that man, in discovering the signs of the contrivance which overcame the difficulties, would admire God's wisdom and power.[158] Bowen offered the same explanation for the contrivance, and he added that the observation of God's government in the natural world gives man a basis for planning his behavior.[159]

The devoted endeavor of its advocates to point out the "ends" which God had in view for the particular adaptations in nature often drew ridicule to the design argument. The apologists adduced preposterous reasons for the existence of some objects in nature. In trying to show that God did nothing without wise and benevolent foresight, they often imputed trivial and unworthy purposes to Him. One of their mistakes was the tendency to think of all nature as an arena expressly prepared for man's use.[160]

157 Pringle-Pattison, 425.
158 Prout, 185, 233.
159 Bowen, F., Lowell Lectures, 189, 190.
160 Fulton, 278; Henslow, G., Theory of Evolution of Living Things, 161; Hocking, W. E., Types of Philosophy, 81; Janet, P., Final Causes, 482, 495-497; Laird, 280, 281; Lindsay, 171, 183, 184; Matthews, 79.

It was a great weakness of the Bridgewater Treatises that they endeavored to show that the world was created and furnished for the noble purpose of serving the comfort of God's highest creature. Commenting on the failing, a critic in recent years has warned that to cite "instances of advantages or even blessings to one being, even if we select Man, as proofs of the wisdom and beneficence of God, is . . . a partial and one-sided view of creation."[161] Pigs were not created in order that man have food. The supply of bacon is a benefit to man, but it is hardly valuable or beneficial to the pig to make it the prey of man. A relationship which is good to one species may be undesirable from the standpoint of another.[162]

It is interesting to notice how closely the Bridgewater authors must have come at times to an awareness of their very subjective manner of interpreting nature and the way in which it forced them to present their facts. Kidd explained that building stone is valuable for man because it is so durable.[163] Iron, on the other hand, has particular value because it is not durable and therefore has to be repaired and replaced frequently.[164] He did not notice that iron would be more valuable if it had greater durability or that a less durable character in building stone would provide more employment for men in the same way which was so praiseworthy in the example of iron. Kidd was not entirely oblivious, however, to the absurd length to which teleology had been stretched when objectivity of judgment disappeared.

161 Henslow, 161.
162 Macfie, R. C., Science Rediscovers God, 261, 262.
163 Kidd, 160, 161.
164 Kidd, 196.

He mentioned the example of the agent of a canal proprietor, who, when questioned in a legal examination as to the purpose for which rivers had been made, replied "that, no doubt, they were intended to feed canals."[165]

The Darwinian emphasis on struggle and competition for the operation of natural selection confronted the teleologists with the need to examine more realistically the existence of dysteleology in the world. When Cooke used the design argument, he did not try to demonstrate the goodness of God. He was forced to confess frankly that the "lightning and tempest, plague, pestilence and famine" are as real in nature as are the pleasures and benefits. He felt that the whole system of nature was so permeated with evil that, apart from revealed theology, "an argument to prove the malignity of God could be made to appear quite as plausible as the arguments which are frequently urged to prove His pure beneficence."[166] No new and worthy answer to the difficulty was offered from the side of natural theology,[167] but Alfred Russell Wallace discussed the "ethical aspect of the struggle for existence" and arrived at the same conclusion which the Bridgewater Treatises had offered. He decided that the manner of allowing one animal to put others to death is not so evil as it might appear to be. The system of warfare in nature enhances the amount of enjoyment possible and decreases the amount of pain and misery.[168]

Having given serious thought to its limitations, theists

165 Kidd, 118.
166 Cooke, 347.
167 Ward, J., Naturalism and Agnosticism, I, 6.
168 Wallace, 36-40. See above at page 51.

tried to reconstruct the design argument in terms which would make it attractive and defensible in competition with the scientific view of the world. They largely abandoned the repetitious description of details of adaptation which was a method of the Bridgewater authors.[169] They acknowledged the efficacy of natural selection, or some other agency of evolution, in working out the course of development in the organic world, but they insisted that anterior to the regularity and pattern of natural processes there had to be some supranatural basis or design.[170] The theists declared that the order and comprehensive unity which the naturalists had discovered was an evidence of design in grander proportions than men had previously imagined. The design argument was renovated to proclaim the presence of a greater teleology, a more enduring purpose in the world, existing "vitally" and requiring no periodic adjustments or corrections, a teleology encompassing beauty and moral value.[171]

A strong emphasis on the existence of general order and harmony in nature arose in the thought of L. Hicks. In 1883 he published his Critique of the Design-Arguments to recommend that the argument be divided into two parts.[172] One part was to be the usual teleological argument in a refined form. The other part of the design argument was to be a demonstration of the order in nature as an eutaxiological argument, distinct from the consideration of final causes. He derived the name

169 Beckwith, 111; Brown, W.A., Pathways to Certainty, 142.
170 Gwatkin, H.M., The Knowledge of God, 54.
171 Beibitz, J.H., Belief, Faith and Proof, 109; Le Conte, 325; McCosh, J., Religious Aspect of Evolution, 60, 61; Macran, 142; Storr, V.F., Argument from Design, 20; Waggett, 493; White, I, 70; Tennant, II, 84, 85.
172 Hicks, v.

from the Greek word, eutaxia, for "established order."[173] Hicks explained that "order and harmony are the marks of intelligence. They imply that there has been a preconceived plan to which the phenomena . . . have been made to conform."[174] Therefore, the existence of order in the world proves the existence and operation of intelligence in the universe.[175] This can be deduced without reliance on any other form of theistic proof.[176] Having demonstrated the existence of intelligence by the order argument, Hicks believed that he could use the teleological argument to show that the intelligence "has been directed to particular and definite results, thus proving volition."[177] He professed that he had little confidence in the ability of the arguments of eutaxiology and teleology to demonstrate that the intelligence evident in the world is resident in a Supreme Being. He was sure that other proofs were available for that demonstration.[178]

The treatment which Hicks gave to the design argument was not entirely new. He gave an extreme development to a distinction which had been expressed in the Bridgewater Treatises. Several of the Bridgewater authors had specifically observed the distinction between the evidences of order and those of adaptation.[179] Writers like McCosh, Powell, and Cooke had distinguished between order and adaptation in their discussions on the design argument.[180] In the Baird Lecture

173 Hicks, 7.
174 Hicks, 18.
175 Hicks, 353.
176 Hicks, 384.
177 Hicks, 380.
178 Hicks, 386, 387.
179 See above at pages 28 to 32.
180 Cooke, vii; McCosh, J., Method of Divine Government, 137 ff.; McCosh, J., and Dickie, G., Typical Forms and Special Ends in Creation, 9 ff.; Powell, B., Order of Nature, 228.

of 1876, Robert Flint had employed the order argument. His treatment of the design argument began with this statement: "Where order meets us, the natural and immediate inference is that there is the world of intelligence. And order meets us everywhere in the universe."[181] After the publication of the book by Hicks, discussions on the value of the eutaxiological argument appeared in works by G. P. Fisher, T. J. Slevin, D. B. Purinton, James Lindsay, and others.[182] The last two named writers even adopted the new word, eutaxiology, in their treatment of the subject.

Lindsay thought that eutaxiology was gaining in favor by the end of the century, but later judgment on the period shows that the trend towards a separate order argument did not continue long. The unity and harmony in nature were not used for the foundation of a separate argument. Theists preferred to retain them as demonstrations of the completeness of the reign of design and its extension to the most minute applications. The study of particular examples of adaptation was also pursued for the purpose of assisting the human mind to appreciate the larger harmony and order.[183]

Another aspect of the reconstructed statement of the design argument was the shift to a conception of a teleology operative within the world. Nature was seen as a process, not as a product.[184] The emphasis turned away from the former,

181 Flint, 131.
182 Fisher, 35; Ladd, G. T., Philosophy of Religion, II, 57, 58; Lindsay, 170 ff.; Purinton, D. B., Christian Theism, 28, 30; Slevin, T. J., tr. Order in the Physical World, vii. Note also Fulton, 127.
183 Note Beckwith, 128, and Fulton, 127.
184 Morris, 47.

implied conception of a transcendent deity who had to resort to refashioning the world to adjust aberrations which occurred by the operation of the system.[185] The Divine Architect whom Kant had depicted as the being to be demonstrated by the design argument was deprived of His place in the new teleological views. He was replaced by a deity who continually participated in the maintenance and development of the universe by the working of an immanent principle. Theists affirmed that God had created the universe and, from the beginning of His creative activity, had endowed it with the properties and impulses which were adequate to provide and sustain the progressive fulfillment of His great design. The new conception of God's design and the provision for its progressive fulfillment enhanced the estimate of His power and wisdom.[186]

When Darwin tried to clarify his views on teleology, he seems to have been hampered by chronic indecision. Concurring with Romanes, he agreed that his ideas on evolution did not rule out the possibility of the existence of God.[187] In revising the Origin of Species, he wrote that he could "see no good reason why the views in this volume should shock the religious feeling of any one."[188] He tried to compare his position with that of Newton, who, having been early called an enemy of religion because of his discoveries, was later acclaimed as a great advocate of theism.[189] Darwin also

185 Waggett, 492.
186 D'Arcy, 68; Ladd, 56, 78; Martineau, I, 327; Pringle-Pattison, 425; Storr, Argument from Design, 20; Storr, Development of English Theology, 60.
187 Romanes, I, 412.
188 Darwin, 1901, 658.
189 Darwin, loc. cit.

cited the opinion of a "celebrated author and divine" in the following expression:

> [He] has written to me that "he has gradually learnt to see that it is just as noble a conception of the Deity to believe that He created a few, original forms capable of self-development into other needful forms, as to believe that He required a fresh act of creation to supply the voids caused by the action of His laws."[190]

Waterhouse has made it clear that although Darwin had no intention of denying the "overwhelming force" with which "the wonderful contrivance of Nature" had impressed him with the notion of design, he was hesitant to admit the existence of God on such evidence.[191] Darwin responded with pleasure when informed that Asa Gray had remarked in Nature that "Darwin's great service to natural science was in bringing it back to teleology; so that instead of teleology being opposed to morphology, the two were joined."[192] There had been widespread confidence in the design argument before 1859. Gray's remark, therefore, cannot mean that Darwin renewed or reinforced the alliance of science with theology in interpreting specific adaptations in nature as signs of specific acts of design. The implication is that Darwin's theory gave rise to the notion of a teleology of organisms — a teleology unfolding from the very nature of the organism and not imposed on it from without. Such a view of teleology is not necessarily a contradiction of the conception of God's immanent operation in natural processes. Theists in the late

190 Darwin, 1901, 658. The quotation marks are those of Darwin.
191 Waterhouse, 88, 89.
192 Waterhouse, 88. See also Pringle-Pattison, 328.

nineteenth century were able to accept the view, but they were not able to prevent its being used by naturalists as an excuse for shutting out God from their conception of the universe.

There were a number of thinkers, confident over the success of Darwin in explaining organic phenomena, who succumbed to the hope that natural selection could explain the existence of the whole world. One result of their speculations was the rise of a metaphysics which viewed the entire universe as in a process of evolution, unfolding by the fulfillment of an inner principle which existed within it from the very "beginning" without derivation from an external source. Teleology was recognized, but it was a teleology wholly immanent and fully autonomous in its operation. It was a teleology without the God of the theists. After the turn of the century the work of Bergson, Lloyd Morgan and others was interpreted as the basis for a metaphysics whose deity is, as Samuel Alexander explained it, the "next higher empirical quality" to mind or consciousness in the scale of evolution.[193]

In the last fifty years the theology of the Bridgewater Treatises has not been in strong favor. Many observers agree with William James in his comment that the treatises do "little

193 Alexander, S., Space, Time and Deity, II, 345. See also Fulton, 213-216, and Waterhouse, 89. The notion of an evolution for the universe as a whole has been rejected by many thinkers because the universe cannot have any environment from which natural causes can influence it — unless a transcendent God is admitted as a part of the conception. (Matthews, 77, 93; Tennant, II, 80. See also Hocking, Types of Philosophy, 108.)

more than gather dust in libraries."[194] The efforts of Martineau and others to vindicate them in the closing years of the last century were of slight avail.[195] The design argument is no longer so convincing to the common man since the triumph of Darwinism has explained the origin of species by natural causes and emphasized the conflicts and suffering in the world.

The outlook in scientific thought in recent years has been of a paradoxical nature. After forcing theology to relinquish its use of science as a support for "proving" the strength of theism, science has gradually been recognizing that its mechanistic concept of the world is inadequate to describe all the phenomena which are presented to its attention.[196] Signs of teleology have broken in upon those who do research in "pure science."

Biologists have discovered that the valuable and helpful theory of natural selection is not a full description of the process of evolution. The theory cannot account for the existence of life and its ability to reproduce and vary.[197] It does not provide an explanation for the appearance of new variations through several stages until they reach a useful condition.[198] Variations do not always appear gradually;

194 James, 74; Brown, W.A., 142; Beckwith, 111; Jones, F.W., 42; Sorley, W. R., Moral Values and the Idea of God, 327; Shebbeare, C.J., Challenge of the Universe, 21.

195 Martineau, I, xiii; Flint, 397; White, I, 43, 44; Morris, 19 ff.

196 Compton, A.H., Human Meaning of Science, 31: Eddington, A.S., Nature of the Physical World, xviii, 75; Henderson, F. E., 301.

197 Balfour, A.J., Theism and Thought (Hereafter noted as T. T.), 26; D'Arcy, 20; Barzun, 69; Waterhouse, 86, 87.

198 Balfour, T. T., 28.

many have occurred in "jerks," leaving gaps in the scale of organic beings.[199] There are human values which are not an aid to survival for either the individual or the race. These are beyond the grasp of the theory of natural selection.[200]

The evidence of biology has disclosed traces of teleology in the world even when it was viewed by the "mechanists."[201] Refusing to abandon entirely the method of the Bridgewater authors, in 1908, J. Bell Pettigrew, the Chandos Professor of Anatomy and Medicine at St. Andrews University, published a large, three volume treatise on design in nature.[202] Three years later, Harvard's professor of anatomy, Thomas Dwight, also published a volume on the design argument?[203] A much more significant work appeared in 1913 with the publication of Lawrence Henderson's book, The Fitness of Environment, embodying the results of his special studies in bio-chemistry. Having carefully conducted experiments on water, he made observations on its unique and peculiar properties. His findings constituted a striking corroboration and enlargement of the scientific data and inferences given in the Bridgewater Treatises of Whewell and Prout, with whose works Henderson was acquainted.[204] With the advantages of more recent and expanded chemical science at his disposal, he made experiments on organic compounds and carbonic acid. In this he repeated much of Prout's work.

199 Hocking, 56, 57; Greenwood, W.O., Christianity and the Mechanists, 189.
200 Balfour, T. T., 27, 28; Compton, 74; Matthews, 116.
201 Henderson, L. J., Order of Nature, 10; Waterhouse, 85.
202 Pettigrew, J.B., Design in Nature, London, 1908. This work was in three volumes of 1416 pages of quarto size.
203 Dwight, Thomas, Thoughts of a Catholic Anatomist, New York, 1911.
204 Henderson, L.J., Fitness of Environment, 3-8, 52, 105 ff. (This work will hereafter be noted as F. E.)

Henderson concluded that the physical properties and present distribution of water, carbonic acid, and the compounds of oxygen, hydrogen, and carbon made possible the most suitable environment for the existence of life. No other conceivable distribution of substances and properties would have constituted so favorable an environment for organic beings.[205] "The fitness of the environment is both real and unique."[206] Henderson explained his conviction in the following terms:

> No other environment consisting of primary constituents made up of other known elements, or lacking water and carbonic acid, could possess a like number of fit characteristics, or in any manner such great fitness to promote complexity, durability, and active metabolism which we call life.[207]

In drawing his conclusions, Henderson recognized that organisms have obtained their ability to live, "in whole or in part by an almost infinite series of adaptations."[208] Nevertheless, the fitness of the organism in the environment had to be matched by the fitness of the environment to support life and, "in our solar system, at least, the fitness of the environment far preceeded the existence of the living organisms."[209] In a footnote he explained that the relationship of the fitnesses of organism and environment is not "symmetrical." "Each organism fits its particular environment, while the environment in its most general and universal characteristics fits the most general and universal characteristics of the organic mechanism."[210]

205 Henderson, F. E., 248.
206 Henderson, F. E., 271.
207 Henderson, F. E., 272.
208 Henderson, F. E., 3, 4.
209 Henderson, F. E., 278.
210 Henderson, F. E., 271.

The results of his work led Henderson to conclude that there are instances, of an unknown number, in which organisms possess "purposeful tendencies" which no mechanical hypothesis is adequate to explain.[211] Henderson made himself familiar with the studies of Bergson and Driesch, but he was unable to follow them in the paths of vitalism.[212] Although he admits that no mechanical explanation of natural phenomena can adequately account for all the evidence, he believes that science must rest content with a mechanistic interpretation of the phenomena. Teleology is operating, Henderson said, "at the very basis of physical science itself," but science "needs no teleology to explain its phenomena and its processes."[213] In his second book, published in 1917, he continued the same line of thought. The inorganic world contains evidence of a "teleological character,"[214] but Henderson was reluctant to say "that it is the result of design or purpose."[215] He asserted that the source and purpose of the teleology is out of reach for science.[216] The place of Henderson in the history of the design argument has been properly described by Hoernlé in the following sentence:

> In fact, when we compare his Order of Nature with say, Prout's volume in the Bridgewater Treatises, we perceive that his argument is in principle that of the Bridgewater Treatises but with the science brought up-to-date and with God left out.[217]

211 Henderson, F. E., 292.
212 Henderson, F. E., 305.
213 Henderson, F. E., 301.
214 Henderson, Order of Nature, 192.
215 Henderson, Order of Nature, 204.
216 Henderson, Order of Nature, 209.
217 Hoernlé, R.F.A., Matter, Life, Mind, and God, 124.
It is difficult to accept Morris Cohen's statement that recent advocates of the design argument have reversed the "position of Paley and the Bridgewater Treatises" by arguing "from fitness of the environment"

The evidence for teleology in nature from biological studies is "impressive," but it is difficult to determine what can be concluded from it.[218] The biologists are not at all agreed about the implications of the teleology and the evolution towards perfection which they observe in nature. Sir Arthur Keith mentioned the existence of "design" which is "manifest everywhere" and a necessary "Lord of the Universe."[219] It is said that Bergson eventually "decided that the 'élan' either is or comes from God."[220] It remains to plague those who like clear definitions that the biologists have been unable to describe the "God" which they sense among their facts and hypotheses.

Recent researches in the physical sciences have brought great changes in the scientific interpretation of the physical world. New work in thermodynamics has prompted the conviction among scientists that a definite beginning for the universe is a reasonable hypothesis.[221] E. T. Whittaker has gone so far as to affirm that the most plausible explanation is "a creation ex nihilo, an operation of the Divine Will to constitute Nature from nothingness."[222] Planck's quantum mechanics and Heisenberg's "principle of indeterminacy"

. . . "instead of arguing for the fitness of the organism." (Cohen, M.R., Reason and Nature, 290. See also Tennant, II, 86.)

The Bridgewater Treatises contained both aspects of the design argument. The fitness of the environment was an especially strong emphasis in the works of Whewell and Buckland. Henderson commented on this in his first book. (Henderson, F. E., 5-7.)

218 Waterhouse, 89.

219 Forum, LXXXIII, 225 (April, 1930).

220 Waterhouse, 93.

221 Compton, 62; Eddington, 84, 85; Macfie, 52; Whittaker, E.T., Beginning and End of the World, passim; Whittaker, E.T., Space and Spirit (Hereafter noted as S. S.), 116, 118, 119.

222 Whittaker, Beginning and End, 63. Note also Macfie, 52.

have destroyed the old mechanistic conception of the universe for physicists.[223] Whittaker explains that, far from being a self-contained display of strictly linked causes and effects, the physical world is subject to "a continual succession of intrusions or new creations."[224] The new physics certainly does not give much support to a fatalistic view of events nor a deterministic view of mental activity.[225]

Thoughtful scientific observers are recognizing the failure of their concepts to fit the total range of the evidence they now find in the universe. New discoveries reveal phenomena which appear strongly to call for interpretation by methods and terms which are not a part of the scientific procedure. The evidence is available for new studies but science, as science, has to neglect it or turn it over to metaphysicians.[226]

Arthur Eddington has said that even in the study of physics it is hardly possible to avoid the use of teleological language.[227] He was led to believe — on the basis of <u>scientific theory</u> — that the existence of a universal mind is "a fairly plausible inference."[228] Sir James Jeans interpreted the nature of the physical world to be more like

223 Compton, 35; Eddington, 220.
224 Whittaker, <u>S. S.</u>, 126, 127.
225 Compton, 46-50.
226 Eddington, 275, 282; Henderson, <u>F. E.</u>, 301.
227 Eddington, 77.
228 Eddington, 338. Compton and Whittaker have recognized that the very existence of scientific work depends on the existence of a mind behind all nature to make it intelligible to the mind of man. (Compton, 62, 63; Whittaker, <u>S. S.</u>, 130. Note also Matthews, 66, 67, and Tennant, II, 81 <u>ff.</u>) The same conviction was discussed in the <u>Bridgewater Treatises</u> of Chalmers and Kidd. See above at pages 64 and 65. (Chalmers, II, 146, 147; Kidd, 276.)

a "thought" from the mind of a pure mathematician than anything else which he could imagine.[229]

When scientists begin to speak of teleology and the intelligence in nature, it is hardly possible to avoid comparing their position with that of the Bridgewater Treatises in which scientist and theologian joined forces. It might be expected that theists would eagerly grasp the evidence which the men of science offer for teleology. Actually there seems to be little reason to expect any great revival of the design argument as a result of the new, scientifically acceptable evidence for the existence of a universal intelligence. On the side of the scientists, Compton and Eddington have been careful to point out the folly of trying to prove or advocate religious beliefs from the data or the methods of the physical sciences. Their interest has been rather in demonstrating that science, at its present stages, is not supporting views which are a denial of the fundamental doctrines of the theist.[230]

Among theologians there are many who warn against an enthusiastic rush towards a rapprochement between science and theology. Several dangers exist for theology when it rests its apologetic too heavily on the pronouncements of science.

229 Jeans, J., The Mysterious Universe, 134, 136. This view is very similar to Whewell's expression that "the legislation of the material universe is necessarily delivered in the language of mathematics." (Whewell, 8.) Roget mentioned that the "Creator has exercised in its construction the severest and most refined geometry." (Roget, I, 9.) Compton's description of the laws of nature as God's "orderly ways of working" is strikingly like Whewell's descriptions of natural law. (Compton, 69; Whewell, 362.)

230 Compton, ix, x, 50; Eddington, 333.

One of the most characteristic traits of scientific decisions is their inconclusiveness. A strong attachment of theological doctrine or apologetics to a formulation of the results of scientific inquiry imperils public confidence in religious doctrine when the scientific conclusions have to be revised. Wise theologians wish to avoid the recurrence of the kind of confusion in ideology which accompanied the acceptance of Copernican astronomy, nineteenth century views on geology, and evolutionary biology. There are also some who stand under strong conviction that the survival of any form of natural theology is likely to distract attention from the real strength of historical Christianity and the evangelical power of the Word of God. For them, even a strong statement of the design argument is not attractive.[231]

The design argument is shunned today by many thinkers who believe that it cannot lead men unto faith. Even when it has been possible to state the argument in a logically convincing form, no man has been known to find faith in God by such overwhelming demonstration.[232] Thinkers like John Baillie, Karl Barth, Emil Brunner, and Karl Heim clearly affirm that even a logically sound argument could not avail to convert a soul.[233] Man must be led to God through "direct personal encounter with Him in the Person of Jesus Christ His Son our Lord."[234] Barth believes that God is revealed

231 Cairns, D.S., The Riddle of the World, 154, 155; Brunner, Emil, Revelation and Reason, 61.
232 Baillie, J., Our Knowledge of God, 132; Heim, K., God Transcendent, 226, 231.
233 Baillie, op. cit., 132, 143; Barth, K., "No!" in Natural Theology, 127; Brunner, op. cit., 340, 341; Heim, 226, 231.
234 Baillie, op. cit., 143. See also Smith, N.K., "Is Divine Existence Credible?" 211, 212.

in His works but that man, unless he has been regenerated by the Word of God, is blinded in his sinful state so that he cannot have "a 'natural' knowledge of the law of God" either before or after his regeneration by the Word.[235] Heim says that man cannot discover God "by any observations or thinking" of his own.[236] Only the redeemed man can see God in the natural world and for him the evidence of natural theology is of minor importance. The believer does not apprehend in nature any "independent, generally true items of knowledge" which are sufficient to persuade another of the existence of God.[237]

The path to faith is not a lane of logical stepping-stones. Therefore, the design argument has been declared to be of no value in helping the man of faith more fully to understand either the faith he obtained through the Word of God or the nature of the God whom he has found revealed in Christ the Savior. Faith does not rise from a structure of inferences and is not to be understood by the study of inferential proofs.[238] The design argument is a product of faith and contains no greater conception of God's power, wisdom, and goodness than faith can give to the believer.[239] The Christian can see God in nature and discern the ways of

235 Barth, "No!" in Natural Theology, 108, 109. See also Smith, op. cit., 226. The Bridgewater authors had a different opinion about the relation of sin to the revelation of God in nature. They said that man's sin was responsible for the appearance of suffering, evil, and a degree of disorder in the world. The evil in the world made the original order less obvious to man, either saved or unsaved, but it did not blind him.

236 Heim, 231.

237 Barth, K., Doctrine of the Word of God, 148. See also Baillie, op. cit., 15.

238 Baillie, op. cit., 143.

239 Baillie, op. cit., 132; Beckwith, 112.

His providence, but he can do so only because he has a conviction of God's sovereignty before he looks at nature for evidences of the handiwork of God.[240]

There is another group of thinkers who believe that the design argument can be used effectively today in arranging an amicable settlement between science and theology. The strong rivalry of appeal which modern science and traditional faith exert on the mind of the common man requires some clear interpretation of the Christian world view. The design argument, being especially related to the interpretation of natural phenomena, becomes involved almost inevitably in any effort to revise the "antiquated" world views for which "religion" has been periodically called an irrelevant superstition or a collection of misrepresentations. There is a strong hope that a review of the design argument may be of some help in demonstrating the error in the assumption that a scientist cannot be a theist nor a good theist an honest scientist.[241]

The design argument has been recurrently attacked with severe criticisms, but after each attack it has returned to show a durability which logic does not conquer.[242] Some apologists believe that its "unfailing appeal to common sense" has made it a favorite with the classes of men who cannot be reassured by any of the other theistic "proofs," the latter

240 Smith, 211.

241 Balfour, T. T., 10; Beckwith, 11, 114, 115; Fulton, 4, 16; Matthews, 14: Shebbeare, op. cit., 21 ff.; Thomson, J. A., Science and Religion, 1, 2. In 1926, Arthur Titius published his Natur und Gott, recommending that theologians attempt to formulate a statement of the relations of God to the natural world.

242 Brunner, Revelation and Reason, 338.

depending too much on more devious ways of reasoning.[243] A respect for the design argument persists in spite of the criticism by its foes and the ridicule incurred by its exaggeration at the hands of its advocates.[244]

Whittaker agrees with Compton that "the argument on the basis of design, though trite, has never been adequately refuted."[245] In his Space and Spirit, Whittaker says: "The proof from Order is to-day more complete, more comprehensive, and more majestic than in the form in which it was presented [by St. Thomas]".[246] From the present evidence from thermodynamics, Whittaker believes that the argument can even rise above Kant's criticism tommake a valid "transcendental inference" to a "supramundane God."[247]

The champions of the design argument are frank in admitting its limitations. The argument is not supposed to be sufficient of its own power to prove either the existence of God or the nature of all His attributes.[248] The argument

243 Matthews, 45.
244 Fulton, 49; Bishop Gore, in Beibitz, viii; Brunner, Revelation and Reason, 338; Waterhouse, 77.
A very capable presentation of the design argument in contemporary perspective and an excellent treatment of the criticisms against the argument is given by W. R. Matthews in The Purpose of God, the published form of the Alexander Robertson Lectures delivered at Glasgow in 1935.
245 Compton, 62.
246 Whittaker, S. S., 131.
247 Whittaker, S. S., 131, 132.
248 Alexander, II, 343; Matthews, 42. Smith seems to be inferring too much when he says that Tennant believed "that the argument to design is by itself valid and sufficient." (Smith, op. cit., 211, 212.) Tennant recognized that "coercive demonstration [is] confessedly unattainable." (Tennant, II, 79.)
In Roman Catholic apologetics the theistic arguments seem to have a more prominent place than in Protestant theology. (Brunner, E., "Nature and Grace," in Natural Theology, 58; Brunner, Revelation and Reason, 340; D'Arcy, M.C., in Box, H.S., The World and God, v-ix.

starts "from the idea of God in the human mind," and is used to substantiate the impression already present. It depends also on an acceptance of some form of the cosmological argument.[249] The design argument is limited also in its ability to describe God's attributes. If the argument had to stand by itself, it could demonstrate only an architect of immense power and wisdom. It could not show God to be the Creator and omnipotent Governor nor display His attributes as infinite.[250] Matthews has implied that although the design argument cannot prove the existence of "an infinite and unconditioned Being," it does strongly suggest and support the existence of a Being who has the attributes of infinity and perfection."[251] Brunner alluded to this weakness of the design argument in the following comment:

> Thus the teleological argument is simply the rational formulation of the revelation through the Creation, of the immanence of the wisdom of the Creator and of His power in the Creation. This rational formulation, however, apart from faith, is of very questionable value; for just as speculative reason misunderstands this, so will it continually misunderstand this in a deistic or in a pantheistic sense.[252]

It is Brunner's opinion, however, that "those whose eyes have been opened by Jesus Christ" are able to recognize in natural phenomena, that is, in general revelation, "the same Triune God, the same Son of God as the Revealer who speaks to us, both in the Old Testament and . . . in the New Testament."[253]

249 Matthews, 21, 42, 45.
250 Balfour, A.J., Theism and Humanism, 43; Beckwith, 140; Matthews, 80, 81; Whittaker, S. S., 33.
251 Matthews, 80, 81.
252 Brunner, Revelation and Reason, 347.
253 Brunner, op. cit., 62.

The champions of the design argument believe that it can serve three purposes in Christian thinking today. They credit it with a utility (1) for preparing the way for the proclamation of the Gospel, (2) for confirming the believer's faith in God, and (3) for giving vividness to the conception of the character of God and His manner of working.

The design argument contributes to the removal of barriers to the spread of the Christian faith.[254] Brunner is confident about this use of the demonstration of God's existence. It does not give the strong "certainty of faith" nor the rich knowledge of the living God which is produced by divine revelation, but it is helpful in assuring doubting souls that the use of reason does not need to result in the denial of faith in God.[255] Brunner has found the theistic arguments to be effective in preparing the way for the proclamation of the Gospel among "modern youth" and "intellectuals." The design argument would seem to be an especially suitable aid in an age with the discoveries of science contribute so greatly to enlarge and strengthen the notion of teleology in the natural world.[256] It is not a

254 Balfour, Theism and Humanism, 43; Fulton, 52, 53.
255 Brunner, Revelation and Reason, 45, 340, 341.
256 Beibitz, 125; Laird, 234. Although many biologists recognize the existence of teleology in nature and also ascribe it to an anterior cause, there are many who are reluctant to acknowledge it to be an evidence of God's existence. George Wobbermin and W. R. Matthews have clearly stated that a purely immanent teleology is not sufficient. Such a conception implies and requires the support of a transcendent teleology. (Matthews, Purpose of God, 93, 108; Matthews, God in Christian Thought, 146, 147; Wobbermin, G., Christian Belief in God, 101.)
In his Gifford Lectures, John Laird discussed the relation of the teleology in nature to the design argument and he decided that there is a teleology (unidead teleology) which is not an indication of conscious

conclusive argument, but it can demonstrate that the evidence against the theistic position is relatively weak.[257] Many doubting souls have been comforted to discover that reasonable demonstrations can help to protect the Christian faith against the attacks of agnosticism. The design argument has given them confidence in the faith they wanted to believe.[258]

The design argument can enhance the believer's faith in God. The charge is not infrequently made that the mind makes its decisions on impulse and then proceeds to find reasons which justify its judgments.[259] In this quest of the mind for support, the theistic "proofs" provide a necessary accompaniment to faith. Hodgson has indicated that in Christian thinking there is a need for arguments — "not to convert, but to justify conversion at the bar of reason."[260] Matthews explains that the discovery of "the action of purposive intelligence" in nature provides "the confirmation both of our religious faith and our theological speculations."[261] The man of faith cannot prove God's existence by argument, but he may find his faith increased in strength and clarity when he expresses his convictions in the forms of logic.

The design argument is still employed to demonstrate the nature of God and the ways of His providence. A study of the wonderful order of nature contributes to the vividness of man's conception of God.[262] Advocates of the argument

purpose and is, therefore, not an evidence of design or intelligence. (Laird, 248, 253, 288.)

257 Beibitz, 125.
258 See Beibitz, 125, and Laird, 234.
259 Baillie, Our Knowledge of God, 132; Matthews, 42.
260 Hodgson, L., The Place of Reason in Christian Apologetic, 16.
261 Matthews, 43.
262 Fulton, 63, 64; Tennant, II, 70.

say that it persists in strength because its demonstrations are founded on the wonderful works of God.[263] The Christian knows that the world which God has created, and which He governs, does contain evidences of His character and providence.[264] Although they acknowledge that faith is born by the revelation of the Word of God, there are many theists who believe that a careful view of nature through the eyes of faith strengthens and enlarges the conception of His power and wisdom.[265] The 'general revelation' contributes to faith by heightening man's conviction of the ever-present God of Grace — for the things which are seen in His world reveal those things which are not seen.

263 Christian theists today do not feel obliged to demonstrate that the world is perfect. The Christian faith is a belief in man's need of God in a world not yet perfect. The inability of the theist to prove that the world is in perfect harmony in all its parts is a circumstance in favor of the Christian view of a world in need of redemption. (Matthews, The Purpose of God, 129, 130; Waterhouse, 87.)

264 Brunner, "Nature and Grace," in Natural Theology, 24, 25; Matthews, 172.

265 Fulton, 63; Waterhouse, 90.

Appendix I

Contemporary Reviews

Reviews of Chalmers' Bridgewater Treatise:

Athenaeum, 1833, 396, 397 (June 22, 1833).
British Critic, XIV, 239-282 (October, 1833).
Edinburgh Christian Review, II New Series, 755-770 (November, 1833).
Fraser's Magazine, VIII, 65-80 (July, 1833).
Fraser's Magazine, VIII, 259-270 (September, 1833).
Gentleman's Magazine, CIII, 54-56 (July, 1833).
Literary Gazette, 1833, 370, 371 (July 15, 1833).
Monthly Review, 1833, II, 378-387 (July, 1833).
Museum of Foreign Literature, XXIV, 1-21 (January, 1834).
This article is printed from the British Critic.
Presbyterian Magazine, I New Series, 296-300 (September, 1833).
Presbyterian Review, V, 1-31 (March, 1834).
Quarterly Review, L, 1-33 (October, 1833).
Select Journal, VIII, 50 ff. (1834).
This article is a reprint of the review in the Gentleman's Magazine with an introduction added.
Westminster Review, XX, 1-22 (January, 1834).

Reviews of Kidd's Bridgewater Treatise:

Athenaeum, 1833, 247-249 (April 20, 1833).
Fraser's Magazine, VIII, 65-80 (July, 1833).
Gentleman's Magazine, CIII, 612, 613 (Supplement to Part I, 1833).
Literary Gazette, 1833, 339, 340 (June 1, 1833).
Monthly Review, 1834, II, 499-509 (August, 1834).
Presbyterian Review, V, 318-331 (July, 1834).
Quarterly Christian Review, L, 1-33 (October, 1833).

Reviews of Whewell's Bridgewater Treatise:

American Monthly Review, IV, 202-215 (September, 1833).
Annali delle Scienze Religiose, I, 3-26 (July-August, 1835).
Annali delle Scienae Religiose, I, 177-205 (September-October, 1835).
Athenaeum, 1833, 184 (March 23, 1833).
British Critic, XIV, 92-113 (July, 1833).
Christian Examiner, XIII New Series, 314-327 (July, 1835).

Reviews of Whewell's Bridgewater Treatise: (continued.)

Edinburgh Review, LVIII, 422-457 (January, 1834).
Fraser's Magazine, VIII, 65-80 (July, 1833).
Gentleman's Magazine, CIII, Part I, 425, 426 (May, 1833).
Jahrbucher der Litteratur, LXXXII, 207-232 (1838).
Literary Gazette, 1833, 306, 307 (May 18, 1833).
Litterarischer Anzieger . . . . , 1839, 380-384 (August 1, 1839).
Monthly Review, II, 1833, 561-568 (August, 1834).
Presbyterian Review, V, 527-542 (September, 1834).
Quarterly Review, L, 1-33 (October, 1833).

Reviews of Bell's Bridgewater Treatise:

Athenaeum, 1833, 427-429 (July 6, 1833).
Fraser's Magazine, VIII, 259-278 (September, 1833).
Gentleman's Magazine, I New Series, 197, 198 (February, 1834)
Monthly Review, 1833, III, 424, 425 (November, 1833).
Presbyterian Review, VI, 470-481 (May, 1835).
Quarterly Christian Spectator, VI, 54-73 (1834).
Quarterly Review, L, 1-33 (October, 1833).

Reviews of Roget's Bridgewater Treatise:

Athenaeum, 1834, 516-518 (July 12, 1834).
Christian Examiner, II Third Series, 137-153 (May, 1836).
Edinburgh Review, LX, 142-179 (October, 1834).
Fraser's Magazine, XII, 415-429 (October, 1835).
Monthly Review, 1834, III, 219-238 (October, 1834).
Presbyterian Review, VIII, 213-230 (May, 1836).

Reviews of Buckland's Bridgewater Treatise:

Annali delle Scienze Religiose, VI, 201-220 (March-April, 1838).
Annali delle Scienze Religiose, VII, 200-219 (September-October, 1838).
Athenaeum, 1837, 79-81 (February 4, 1837).
British Critic, XX, 295-328 (October, 1836).
Church of England Quarterly, II, 450-491 (1837).
Congregational Magazine, I New Series, 42-50 (January, 1837).
Dublin University Magazine, VIII, 692-701 (December, 1836).
Edinburgh Review, LXV, 1-39 (April, 1837).
Fraser's Magazine, XVI, 719-731 (December, 1837).
Fraser's Magazine, LIX, 227-243 (February, 1859).
Gentleman's Magazine, VII New Series, 115-142 ((February, 1837).

Reviews of Buckland's Bridgewater Treatise: (continued.)

Litterarischer Anzeiger . . . . ,1838, 345-384 (July-August, 1838).
Monthly Review, 1836, II, 330-351 (November, 1836).
Presbyterian Review, IX, 222-246 (January, 1837).
Quarterly Review, LVI, 31-64 (April, 1836).
Southern Literary Messenger, V, 548-558 (August, 1839).

Reviews of Kirby's Bridgewater Treatise:

Annali delle Scienze Religiose, III, 5-36 (July-August,1836)
Annali delle Scienze Religiose, IV, 224-260 (March-April, 1837).
Athenaeum, 1835, 663 (August 29, 1835).
Fraser's Magazine, XII, 415-429 (October, 1835).
Literary Gazette, 1835, 417-419 (July 4, 1835).
Literary Gazette, 1835, 438-441 (July 11, 1835).
Presbyterian Review, VII, 571-587 (January, 1836).
Southern Literary Messenger, V, 211-216 (March, 1839).

Reviews of Prout's Bridgewater Treatise:

Athenaeum, 1834, 349, 350 (May 10, 1834).
Fraser's Magazine, XVI, 719-731 (December, 1837).
Monthly Review, 1834, I, 349-364 (April, 1834).
Presbyterian Review, VI, 1-15 (November, 1834).

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Appendix II

Editions of the Bridgewater Treatises

1. Chalmers' Bridgewater Treatise

		Symbols
First edition:	London: Pickering, 1833	B
Second edition:	London: Pickering, n.d.	I
Third edition:	London: 1834.	B
Fourth edition:		I
Fifth edition:	Glasgow: Collins, 1839.	M
Sixth edition:	1840.	A
Another edition:	London: Bell & Daldy, 1853.	D E
Another edition:	London: Henry Bohn, 1871.	C
American edition:	Philadelphia: CLB, 1833.	L
" "	New York: 1834.	L
" "	Philadelphia: 1835.	L
" "	Philadelphia: CLB, 1836.	L
" "	New York: Harper, 1849.	L
German edition:	Stuttgart: 1838 (tran. by G. Pleininger).	G

2. Kidd's Bridgewater Treatise.

First edition:	London: Pickering, 1833.	B
Second edition:	London: Pickering, 1833.	I
Third edition:	London: Pickering, 1834.	N
Fourth edition:	London: Pickering, 1836.	N
Fifth edition:	London: Pickering, 1837.	A N P
Sixth edition:	London: Bell and Daldy, 1852.	A C D

A - Allibone's Dictionary of English Literature.
B - Listed in the British Museum Catalogue.
C - Listed in the Catalogue of the Reference Library of the Birmingham Free Library (J.D.Mullins, compiler).
D - Letter from G. Bell and Sons, Ltd., Publishers.
E - Edinburgh University Library.
G - Kayser's Neues Bucher-Lexicon, &c., Leipzig, 1841.
I - No copies of this edition found by the present writer.
K - Listed in Catalogue of the London Library.
L - Union Catalog, Library of Congress, Washington, D. C.
M - Copy in possession of the present writer.
N - Library of New College, Edinburgh.
P - Catalogue of the National Library of France, Paris.
S - Listed in the Catalogue of the Signet Library, Edinburgh.

CLB - Carey, Lea, and Blanchard, publishers of Philadelphia.

2. Kidd's Bridgewater Treatise (continued)

American edition:	Philadelphia: CLB, 1833.	L
" "	Philadelphia: 1835.	L
" "	Philadelphia: 1836.	L
German edition:	Stuttgart: 1838 (tran. by Gustav Pleininger).	G

3. Whewell's Bridgewater Treatise

First edition:	London: Pickering, 1833.	I
Second edition:	London: Pickering, 1833.	E
Third edition:	London: Pickering, 1834.	M
Fourth edition:		B
Fifth edition:		I
Sixth edition:		I
'Another' edit.:	London: 1837.	A
Seventh edition:	London: 1839.	A M
'Another' edit.:	Bohn's Science Library. 1847.	S
'Another' edit.:	Bohn's Science Library, 1852.	A
Eighth edition:	London: H. G. Bohn, 1862.	N
'Another' edit.:	Cambridge, London: 1864.	A B
'Another' edit.:	Bell & Daldy, 1871 (Eighth ed.)	D
American edition:	Philadelphia: CLB, 1833.	L
" "	Philadelphia: CLB, 1836.	L
" "	New York: Harper, 1841.	L
" "	New York: Harper, 1852.	L
" "	New York: Harper, 1856.	L
German edition:	Stuttgart: 1837 (tran. by G. Pleininger).	G

4. Bell's Bridgewater Treatise

First edition:	London; Pickering, 1833.	M
Second edition:	London: Pickering, 1833.	E N
Third edition:	London: Pickering, 1834.	B
Fourth edition:	London: Pickering, 1837.	E N
Fifth edition:	London: Murray, 1852.	E N
Sixth edition:	London: Murray, 1860.	E
Sixth edition:	London: Bell & Daldy, 1860.	D
Seventh edition:	London: Bell & Daldy, 1865.	B
Eighth edition:	London: Bohn's Science Library, 1872.	E
Eighth edition:	London: G. Bell and Sons, 1877.	C N
Ninth edition:	G. Bell and Sons, 1874.	B
American edition:	Philadelphia; CLB, 1833.	L
" "	Philadelphia: CLB, 1835.	L
" "	Philadelphia: CLB, 1835. (A new edit.)	L

4. Bell's Bridgewater Treatise (continued)

American edition:	Philadelphia: CLB, 1836.	L
" "	New York: Harper, 1840.	L
" "	New York: Harper, 1855.	L
" "	New York: Harper, 1864.	L
German edition:	Stuttgart: 1837 (tran. by Hermann Hauffmann).	G

5. Roget's Bridgewater Treatise

First edition:	London: Pickering, 1834.	B M
Second edition:	London: Pickering, 1834.	M P
Third edition:	London: Pickering, 1840.	B N
Fourth edition:	London: Bohn's Science Library, 1867.	D E
American edition:	Philadelphia: CLB, 1836.	L
" "	Philadelphia: CLB, 1839.	L
German edition:	Stuttgart: 1837, 1838 (tran. by F. M. Duttenhofer).	G

6. Buckland's Bridgewater Treatise

First edition:	London: Pickering, 1836.	M N
Second edition:	London: Pickering, 1837.	A B
Third edition:	London: Routledge, 1858.	
Fourth edition:	London: Bell and Daldy, 1869.	C B
American edition:	Philadelphia: CLB, 1837.	L
" "	Philadelphia: CLB, 1841.	L
" "	London, New York: Routledge, 1858.	L
French edition:	Paris: Crochard, 1838 (tran. by M. L. Doyere).	P
" "	Paris: G. Bailliere, 1838 (tran. by M. Joli). Abridged.	P
German edition:	Stuttgart: 1837 (tran. by Fr. Werner).	G
Swiss edition:	Neuchatel: 1838, 1839 (tran. by Louis Agassiz).	B

7. Kirby's Bridgewater Treatise

First edition:	London: Pickering, 1835.	M
Second edition:	London: Pickering, 1835.	M N
Another edition:	Bohn's Science Library, 1852-53	D K
American edition:	Philadelphia: CLB, 1836.	L
" "	Philadelphia: CLB, 1837.	L
German edition:	Stuttgart: 1838 (tran. by Dr. F. Oesterlen).	G

8. Prout's Bridgewater Treatise

First edition:	London: Pickering, 1834.	M
Second edition:	London: Pickering, 1834.	M
Third edition:	London: Churchill, 1845.	E P
Fourth edition:	London: Bell and Daldy, 1855.	A D
American edition:	Philadelphia: CLB, 1834.	L
" "	Philadelphia: CLB, 1835.	L
" "	Philadelphia; CLB, 1836.	L
German edition:	Stuttgart: 1837 (tran. by G. Pleininger).	G

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Appendix III

A Poem

To the Reverend William Kirby, Rector of

Barham, on his Bridgewater Treatise.

-Composed by the Rev. R. F. Walker.*

Not for its learning, venerated Sir,
As men call learning, do I so prefer
Thy interesting Treatise, late put forth,
But for its far superior pious worth.
Though plentifully stored with gems of mind.
It yields a warmer and more genial glow,
Which speaks thy heart above the things below;
Speaks to this heart of mine, that loves the man
Who, in thy spirit, undertakes to scan
Creation's works for the Creator's name,
Not for mere science, or a scholar's fame.
Thus, in thy book, I recognition view
Of rev'rence to the Holy Scriptures due;
These hast thou claimed as man's best guide to see
The wisdom, goodness, pow'r of Deity;
These as the nucleus of nature's light,
The key to knowledge of the things of sight.
"Twas thus thy genius could rise and swell,
'Twas thus thou learn'dst of God to write so well.
And shall not works like thine thy name adorn?
They "follow" thee, that thousands yet unborn
May seek the track those works shall leave behind,
And see more clearly the Almighty mind;
May through deep waters trace the paths of God,
And read his name on rocks thy feet have trod;
May read it 'lumined by these Bethlehem rays,
That kindled heretofore thy prayer and praise.
Champion of wisdom! in her lovelier form,
Not as she shakes the mountains, rules the storm,
Wings the dread lightnings, balances with death
Earth's living hosts, supplies new life and breath;
Nor only as she tells how much is spar'd
To thankless man of what, unfall'n, he shared;
Well hast thou pleaded truths like these, and more,
But better still hast taught us to explore
The Bible, heav'nly wisdom's choicest mine,
Teeming with wealth, exhaustless and divine:

* Freeman, John, Life of the Rev. William Kirby, 473-475.

A field of treasure for the mind and heart,
Oh how more rich than nature, science, art,
Here would'st thou show us how by thought to gain
Truths without which our other thoughts are vain,
But graced with which, "fair science," truly fair,
Not vainly pants for her own native air,
Springs into life immortal, lives indeed;
Borrows from Heav'n all help for time of need;
Lures to a fount where mortals thirst no more,
Points to a realm for souls in spirit poor,
Where smiles a home, to faith's far seeing eyes,
Not made with hands, eternal in the skies!
Be strong, dear Sir, meanwhile to rise or fall,
"The Way, the Truth, the Life" — thy all in all.
May but His spirit in our hearts abide,
Rend'ring His Word our comfort, strength, and guide;
So shall we soon from sin's deceiving load,
Rise to full likeness of th'Incarnate God:
Nor longer darkly, as in mirrors here,
Shall see Him as He is for ever, ever near.

... ...

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