

Robert Chambers and His Evolutionary Ideas

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로버트 체임버스와 그의 進化思想

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요 약

1844년 빅토리아시대의 영국에는 生物의 진화에 관한 저서 「창조의 자연사의 흔적」(*Vestiges of the Natural History of Creation*)이 익명으로 출판되었다. 저자 체임버스는 당대의 사상적 주관심사였으며, 우주의 진화를 설명하는 새로운 가설로서 등장하고 있던 星雲說(Nebular Hypothesis)을 그의 진화론의 전제로 하고 있다. 이 자연계에는 단 하나의 자연법, 즉 발전의 법칙(law of development)이 지배하는데 이것에 의해서 생물계나 무생물계나 非異質의인 시작으로부터 점증하는 복잡성의 理想을 향하여 진보를 계속하고 있다는 것이다. 성운설에 의하면 현대의 力動的 체계 하에서 운행되고 있는 태양계의 별들은 원초적인 가스와 같은 안개덩어리로부터 진화해 왔다는 것이다. 따라서 마치 비생물적인 우주가 일관된 법칙에 종속됨으로써 오늘에 이른 것처럼 생물계도 마찬가지로 같은 법칙을 따라서 진화했다는 것이다. 그러면 생물의 진화는 구체적으로 어떻게 이루어졌는가? 체임버스에 의하면 비록 일반적으로 하나의 種은 같은 種을 낳는 것이나, 때로는 그렇지가 않은 현상이 일어난다. 따라서 어떤 때는 전혀 새로운 種의 생물이 단번에 한 種의 자궁으로부터, 예를 들어 1억 2번째의 확률적 出産에 의해, 태어난다는 것이다. 어떤 外的인 환경의 변화가 있을 때, 한 생명의 자궁 내에서의 胚로서의 존재 기간이 연장됨으로써, 그 생명체는 한단계 높은 새로운 생물의 胚로 발전하게 됨으로써, 새로운 種의 탄생이 이루어져 진화가 얻어진다는 것이다.

체임버스는 그의 이론을 뉴턴체계에 비교하고 있다. 실제로 빅토리아시대를 통하여 과학자들은, 법칙을 통하여 자연을 설명하고 그 법칙이란 가능한 한 뉴턴물리학, 특히 1830년대의 뉴턴天文學과 같아야 한다는 생각에 지배되고 있었다. 마치 重力에 의해 무생물계가 통제되듯이 생물의 세계는 발전의 법칙에 종속되어야 한다는 것이다. 체임버스도 이러한 그 시대의 지배적 개념이었던 “법칙을 통한 설명”을 시도했던 것이다. 神이 수많은 생물의 各種들을 지질학적 기록에 나타나는 각각의 시대에 하나하나 만들어 뒀다는 것은 신의 능력을 축소하고 신을 또한 너무나 擬人化하는 것이라고 체임버스는 생각했다. 그것보다는 창조주가 하나의 자연법을 설정하여 자연에 작용케 함으로써 하나의 미친한 생명체로부터 생물계가 발전하도록 하는 것이 훨씬 더 신을 고귀하게 한다는 것이다. 각 지층에 나타나는 化石기록은 체임버스의 진화론의 또 하나의 주요한 뒷받침이었다. 化石기록이 보여 주는

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명백한 진보(progression)——단순한 하급동물이 최초로 나타나고 점차적으로 고등동물의 出現에 이르고 최후로 人間이 나타나는——는, 비록 이것이 창조론자들에게 있어서 생물 하나하나에 대한 신의 창조의 좋은 증거이기도 하였지만, 체임버스에게 있어서는, 발전의 법칙에 의한 생물진화의 더 없는 근거였다.

체임버스의 주장에 대한 당대의 과학·종교계의 반응이란 냉혹했다. 많은 저명한 빅토리아인들은 생생하고 원색적인 감정으로 *Vestiges*를 비난했다. 과학계는 *Vestiges*에 사실(facts)이 결여되어 있음을 들어 배척했다. 실제로 발전의 법칙의 萬有性이나 胚의 변화에 의한 진화 등의 그의 가설은 수집된 데이타로부터 추출된 것은 아니었다. 그 대신에 그는 이미 만들어진 가설을 맞추기 위해 사실들을 수집했다. 종교적인 사람들은 진화론이 제시한 인간의 특수한 지위에 대한 위협에 크게 당황하고 분노했다.

그러나 종교·과학계의 이러한 비판에도 불구하고 *Vestiges*는 일반대중으로부터는 엄청난 인기를 누렸다. 1860년 경에 이르러 *Vestiges*는 20,000부 이상이 팔렸고 11판을 거듭했다. 아마도 *Vestiges*의 의미란 그것 자체의 과학적 가치에 있다기보다는 진화사상을 대중화했다는 그 역할에서 찾아야 할 것 같다. 비록 *Vestiges*가 사실 해석의 오류나 근거없는 一般化의 잘못은 있었으나, 대중은 그런 것에 유의하기보다는 우주 전체에 적용할 수 있는 발전의 가설이라는 사상이 더욱 매력적이었을 것이다. 이 저서의 성공은 이 시대 사람들의 진화에 대한 깊은 관심을 반영한 것이라고도 할 수 있다. 1840년대의 영국에는 새로운 과학사상과 전통적인 관념과의 사이에 미묘한 투쟁의 場이 있었다. *Vestiges*는 이 상쟁을 노골적으로 표면화함으로써 두 사상체계 사이에 좀더 솔직하고 공개적인 숙고를 요구했다. 생물의 진화에 관한 토론은 더 이상 私人的인 과학적 토론이 아니라 대중 앞에 던져진 불타는 질문이었다. 그의 거대한 판매부수는 일반대중이 *Vestiges*의 주제를 그들의 종교적 입장에 관계 없이 그럴듯한 것으로 명백히 받아들였음을 보여 준다. *Vestiges*의 효과는 빅토리아시대에 이미 제시된 진화사상의 定着을 가속시키는 것이었다. 결국 체임버스는 진화사상을 大衆化함으로써 다윈을 위해 길을 닦았다고 하겠다. 진짜 이유가 어디에 있었든 간에, 1844년에 체임버스가 *Vestiges*를 출판했을 때에는 전문적 과학자사회의 누구도 그의 중심논제를 받아들이지 않았으나, 1859년에 다윈이 「종의 기원」을 출판했을 때에는 생물의 기원에 관심을 가진 과학자들은 급속히 진화사상으로 改宗되어 가고 있었던 것이다.

In 1844 an anonymous work on organic evolution, *Vestiges of the Natural History of Creation*, appeared in Victorian Britain. The main thesis of the *Vestiges* is that the organic world is controlled by the law of development, just as the inorganic is controlled by gravitation. This full-length work, crammed with speculations on organic origins, proved immensely popular with the general public, and was discussed in leading reviews at length. The early period of Victorian age witnessed the lively discussion on the organic origins questions, but actually no one was a pronounced evolutionist. Though some favored an unknown but essentially law-bound originating mechanism, most people still supported creationism.¹⁾ The friendly, though lively, debate about organic origins ended with the anonymous publication. *Vestiges*, despite its alarming popularity among the general public, became one of the most roundly hated books of its time, becoming the new sensation of religious England. For years it had been the center of a fierce little storm, the target of a steady fire of philosophic analysis, scientific ridicule, and theological vituperation. Its author was variously denounced as atheist, shallow smatterer, and credulous dupe.²⁾ It emerged forty years later that the author of the “boldest and most comprehensive

1) Michael Ruse, *The Darwinian Revolution* (Chicago & London: The University of Chicago Press, 1979), p. 268.

2) Milton Millhauser, *Just Before Darwin. Robert Chambers and Vestiges* (Middletown, Connecticut: Wesleyan University Press, 1959), p. 4.

statement of the evolutionary doctrine since Lamarck"³⁾ was Robert Chambers, journalist and popular educator, editor of the *Chambers' Journal*, and author of some thirty books on history, literature, and biography. This paper is a story about Robert Chambers of Edinburgh and his evolutionary ideas.

Robert Chambers was born on July 10, 1802, in the Scottish village of Peebles, where his father prospered as a cotton manufacturer. Though he was born to reasonable comfort, by his early teens his family had fallen on very hard times. He was not quite fourteen years old when he was apprenticed to a bookseller for five years, following his elder brother's example. After some years of real hardship in his youth, by diligence and enterprise, Chambers dragged himself up from the most extreme poverty, until he and his brother formed one of the most successful publishing firms of the nineteenth century, chiefly famous for *Chambers's Journal*, a weekly magazine packed with edifying and useful information. Chambers was more than just a publisher. He wrote copiously, chiefly treating topics related to Scotland, in a form likely to appeal to the widest reading public.⁴⁾

The particular science to which Chambers devoted himself was geology. From the mid-1840's through the 1850's Chambers wrote a number of papers dealing with Scottish geology, particularly glacial action and erosion phenomena. These papers, competent although not highly original, earned him a reputation as a scientist. He was given credit for helping to gain acceptance for the glacial theory.⁵⁾ Though *Vestiges* occupied much of Chambers's time between 1844 and 1860, he carried out field expeditions in geology producing technical pamphlets on them. He wrote a four volume *Life and Work of Burns* (1851), became Director of the Scottish Life Assurance Society, worked on the *Chambers's Encyclopaedia*, and spent his much efforts in the British Museum working on the *Book of of Days* (1863).⁶⁾ His home was a meeting place for both scientific and literary intellectuals from Edinburgh, which enabled Chambers to keep abreast of current advances in both areas, which rendered much assistance to Chambers for writing a book such as *Vestiges* and compensated the fact of Chambers's being largely self-educated.⁷⁾ He had been elected to the Royal Society of Edinburgh in 1840 and to the Geological Society in 1844. He was understood to be corresponding with the leading British scientists on the widest possible assortment of topics.⁸⁾

After his first wife died in 1863, Chambers became more interested in religion than before, an interest which eventually involved him in spiritualism. During this period he wrote little, however, he remarried and wrote again during his last years until his second wife died in 1870. Robert Chambers died in 1871.⁹⁾

3) Gertrude Himmelfarb, *Darwin and the Darwinian Revolution* (New York: W.W. Norton 1959), p. 216.

4) Ruse, *The Darwinian Revolution*, p. 99.

5) Wesley C. Williams, "Chambers, Robert," *Dictionary of Scientific Biography* (New York: Charles Scribner's Sons, 1971) Volume III, 192.

6) Millhauser, *Just Before Darwin*, pp. 165-72.

7) Ibid., pp. 26-29.

8) Ibid., p. 8.

9) Ibid., pp. 174-189.

Now, what is exactly written in the *Vestiges*? I will first analyze the content of the work and then will show how the Victorian society reacted to it.¹⁰⁾ Chambers opened *Vestiges* by discussing and accepting the nebular hypothesis. Chambers wanted to convince his readers of the universality of a single natural law, the law of development.¹¹⁾ His contention was that being in both its inorganic and organic forms is progressing from an undifferentiated beginning towards an ideal of increasing complexity. To support his hypothesis of the all-pervading influence of development, Chambers appropriated a popular theoretical proposition, the nebular hypothesis. This hypothesis postulated the evolution of the highly organized heavenly bodies from a primordial, gaseous nebular mass. If development could be demonstrated on a cosmic scale, as indicated by this hypothesis, Chambers would have established a basis for its extension to more microcosmic levels.

Therefore he was very much concerned in establishing the truth of this proposition.¹²⁾ What he hoped to establish was that since the inorganic, cosmological world is subject to unbroken law, by analogy it is reasonable to suppose that the organic world, including organic creations, is also subject to law. Though Chambers one time took a little bit weakened position saying that "it is a mistake to suppose this (nebular) hypothesis essential, as the basis of the entire system of nature developed in my book,"¹³⁾ he nevertheless believed it really impressive that in the organic world, as physics demonstrates, laws hold, and that these "natural laws work on the minutest and the grandest scale indifferently."¹⁴⁾

The nebular hypothesis was an important ideological focal point of the period. However nebular speculations were experiencing difficulties about the middle of the century, therefore the uncertain status of the nebular hypothesis made Chambers especially vulnerable to critical attacks.¹⁵⁾

Having set the outer limits on the range of law working on planets and men, Chambers was really ready to argue that everything is subject to law, including the origins of species. The next thing Chambers discussed in detail was the nature of the fossil record. As we have seen Chambers achieved most in geological science. It was perhaps the area Chambers dealt with most confidence. We see in the record, Chambers pointed out, a definite progression from the humblest organisms right up to mammals, with man certainly one of the most recent additions. More specifically, Chambers started with invertebrates, then move up to primitive fish.¹⁶⁾ He then moved on to reptiles, with a side mention of progression in plants. Next came a link between reptiles and birds, with Owen cited as the authority. Following this came the earliest

10) I will use the first edition of *Vestiges* (1844), Robert Chambers, *Vestiges of the Natural History of Creation* (London: John Churchill, 1844).

11) "Development" was the early nineteenth century's term for what we call evolution.

12) Marilyn Bailey Ogilvie, *Robert Chambers and the Successive Revisions of the Vestiges of the Natural History of Creation* (Ph.D. Dissertation, University of Oklahoma, 1973), p.41.

13) Robert Chambers, *Explanation: A Sequel to Vestiges of the Natural History of Creation* (New York: Wiley and Putnam, 1846), p.5.

14) *Ibid.*, p.6.

15) Marilyn Bailey Ogilvie, "Robert Chambers and the Nebular Hypothesis," *British Journal for the History of Science*, 1975, VIII, 214.

16) Chambers, *Vestiges* (1844), pp.54-75.

mammals, significantly, the primitive marsupial forms, and so on up to the present, as forms become ever more recognizable, culminating in man. Thus Chambers believed he had showed a relatively gradual progressive climb. Chambers was also drawn to Agassiz's particular interpretation of the embryo/fossil-record analogy, together with von Baer's ideas.

Next Chambers considers the questions of spontaneous generation after the lengthy geological discussion. Chambers also discusses the creation of the organic from the inorganic. His hypothesis was that life is formed by a "chemico-electric" operation,¹⁷⁾ and he gave great prominence to the alleged creation of an insect when electricity was passed through solutions of silicate of potash and of nitrate of copper.¹⁸⁾ He also pointed out how the organic substance, urea, can be manufactured from inorganic substances.¹⁹⁾ Those "facts" and others apparently point to the possibility of creating the organic from the inorganic.

Chambers now turned to the question of just how transmutation could occur. A law could hold in a certain way, Chambers argued, for 100,000,002nd times. Chambers therefore insisted that although like normally produces like, it need not always do so. On rare occasions like might produce unlike, and thus by law new species could be formed. He apparently expected the move from one species to another to be a one-step affair rather than a very gradual process.

Embryological issue was what Chambers took up next. First he suggested that man's organs recapitulate adult forms of insects, fish, reptiles, birds, and lower mammals before they reach maturity.²⁰⁾ However, Chambers talks another thing concerning the recapitulation without any due acknowledgment: He simply swung around and endorsed a different position, suggesting that in the development of the embryo of higher forms, "the resemblance is not to the adult reptile, but the fish and reptile at a certain point in their foetal progress."²¹⁾ And in trying to explain exactly how he thought evolution occurred, his central suggestion was that sometimes, because of external conditions, the embryonic stage is prolonged so that the organism develops into the embryo of a higher organism, and thus a new species is created. To get evolution, all we need to suppose, argued Chambers, is that in some cases embryos stay embryos and go on developing longer than is usual. An over-developed fish is hence no longer a fish but a reptile, and so on. "To protract the straight-forward part of the gestation over a small space... is all that is necessary."²²⁾ Chambers suggested that light and oxygen might have something to do with the length of gestation and hence with transmutation.²³⁾

Chambers tended to speak harshly of his evolutionary predecessor Lamarck, criticising the Lamarckian hypothesis of needs and their fulfillment.²⁴⁾ The main proposition of Lamarck was that organisms, in their incessant attempt to adapt to changing environment, have changed themselves gradually by use and disuse of their parts and that the acquired characteristics

17) Chambers, *Vestiges* (1844), p. 204.

18) Ibid., p. 185.

19) Ibid., p. 210.

20) Ibid., p. 200.

21) Ibid., p. 212.

22) Chambers, *Vestiges* (1844), p. 212.

23) Ibid., pp. 228-29.

24) Ibid., p. 231.

through the inner needs were inherited onto their offsprings. But Chambers's theory was not unlike Lamarck's in some aspects. For example, Lamarck did not propose a common ancestry for all organisms, rather we get continuous, parallel evolution, destined always to go through more or less the same stages. And Chambers also believed in a certain number of separate "foci of organic production,"²⁵⁾ and, like Lamarck, envisioned separate but parallel evolution from these points. Lamarck, who had a thorough knowledge of biology, made the first public statement of his unorthodox views in 1801. Not until 1809, in the *Philosophie Zoologique*, was his theory stated in a full-scale form. Lamarck's fame was restricted to the narrow and rather hostile circles of professional biology.²⁶⁾

Vestiges has earned for its author a sort of automatic reputation as "a precursor of Darwin." Chambers, however, followed the Lamarckians more than he anticipated Darwin. His theory depended on environmental influence and gross embryonic change—the production of new types at a single step by "sporting"—rather than anything so gradual as the accretion of minute differences and a Malthusian struggle for existence.²⁷⁾

Chambers did not hesitate to show his megalomaniac personality when he, with a confidence, compared his system with Newtonian system.

"The inorganic has one final comprehensive law, gravitation. The organic, the other great department of mundane things, rests in like manner on one law, and that is development. Nor may even these be after all twain, but only branches of one still more comprehensive law, the expression of that unity which man's wit can scarcely separate from Deity itself."²⁸⁾

Actually throughout Victorian period scientists felt a metascientific urge to explain through law, bound up with a general belief that science ought, as much as possible, to imitate Newtonian physics, particularly the Newtonian astronomy of the 1830's. A major motive behind Chambers's work clearly was his desire to explain through law, and the same holds for Darwin and for those who responded to his writings. Good Newtonian science requires law, and in the end only evolution could provide it.²⁹⁾

Vestiges depicted a universe in which law had replaced miracle and the ruling principle was everlasting, forward-moving change. In the world of *Vestiges* the law of progress was as pervasive and fundamental as had been the law of gravitation in the Newtonian universe. It manifested itself on a cosmic scale in the creation of planetary systems out of diffuse nebulae, and on a terrestrial one in the evolution of all forms of organic life, including man, out of primordial protoplasm and ultimately out of inorganic dust. The very origin of life itself he had reduced to an electrochemical accident, reproducible under favorable conditions in the chemist's laboratory, had arisen by law, not miracle, in accordance with a "principle of development."

Robert Chambers was a man cast in a Platonic-Pythagorean mold. Relying on the experiments

25) Ibid., p. 259.

26) Millhauser, *Just Before Darwin*, p. 69.

27) Ibid., p. 87.

28) Chambers, *Vestiges* (1844), p. 360.

29) Ruse, *The Darwinian Revolution*, p. 270.

and observations of others for corroboration, he constructed a universe in his mind.³⁰⁾ By means of his intellect he was able to glimpse the way in which the "Almighty Author," by necessity, would have formed the cosmos — by devising immutable preconceived natural laws operating uniformly throughout the whole of creation.³¹⁾ Chambers marvelled, "it is remarkable of physical laws, that we see them operating on every scale as to magnitude with the same regularity and perseverance."³²⁾ To think otherwise, he argued, would be absurd. It would rob "that great being, who shall say where is his dwelling place,..." of his omnipotence and replace him with a whimsical anthropomorphic deity subject to the same kind of frailties found in him human creation.³³⁾ Chambers thought the idea of having God create each species individually at the time at which it appeared in the geological record was belittling to God and unduly anthropomorphized Him. To Chambers it was far more noble to envisage the Creator as working through natural laws and having the organic world develop from humble beginnings. Such a system also provided the basis for an original unity of the entire organic world. Chambers argued that the operation of the natural law is inherently good because they are God's laws. Knowing that God operate reasonably by means of established natural laws, Chambers the Platonic-Pythagorean assumed that the basis of these laws was mathematical,

"nor should it escape our careful notice that the regulations on which all the laws of matter operate, are established on a rigidly accurate mathematical basis. Proportions and geometrical figures rest at the bottom of the whole."³⁴⁾

Science clearly shows why *Vestiges* was rejected by the contemporary world, though reactions to Chambers's work were not exclusively scientific. *Vestiges* was saddled with all kinds of untenable assumptions. Great scorn was thrown on his speculations about spontaneous generation. Equally castigated were Chambers's embryological speculations. The subject that received most attention was his treatment of the fossil record, the scientific topic he himself examined in most detail. It was this area that bordered most closely on cherished beliefs of the antievolutionist. Most people were happy to see progression in the fossil record, at least as evidence of God's preparing the world for man; it was evidence of God's overall plan as He worked from the most humble organisms right up to man. For the anti-evolutionists the fact that fossil record is progressive was the best interpretation for non-evolution.³⁵⁾ During the period of our study, at best the relationship between religion and geology regarding the history of the earth had been a delicate one, and Chambers violated the sense of holy evidence of Creation in the geological record.³⁶⁾ Chambers was more competent in geology than in any other scientific field. But his geological work did not leave him any less vulnerable to criticism in this area than in

30) Ogilvie, *Robert Chambers and the Successive Revisions of the Vestiges*, p. 12.

31) Chambers, *Vestiges* (1844), p. 359.

32) Ibid., p. 24.

33) Ibid., p. 26.

34) Chambers, *Vestiges* (1844), p. 25.

35) Ruse, *The Darwinian Revolution*, p. 107.

36) Ogilvie, Ph.D. Dissertation, p. 17.

others in which he had less knowledge.³⁷⁾

Philosophical criticism dealt with the overall scientific methodology and strategy Chambers advocated. So much of Chambers's argument was devoted to the claim that evolutionism follows necessarily if we take a proper scientific approach to biology. To be a good Newtonian in biology, he claimed, requires that one be an evolutionist, and he meant the theory of *Vestiges* to be the biological analogue of Newtonian astronomy. Chambers introduced the nebular hypothesis as an analogy to biology. Many of his critics, however, rejected the nebular hypothesis; they claimed that recent telescopic evidence had suggested that genuine nebulae did not exist; nebulae, being the supposed clouds of gas resolved into distinct stars,³⁸⁾ and thus in their eyes a crucial premise of the hypothesis vanished. Critics claimed that as good Newtonian they did not have to become evolutionists, then conversely claimed that Chambers's theory did not measure up to Newtonian standards.³⁹⁾ Although the supporters of the nebular hypothesis did not come to Chambers's defense, its opponents rushed to attack him. The implication of the nebular hypothesis was so important that some of those who considered it in the mid-nineteenth century were concerned not only with its physical correctness and its theological implications but also with its bearing on other controversial theoretical constructs, such as uniformitarian geology.⁴⁰⁾

I want to quote here some eminent Victorians to convey the vivid emotional reactions of them to *Vestiges*. Though all the furor did not spring solely from religious sensitivities, yet religion was still a major force behind the nonevolutionary positions formulated in the mid-nineteenth century. Religious people were terrified by the threat evolution posed to the special status of man, and both those for law and those for miracle cared desperately that full place be left for God's designing powers. Religion, of course, was a major element in the reaction against Chambers. With good reason, he was considered to undermine the dignity of man and to leave no room for God's design. And, in fact, much the same points came up again after the *Origin of Species* of Charles Darwin. Reverend Samuel Richard Bosanquet wrote a book to refute *Vestiges* and he opened his argument as following:

"The recent publication of the book entitled *Vestiges of the Natural History of Creation*, is very much to be regretted; and still more is it to be regretted that it is obtaining a rapid circulation, if not a general approval; and that the public taste or discernment has not passed upon it an immediate sentence of condemnation and rejection from the stages, on its first representation."⁴¹⁾

Bosanquet was very much disappointed with the fact that the general public liked to read *Vestiges*, and, after defending God's Creation, he has given on *Vestiges* the condemning sentence.

"The design of the work is to show that there has been no such things as creation, in the sense in

37) Ibid., p. 484.

38) Ruse, op. cit., p. 110.

39) Ibid., p. 112.

40) Ogilvie, "Robert Chambers and the Nebular Hypothesis," *British Journal for the History of Science*, 1975, VIII, 220.

41) Samuel Richard Bosanquet, "*Vestiges of the Natural History of Creation*:" *Its Argument Examined and Exposed* (London: John Hatchard, 1845), p. 1.

which we receive it from the Mosaic History and Revelation; that there is no such thing as a Special Providence; that the very notion of it "is ridiculous."⁴²⁾

"We really attribute to it all the graces of the accomplished harlot."⁴³⁾

Sir David Brewster, veteran of science and applied theology, saw the gloomy future through *Vestiges* when he lamented as follows:

"Prophetic of infidel times, and indicating the unsoundness of our general education, 'the *Vestiges*...' has started into public favour with a fair chance of poisoning the foundations of science, and sapping the foundations of religion."⁴⁴⁾

Brewster also pointed out the despising nature of *Vestiges's* full of speculation not without justification.

"who practise their orgies in the temple of science, ransacking its storehouse for the materials of hypothesis, and not infrequently adulterating them for popular taste, or fashioning them for vulgar apprehension, or perchance suppressing or denouncing the testimony which they bear. Writers of this class have neither learned, nor wish to learn, the real meaning and sterling value of A FACT IN SCIENCE — that eternal and immutable truth which every man must believe, and which all men may possess, that indestructible element of knowledge, which time cannot alter, nor power crush, nor fire subdue — that self-luminous atom, which shines brightest in the dark, and whose vestal fire an intellectual priesthood will ever struggle to maintain..."⁴⁵⁾

Adam Sedgwick, Woodwardian professor of geology at Cambridge, exercised especially effective influence in his criticisms of *Vestiges* because they were found in one of the better known review magazines, *The Edinburgh Review*. They could not be ignored because of their wide circulation.⁴⁶⁾ "From the bottom of my soul," wrote Sedgwick, "I loathe and detest the *Vestiges*."

"If the book be true, the labours of sober induction are in vain; religion is a lie; human law is a mass of folly, and a base injustice; morality is moonshine; our labours for the black people of Africa were works of madman; and man and woman are only better beasts!"⁴⁷⁾

One of *Vestiges's* most famous reviewers, the self-proclaimed bulldog for Darwinian evolutionism, Thomas Henry Huxley, accused its author of sensationalism amounting to "charlatanerie," and blamed the ignorance of the reader for making possible so many editions of a very bad book. Huxley admitted that it was Chambers's *Vestiges*, about which he wrote the only review he ever thought to be harsh.⁴⁸⁾ *Vestiges* was also humorously satirized in Benjamin Disraeli's novel, *Tancred*, published in 1847, in which a lady urges a man to read the current best-seller, *Vestiges*.

42) Ibid., p. 4.

43) Ibid., p. 3.

44) Millhauser, *Just Before Darwin*, pp. 125—126.

45) Ogilvie, op. cit., p. 228.

46) Ogilvie, Ph.D. Dissertation, p. 484.

47) Quoted in Millhauser, *Just Before Darwin*, p. 122.

48) William Irvine, *Apes, Angels, and Victorians* (New York: McGraw-Hill, 1955), p. 104.

"You must read (*Vestiges*) ; it is all explained. But what is most interesting, is the way in which man has been developed. You know, all is development. The principle is perpetually going on. First, there was nothing, then there was something; then, I forget the next, I think there were shells, then fishes, then we came, let me see, did we come next; Never mind that; we came at last. And the next change there will be something very superior to us, something with wings. Ah! that's it; we were fishes, and I believe we shall be crows."⁴⁹⁾

Both scientists and clergymen joined together to voice their disapproval; they argued that the ideas in it were potentially harmful to those untrained in scientific procedures and unaware of the book's religious heresies. The work itself, alarmingly popular despite a merciless critical pounding, was regarded by the orthodox as pernicious in the very highest degree.

As we could glimpse from the voices of the critics above-mentioned, *Vestiges* was enormously popular among the general public. Perhaps the significance of the *Vestiges* should be found in its role of popularizing evolutionary ideas even though its intrinsic value is not great. Its subject, a universally applicable developmental hypothesis, must have been fascinating to people. The general public, who liked the book, was not concerned with errors in fact and unsupported generalizations, but instead was attracted by the smoothness of its literary style and the glibness of its pronouncements.⁵⁰⁾ By 1860 *Vestiges* had sold over 20,000 copies in eleven British editions plus editions in the United States, Germany, and the Netherlands.⁵¹⁾ As we see from this record, in fact, *Vestiges* was one of the most controversial books of its time, and it was simply accepted by the laymen of Victorian Britain. Even though *Vestiges* was ravaged by ferocious critical attacks, and to some extent because of them, it assumed a prominent position in Victorian perspective. Its reception reflected a contemporary interest in evolution.⁵²⁾

The numerous revision of the *Vestiges* within Chamber's lifetime indicate both its popularity and his desire to make it acceptable to his detractors. One of the reason why there was so much opposition to *Vestiges* from the professional scientific community might be explained by the supposition of the tension between professionalism and amateurism. Given the premise that *Vestiges* was accepted by the general public with the evidence of its large sale and many editions, "it must have been galling to the professional scientist that a book containing so many demonstrably absurd speculations should prove so popular."⁵³⁾

In his first edition of the *Vestiges* in 1844, Chambers declared that he would let the work speak for itself:

"I do not expect that any word of praise which the work may elicit shall ever be responded to by me; or that any word of censure shall ever be parred or depreciated. It goes forth to take its chance of instant oblivion, or of a long and active course of usefulness in the world."⁵⁴⁾

However, almost immediately upon publication of his book Chambers broke his resolution to let

49) Millhauser, op. cit., p.152.

50) Ogilvie, "Robert Chambers.....", 214.

51) *Dictionary of Scientific Biography*, p.192.

52) Ogilvie, op. cit.

53) Ruse, *The Darwinian Revolution*, p.129.

54) Chambers, *Vestiges* (1844), p.387.

Vestiges stand unaltered upon its merits, and he was forced to publish *Explanation*(1846) and successive revisions of *Vestiges* to meet the devastating reviews, which were poured on his work. And he announced:

“the author should have to regret seeing it in a great measure misapprehended in its general scope, and also so much excepted to, justly and unjustly, on particular points, that ordinary readers might be ready to suppose its whole indications disproved.”⁵⁵⁾

It was apparent that Chambers was sensitive to the reactions of his reviewers and sought, by modifying his text, to alleviate some of the adverse criticism. But, although he modified his position in response to some particular objections, he steadfastly maintained his basic premise that development was the basic law governing the universe.⁵⁶⁾

Although Chambers insisted that the correctness of the nebular hypothesis was not essential to his theory, his behavior suggested that he really thought otherwise. Throughout the *Vestiges* an initial postulate was implied: that God would have created the universe as simply as possible. This idea of the simplicity of creation demanded a universal law acting at every level of being from the origin of the cosmos to the operation of the most minute of terrestrial phenomena.⁵⁷⁾ Since nowhere in the *Vestiges* did Chambers consider an alternative to the nebular hypothesis, the critics assumed that the viability of this theory was fundamental to the rest of the developmental hypothesis. Their determination to destroy was matched by Chambers's commitment to support. He continued to discuss the hypothesis in each edition, patching sections when possible and leaving highly criticized sections intact when he felt that a change would threaten the entire nebular conception.⁵⁸⁾ After all Chambers's numerous modifications and revisions failed to make the book palatable either to the church or to science.

The fact that the author of *Vestiges* anonymous must have added greatly to the book's fascination. Speculations on his identity ranged from Prince Albert on down, and many fastened on one Robert Chambers of Edinburgh. The rumor that he was the secret author of a recent anonymous book, a work of black materialism, the notorious *Vestiges* was used to Chambers's disadvantage to be a candidate for the post of Lord Provost of Edinburgh.⁵⁹⁾ Darwin was one of those who had firm conviction of Chambers's authorship of *Vestiges* by 1847. Chambers decided on anonymity mainly to safeguard his publishing ventures and to get a fairer hearing for his views.⁶⁰⁾ In 1884, long after interest subsided, Chambers was indeed revealed as the author. This was announced in the twelfth and final posthumous edition.

55) Robert Chambers, *Explanations: A Sequel to Vestiges of the Natural History of Creation* (New York: Willey and Putnam, 1846), p. 1.

56) While Millhauser's *Just Before Darwin* puts its emphasis on the climate of opinion which induced the spawning of evolutionary ideas rather than on a detailed analysis of the text itself, Ogilvie's dissertation examines the changes made in the successive English editions of *Vestiges* and investigates the relationship of the critics' barbed remarks to these changes in great detail.

57) Ogilvie, "Robert Chambers.....", 219.

58) Ibid., 229.

59) Millhauser, *Just Before Darwin*, p. 4.

60) M.J.S. Hodge, "The Universal Gestation of Nature: Chambers's *Vestiges* and *Explanation*" *Journal of the History of Biology*, 1972, 5: 127-151, (131).

Both in reflecting the contemporary Victorian climate of thought and in preparing the populace to understand subsequent ideas on transmutation, *Vestiges* played a significant role in the history of nineteenth century science. Considered together, Chambers and his critics exhibited the Victorian mind in its dealing with pre-Darwinian science. That mind was already, 1840's, the arena of a struggle between traditional concepts and the implications of the newer sciences. *Vestiges*, stating the conflict baldly, demanded a more frank and open consideration of the two great bodies of thought involved. *Vestiges* put evolution in the air.⁶¹⁾ The organic origins debate was no longer a private scientific controversy but a burning question that had been thrust upon the public eye. Chambers steered people toward evolutionism. In view of its huge sale, the general public obviously found the message of *Vestiges* exciting and plausible, religious standing notwithstanding. The effect of *Vestiges* was to accelerate the already present Victorian interest in transmutation. It was the first thoroughgoing presentation of evolutionary theory in England; it was at once a novelty and a portent.

However, the scientific world was almost literally unanimous in condemning it. It was assailed with extraordinary vigor. Most of the comments about the *Vestiges* contained in the reviews were devastating. Moreover, most of them were valid. Chambers appeared to approach the problem from the wrong direction. His hypothesis of the universality of the law of development did not stem from the collection of data. Instead, he selected facts to conform with his preconceived hypothesis. Here was a work which rejected all that was revered—the very essence of science, fact.⁶²⁾ For all his talk of being Newtonian, Chambers really made no attempt to provide a vera causa for evolution, and his critics quickly noted this.⁶³⁾

Again the importance of Chambers lies not so much in his scientific work but in the effect he produced on nineteenth-century society. The subject of *Vestiges* was obviously fascinating. The curiosity of the reading public was aroused. When Darwin appeared he found a ready made audience. Chambers, an intuitive amateur poaching on the dogmatic specialist's preserves, prepared the way for Darwin by popularizing an earlier theory of evolution and by drawing the brickbats of outraged orthodoxy. Every great intellectual concept has both its prophets and its forerunners; and in the field of evolutionary thought, Robert Chambers of Victorian Edinburgh was such a forerunner. If *The Origin of Species* was reviewed as science and not as heresy, some of the credit for this change of intellectual climate must go to the clumsy stubbornness of "Mr. Vestiges."

In closing this paper, let us ask what Charles Darwin himself said about the "development hypothesis" in the *Vestiges of the Natural History of Creation*. In the "Historical Sketch" appended to later edition of the *Origin* (6th ed., p. 14), Darwin remarked.

"(It has) done excellent service in this country in calling attention to the subject, in removing prejudice and thus preparing the ground for the reception of analogous views"⁶⁴⁾

61) Millhauser, op. cit., p. 8.

62) Ogilvie, Ph.D. Dissertation, p. 480.

63) Darwin certainly did not satisfy everyone with his mechanism of natural selection, but in the *Origin* he made a systematic attempt to conform to criteria of scientific excellence, and the powerful effect of the *Origin* in large part sprang from this care.

64) Quoted in Himmelfarb, *Darwin and the Darwinian Revolution*, p. 221.

Whatever the real reasons for it, in 1844, when Chambers published his *Vestiges*, almost no member of the professional scientific community accepted its central message; but in 1859, when Darwin published the *Origin*, scientists concerned with the origins of organisms were rapidly converted to evolutionism.