

$$F = \frac{\mu q^2 da/dt}{6\pi c} \quad (33)$$

It depends on da/dt , the rate of change of acceleration, not acceleration. It could not work during constant acceleration because that would imply that $F = 0$; but force is required to produce the constant acceleration and the associated radiation. This would be a violation of the law of conservation of energy. Sommerfeld of course knew the limitations of this solution; but neither he nor anyone else has been able to give a general solution. When it is done it will undoubtedly require a modification of Newton's second law, because Newton did not consider any radiation effects.

It is hoped that this unsolved problem will emphasize the need to reinvestigate some of the foundations of physics.

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pointed out the need of qualifying a statement about Newton's third law. See the footnote along with Section 1.

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NATURAL SELECTION AND THE CHRISTIAN VIEW OF REDEMPTION

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The theory of natural selection is irreconcilable with the Christian view of redemption. According to the theory of evolution, mankind and other species have common ancestors. Natural selection occurred through a process of the survival of the fittest, according to which species that were not sufficiently adapted to the environments in which they lived were unable to survive. The theory of natural selection is dependent upon the assumption that there was death in the world before the appearance of man and that death played a part in the development of modern man, since man is a product of the process of the survival of the fittest. Such a theory cannot be reconciled with the Christian view of redemption, according to which: (1) man's susceptibility to physical death was a result of the curse placed upon him as a result of the fall and (2) mankind has been released from the effects of the curse, including physical death, through the resurrection of Christ from the dead. If, as the theory of natural selection would require, death existed before the appearance of man upon the earth and man inherited mortality from his forbears, then it would be inconsistent to maintain (1) that man's susceptibility to physical death was a result of the curse, (2) that there is any redemption from physical death through Christ, (3) that there will be a physical resurrection of the dead at the end of the age and (4) that there was a physical resurrection of Jesus Christ from the dead.

Natural Selection and the Christian View of Redemption

For more than 120 years, the western world has become increasingly enamoured with the idea of the evolution of species, which is alleged to provide us with a compelling model for an understanding of the origin of all of life, and, most importantly, of the origin of mankind with his unfathomable intricacy of mind and complexity of personality. It is interesting that

prior to the publication of Darwin's *Origin of Species* in 1859, the dominant scientific world view in the English-speaking world and in western Europe was derived, for the most part, from the Judaeo-Christian Scriptures, according to which all species were created separately and were made to reproduce, each according to its own kind. It is true that there were some who urged doctrines akin to evolution even before the *Origin* appeared but these were in disrepute.

According to the theory of natural selection, those species best adapted to their respective environments have survived, whereas others that have been less

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suited to the conditions of their surroundings have become extinct. This idea of the survival of the fittest has pervaded not only the field of biology, but many, if not most other major fields of study in the twentieth century. Anthropologists and sociologists, for example, take the facts of evolution for granted; it has become axiomatic that man and other species have common ancestors. The predecessors of humanity, although similar in some respects to man, were far more primitive, both sociologically and biologically; and if one goes far enough back in time, through millions of years, the ancestors of mankind cease to be human at all. The most intelligent specimens among man's ancestors—those that were best able to use primitive tools and invent ingenious means for survival—remained alive and continued to evolve, while other less suitably equipped specimens did not survive.

Thus, the theory of natural selection places the origin of death prior to the existence of man. On the other hand, the Christian view of redemption is that man's fall introduced sin and physical death into the world and that Jesus Christ redeemed us from these effects of the fall through his incarnation, crucifixion and resurrection. According to the Christian view, death resulted from the fall of man. If this is so, then how could man have evolved through a process of natural selection, since death is the mechanism through which the survival of the fittest must necessarily occur?

Several methods might be tried for reconciling the apparent conflict between the theory of natural selection and the Christian view of death and redemption. Perhaps death was possible for animals prior to the fall, but until mankind sinned, he was not yet susceptible to death. The Bible does not specifically state that the death of animals was a result of the fall. It merely states that death came by Adam. Yet, if the mechanism of natural selection is responsible for the gradual evolution of mankind, at what point during the process do we stop and say that man has finally arisen? Is it possible to pin down the rise of man to a specific point in time, since man's development has been so gradual, over periods of millions of years? It is not reasonable to pinpoint any particular generation in such a process and claim that it is the first family of men. The postulated development is too gradual; the changes over the course of aeons are too subtle.

In dealing with this problem, some Christian expositors have argued that God sovereignly chose a particular generation and decided, at precisely that point in time to put a spirit within a particular individual and call him man. Thus, there was a point of discontinuity during the evolutionary process at which time man arrived on the scene, quite distinct from his ancestral antecedents. Animals were subject to death before the fall of man, yet mankind's fall introduced death to the human race. This argument, however, seems forced. Why should man be descended from species that were susceptible to physical death, yet he himself was immune from it, at least until the fall? How is it any more remarkable that man should have been created by God apart from any process of natural selection, than that he should have been altered at some point in the evolutionary process, and then be

granted the immunity from death that he enjoyed until his fall?

Another approach to the problem interprets Biblical passages on death as symbolic. By Adam came death, but not physical death. Rather, biological death has always co-existed with life, but that which came about with the fall of man was spiritual death. This view is difficult to reconcile with the Scriptures. We see in I Corinthians 15:21-22, for example, that the introduction of death into the world through Adam is compared directly to the redemption we have through Christ's resurrection from the dead:

But now Christ has been raised from the dead, the first fruits of those who are asleep. For since by a man came death, by a man also came the resurrection of the dead. For as in Adam all die, so also in Christ shall all be made alive.

If we say that death in this context is not biological, but spiritual death, then we must also say that resurrection from the dead is not physical, but only spiritual. For here we see that the death that was brought about by Adam's fall is inextricably bound up with our resurrection in Christ. In fact, our redemption in Christ is treated in this passage as a rectification of the ill effects of the fall. What sense would it make for Paul to say that, just as man's death proceeds from Adam's transgression, so all shall be resurrected in Christ, if, in fact, the death were only spiritual, but the resurrection was to be physical?

If physical death was not introduced into the world through the fall, then not only does our redemption become nonphysical, but Christ's resurrection could not have been physical either. In the passage from I Corinthians under consideration, Paul draws a direct parallel between the results of Adam's disobedience and Christ's resurrection: "For since by a man came death, by a man also came the resurrection of the dead." The logical implication of this statement is that if the death that came by Adam is only spiritual, then the resurrection that came by Christ is also only spiritual. Paul provides a further parallel between Christ's resurrection and our own, since Christ, being raised from the dead, is considered the first fruits of those who are asleep. It would be nonsensical to refer to Christ as the first fruits of the resurrection if his resurrection was physical and ours is to be merely spiritual. The passage is meaningful only if Paul is alluding to physical death as a consequence of the fall. For if one holds that it was not physical, but only spiritual death that resulted from the fall, the only possibility for consistent interpretation of this passage would be that neither Christ's resurrection, nor our own redemption from death is physical. Yet the resurrection of Jesus Christ is the cornerstone of the Christian faith. Paul writes that, "If Christ has not been raised, then your faith is in vain."

The astute reader will recognize at this point that if the above argument is correct, then the theory of evolution is irreconcilable with the Christian view of redemption. According to the Christian view, man's fall introduced sin and physical death into the world and Jesus Christ redeemed us from these effects of the fall through his incarnation, crucifixion and physical resurrection.

Natural selection, on the other hand, could not possibly have taken place apart from the mechanism of physical death inherent in the process of the survival of the fittest. If men evolved as a result of this process, then physical death could not have resulted from man's fall. Rather, man's tendency to die would have been inherited from his immediate forbears. Yet, if physical death is not a result of the fall, then our redemption in Christ is not physical either, or such Biblical passages as I Corinthians 15:21-22 would be completely nonsensical.

In keeping with the parallels provided in the Scrip-

tures between Christ's resurrection and our own, it seems inescapable that, if our redemption is not physical, then neither can Christ's resurrection have been physical. Yet this is in direct contrast to the latter portion of the gospel according to John, in which Didymus the disciple is invited to touch the risen Christ and inspect the marks of the wounds inflicted by his crucifixion.

In view of these considerations, it seems inescapable that it is logically inconsistent to hold both that Christ has been raised in the physical sense, and that man has evolved during a process of natural selection.

LIEBERMAN REVISITED

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"If we accept the theory of evolution, we must face the problem of the evolution of human language."¹ Many philosophers² and researchers³⁻⁵ have approached this problem but no one answer has been universally accepted. Philip Lieberman's conclusions were presented in Palermo's⁶ book as probably correct—conclusions of which I am skeptical. Using scientific evidence, I have attempted to highlight his major errors, thereby showing that his suggestion of a missing link in the evolution of language is unfounded.

1. Lieberman's Argument

Philip Lieberman⁷ believes that evolution proceeds in small steps, and the only reason that human language appears to be so disjoint from animal communication is that the hominids who possessed "intermediate" language are all dead (i.e., Neanderthals). He says that human linguistic ability must be viewed as the result of a long evolutionary process that involved changes in anatomical structures through a process of mutation and natural selection which enhanced speech communication.⁸

Lieberman and his colleagues conducted a comparative study of twelve human newborn skulls and heads; two modern apes (*Pongidae*), who do not have speech; fifty modern adult skulls, who do have speech; and Neanderthal man, using La Chapelle-aux-Saints as the representative, to assess the language capabilities of the Neanderthal man. Although he and others^{9,10} agree that Neanderthal man probably had some form of language, Lieberman suggests that "Neanderthal man did not have the anatomical prerequisites for producing the full range of human speech."⁸ His conclusions are primarily based on skull and jaw structure similarities of Neanderthal man and the human newborn, and consequently, the differences of these two as compared with modern man. These include (as summarized in Le May¹⁰),

- 1) the body of the Neanderthal mandible is longer than the ascending ramus, whereas they are nearly equal in the adult man.
- 2) the ascending ramus of man inclines from a vertical plane and the angle formed by the body and the ramus is more open.

- 3) the mandibular coronoid process is broader; the mandible notch is more shallow in Neanderthal.
- 4) the styloid process is more inclined from the vertical plane, and the hyoid bone and the larynx are higher in position.
- 5) the dental arch is "U"-shaped (as opposed to "V"-shaped in modern man).
- 6) the length of the hard palate is less than the distance between the hard palate and the anterior margin of the foramen magnum.
- 7) the portion of the occipital bone between the foramen magnum and the sphenoid bone is nearer horizontal, while in modern man it is more vertical.

Furthermore, he concludes that Neanderthal man had no chin, which he designates as a pongid characteristic. The head was smaller than modern man, resulting in small frontal lobes and inadequate cavity space for forming vowels (particularly /a/, /i/, /u/). Also, he suggests that Neanderthal man had a supralaryngeal vocal tract in which the larynx exited directly into the oral cavity. In the adult human, the larynx exits into the pharynx.³ The tract consisted of only one tube, so Neanderthal could not encode, as modern man does with two tubes. (Speech is possible without encoding, but it is about ten times slower than normal speech.)

To reconstruct the supralaryngeal tract, Lieberman first located the position of the hyoid bone and thus of the larynx, which is beneath it; secondly, he reconstructed the tongue and the pharynx, relative to the larynx; next, he built the laryngeal, oral and pharyngeal cavities; and finally, he cast the supralaryngeal air passages, or vocal tract (as summarized in Falk⁴).

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