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Evolution and the Darwinian Theory of Human Descent

VIEWED FROM THE STANDPOINT OF A MULTIPLE PRIMATE
ANCESTRY

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PHILADELPHIA

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EVOLUTION AND THE DARWINIAN THEORY OF HUMAN DESCENT

VIEWED FROM THE STANDPOINT OF A
MULTIPLE PRIMATE ANCESTRY *

CHARLES K. MILLS, M.D., LL.D.

PHILADELPHIA

The Philadelphia Neurological Society was organized late in 1884. In the early years of the society, especially in the lustrum from 1885 to 1890, much attention was given in its proceedings to the morphology, anatomy and physiology of the brain. The reason for this is to be sought in a knowledge of the character and scientific tendencies of some of the early members, among whom I may refer to, Andrew J. Parker, Francis X. Dercum, Harrison Allen, James Hendrie Lloyd, William Osler and perhaps myself.

Parker and Dercum at times pursued investigations in the laboratory of that great biologist, Joseph Leidy. In Leidy's laboratory, with Parker, I joined in some researches on the circulation of the brain and on the surface morphology of Chinese, negro and aberrant Caucasian brains.

Leidy was an early disciple of Darwin, with whom he not infrequently corresponded. Influenced by the example of Leidy and our own personal inclinations toward new scientific truths, it happened, therefore, that some of us soon became ardent Darwinians. Some of the work contributed at the meetings of our Neurological Society, in addition to that from Leidy's laboratory, was done at the Academy of Natural Sciences and some at the Philadelphia Hospital.

Osler came to Philadelphia to become professor of clinical medicine in the University of Pennsylvania in 1884, and soon became a member and a constant attendant at the meetings of our society. My attention was first attracted to his work by a paper on "The Brains of Criminals."¹ Like Osler, I had studied the papers of Benedickt of Vienna on this subject, and while not fully subscribing to the views of Benedickt, I had found many confirmations of his ideas in the numerous brains of the low types which I examined.

* Read at a Meeting of the Philadelphia Neurological Society, Nov. 18, 1928. A number of other papers in the symposium on Evolution, read at the same meeting, appear in the Society Proceedings in this issue.

1. Osler, William: The Brains of Criminals, *Canad. M. & Surg. J.* February, 1872.

Probably no one has done so much for American archeology as Dr. Daniel Garrison Brinton, of Philadelphia. Not a little of his work was contributed to the proceedings of the Academy of Natural Sciences of Philadelphia.

In 1895, a Section of Anthropology was started at the Academy of Natural Sciences with Dr. Harrison Allen as director. On this section Dr. Dercum and I were in frequent attendance. This section continued to function during 1895, 1896 and 1897 and was discontinued in 1898. I recall that at one of the meetings Brinton exhibited and described a number of skulls from South America, chiefly from Peru.

Brinton, in his work on "The American Race"² and in his contributions on American archeology, takes the ground which supports the main contention of this paper, that of a separate primate ancestry for the Red Indian. He holds that the American Indian is a particular and separate race, which was on the American continent before the glacial period many thousand years ago. He opposes the view that the American Indian comes from Asia, a view that sprang from the idea that the human race had its origin in Asia from a single family tree.

Brinton contends that at an early period there was a land communication between the northernmost portion of North America and the northern islands of the Atlantic—Greenland, Iceland, Shetland, Ireland, Wales and England. He gives many facts, linguistic and paleontologic, which point to the idea that the race which inhabited the northernmost part of North America was the same as that of which the remains are found in England, Shetland, Ireland, Scotland and Wales.

Some differences of opinion exist as to whether the Eskimos or Innuits belong to the American Indian race or whether they are of Mongolian origin. Peary in his work on "The North Pole"³ holds to the latter view. He says there is a theory first advanced by Sir Clements Markham that the Eskimos are the remnants of the ancient Siberian tribe driven out by the fierce Tartar waves in the Middle Ages. Peary believes that some of the Eskimos are of a distinctly Mongolian type; they display many Oriental characteristics, and there is a strong resemblance between the stone houses and the ruins of the houses found in Siberia. As a general rule, the Eskimos are short in stature, as are the Chinese and Japanese. The women are short and plump and have rather slender legs.

That portion of land between North America and northwestern Europe, which allowed the American Red Indian race and the northwestern European people to communicate and merge, probably was south of the Eskimo's arctic zone; in other words, it may have included

2. Brinton, Daniel G.: *The American Race*, New York, N. Hodges, 1891.

3. Peary, Robert E.: *The North Pole*, ed. 2, New York, F. A. Stokes Company, 1910.

Labrador, Newfoundland, Nova Scotia and part of the American continent even farther south.

The view that the Eskimo and American Indian races are distinct does not antagonize but favors the theory of which this paper is the proponent, that of a multiple primate ancestry for races of different color.

A new stimulus was given to the view long held by me of the primate ancestry of the human race by the reading of the address of Sir Arthur Keith,⁴ President of the British Association for the Advancement of Sciences, at its annual meeting at Leeds. At this meeting, late in August, 1927, Sir Arthur presented undeniable data which enforced the Darwinian hypothesis.

The address was given a historical setting by his reference to a meeting of the Association also held at Leeds sixty-nine years earlier, that is in 1858. At this meeting Sir Richard Owen attacked the views which Darwin had expressed in various publications. At the time of the meeting at Leeds in 1858, Darwin was engaged on chapters of his book on "The Origin of Species"⁵ which appeared fifteen months later (1859). Huxley took up the cudgel for Darwin and wielded it with such effect that, later in 1860, at a memorable meeting at Oxford, he left Owen and the Bishop of Oxford without a leg on which to stand.

Preceding Sir Arthur Keith by four years, a German investigator, Dr. Klaatsch,⁶ published the first work of which I have any knowledge on the multiple primate ancestry of man. Exceptions have been taken to some of the views advanced by him, but his conclusions have much in common with those of Keith. Dr. Klaatsch believes that the negro and the Neanderthal man are descended from the same stock that gave rise to the gorilla and the chimpanzee. He also believes that the Mongolians and the northern Europeans have descended from the same stock as the orang-utan.

Recently, another addition has been made to this discussion of the origin of man by Dr. Hrdlicka,⁷ an American anthropologist at the Royal Anthropological Society at London. He believes that the existing evidences point to the Neanderthal man as the direct ancestor of ourselves.

Next to "The Origin of Species" one of the most important of Darwin's comparatively early works was "The Variations of Animals

4. Keith, Sir Arthur: Presidential Address Before the British Association for the Advancement of Sciences, August 21, 1927; Cited in the Sunday New York Times, Sept. 4, 1927.

5. Darwin, Charles: Origin of Species, ed. 4, London, John Murray, 1866.

6. Klaatsch, H.: Evolution and the Progress of Mankind, London, K. McKade, 1923.

7. Hrdlicka, A.: Paper Given Before the Royal Anthropological Society, London, Nov. 8, 1927; Cited in the Philadelphia Public Ledger, Nov. 9, 1927.

and *Plants Under Domestication*,"⁸ published in January, 1868. In the preparation of this book Darwin not only spent unusual time and labor in observation and correlation of facts observed by others but also made use of his remarkable powers of generalization in the effort to explain the phenomena of heredity. In doing this he advanced the doctrine or hypothesis of pangenesis which, in a general way, expressed the idea that every cell in plant or animal gave forth gemmules or atoms which exerted a reproducing influence on every cell of succeeding organism, plant or animal. It is worthy of remark that under the modern theory, that atoms are composed of millions of electrons, Darwin's doctrine of pangenesis is more readily comprehensible. The story of pangenesis is only another proof of Darwin's remarkable powers of reasoning on observed facts.

Darwin's "*The Descent of Man*"⁹ was published in 1871, and was followed in 1872 by "*The Expression of the Emotions in Man and Animals*."¹⁰ Materials collected in these volumes are too well known to need recounting. Darwin died in 1882, and it was not until ten years after his death that Dubois found in the strata laid down by a stream in Java during the later part of the pliocene period the fossil remains of primitive humanity, to which he gave the name of *pithecanthropus* or ape-man.

As I have already indicated, one of the stumbling blocks to the full acceptance of the Darwinian theory that man belongs to the primates or anthropoid apes is the outworn idea that man is derived from a single ancestral stock. It is clear that he has come from more stock than one, and that these have resulted in the diverse races of different colors—brown, yellow, black and red. Man's descent, in other words, has not been a single file affair.

Special consideration should be given to the question of the origin of the white or Caucasian race. The first types of prehistoric man were probably of a dark color. Primitive man, like his more immediate primate ancestry, was nomadic. He wandered hither and thither in search of food and to escape from and to attack his enemies, animal or human. He fled perhaps to the hills and toward the high regions of the Caucasus, Urals and Himalayas and to the frozen plains of the north.

The changes of color from dark to light, in the thousands or millions of years of prehistoric development of man, was climatic. It was the result of the change in latitude and elevation from the plains. The white

8. Darwin, Charles: *Variations of Animals and Plants Under Domestication*, London, John Murray, 1868.

9. Darwin, Charles: *The Descent of Man*, ed. 1, New York, D. Appleton & Company, 1871.

10. Darwin, Charles: *The Expression of Emotion in Man and Animals*, ed. 1, New York, D. Appleton & Company, 1873.

or Caucasian race, therefore, may have been an offshoot or an outgrowth of the races of darker color. It was a nordic or mountain race, a race of the cold plateaux and highlands. It is in accordance with this idea that one finds evidences of progressive evolution through the brains of dark colored races, like Chinese and negro, to that of the white or Caucasian race.

The conditions, such as I have described, found in criminals and other brains of low type do not contradict this view. These fissural and gyral aberrations are simply atavistic, both as regards low racial types and animal ancestry. This view of the white or Caucasian race, therefore, upholds the general Darwinian idea of human descent.

The curious fact that blond people are found at various points on both the North and South American continents seems to me to be in accordance with the idea that the light color is of climatic origin, the result of both cold and elevation. Among the Cordilleras of south California and Mexico, blonds occasionally appear amid the generally dark peons who form the bulk of the people.

A year or two ago, a South American explorer brought from the high regions of Brazil a blond family of four or five members of which an interesting account was given in the newspapers and magazines. A blond or light colored native race is found today on the pampas of Argentine. The Andean heights, which separate Argentine from Chile, reach tremendous elevations of 18,000 feet or more. Presumably the blond natives of the pampas were original inhabitants of some of the higher elevated Andean plateaux.

As ages progressed, the white race became not only a nordic and mountain people but a conquering and controlling race—in its subdivisions represented by the Goths and Visigoths, by the Vikings and Vandals, and by the followers of Alleric and Genghis Khan. As civilization has spread and advanced, all races and colors have commingled for the benefit of all.

Different races have appeared at different times and places more or less separated. The illustrations of this fact are slowly being accumulated. We have Dawson's account of the remains, found in 1912, at Piltdown not more than thirty miles from the home of Darwin, and the remains of types of anthropoids with manlike pointings found in India, Thibet, various parts of Europe and in America. All of these seem to indicate that the transition from apes, like the gibbon, the chimpanzee, the orang, and the gorilla to primitive man, began during the miocene period, at least 600,000 or perhaps 1,000,000 years ago.

Numerous well established facts confirm the relationship of man with the anthropoids. Examination of the blood of anthropoids and of man has shown the same constituents. Bacteriologists have demonstrated that the anthropoid apes are subject to the same infections as man.

Anthropoids and man are so alike in their structural organizations that experimental physiologists transfer the results of their investigations of the brain of one to the other. The same embryologic conditions and actions occur in the womb of the anthropoids and of the human being. To use the words of Sir Arthur Keith, "We find the same vestigial structures—the same 'evolutionary post-marks' in the bodies of man and anthropoid. The anthropoid mother fondles, nurses and suckles her young in the human manner."

Darwin, who was not a professional anatomist, accepted the opinion of Huxley that "The human brain was but a richly annotated edition of the simpler and older anthropoid book, and that this edition, in turn, was but the expanded issue of the still older primate publications."

Since the time of Darwin and Huxley, thousands of anatomists and physiologists have studied and compared the brain of anthropoids with that of man. Like Elliot Smith, they have come to the conclusion that no structure that exists in one is absent in the other. The differences between the brain of anthropoids and that of man are quantitative rather than qualitative. They are differences of degree rather than of kind.

The brains of all mammals, including of course, the anthropoids as pointed out by Sir E. Ray Lankester, have increased in size and therefore probably in capacity. The human brain, more than that of any other mammal, has gained in size and endowment.

In order to show that my views on Darwinism and evolution are not the result purely of reading but are based on actual observation and investigation, I shall refer to some of my early personal published work bearing on this question. After my appointment as neurologist to the Philadelphia Hospital, in 1877, I soon had unusual opportunities to study human brains, and the macroscopic examination of the brain became almost a passion with me. Not only was I well informed as to the actual correlatives of the ventricles and horns, but there was scarcely a fissure or gyre, large or small, with which I was not familiar. I noted closely the morphologic and anatomic differences in the configuration of different brains, and these I found to be great in the brains of criminals, defectives, idiots and paranoiac persons.

My presidential address¹¹ at the annual meeting of the American Neurological Association, in 1886, was largely given up to a discussion and description of arrested and aberrant fissures and gyres in the brains of criminals, idiots, negroes and insane persons.

Passing by the question of disease in the numerous specimens of brain studied by me, I wish to emphasize now, as at the time of the first

11. Mills, Charles K.: Arrested and Aberrant Development of Fissures and Gyres in the Brains of Paranoiacs, Criminals, Idiots, and Negroes: Preliminary Study of a Chinese Brain with Andrew J. Parker, *J. Nerv. & Ment. Dis.*, 1886, vol. 13.

appearance of my papers on this subject, only the morphologic and anatomic differences and similarities among these human brains and the brains of primates. Expressed briefly, the human brains all had simian appearances and characteristics and the simian brains all had striking similarities with the low type human brains. I made a careful comparison of the human with the anthropoid brains pictured in Gratiolet's atlas of primate brains.

In the anthropoid brains, the fissures were sometimes longer and deeper than in the human brain. The human brains, on the other hand, were sometimes bridged by the *plis de passage* described by Gratiolet in anthropoid brains. The convolutions in the simian brains were less voluminous and simpler in type than those in the human brain, although in some instances the two approached each other closely.

My studies in racial types, Asiatic, African and European, uphold the view that the origin of the human race is not from a single ancestral line, but, like that of the anthropoids themselves, is from distinct and separated strains. As Sir Arthur Keith puts it, the development of the human race from the anthropoids pursued a zig-zag and irregular course instead of being in a straight line from one ancestral stem.

Why all the anthropoids failed to reach the human status but remained in their original state or became more degenerate is not within the scope of these remarks.

I might bring numerous other facts based on my own personal investigations to uphold the Darwinian idea of the descent of man as taught by Sir Arthur Keith. By the effects of electrization (faradization) of different regions of the brain during operations, I have shown more than once how the cerebral motor area is separated from the areas concerned with various forms of sensation in man as well as in the anthropoids.¹²

When Professor Sherrington was in this country, in 1904, delivering a course of lectures at Yale University, he came to Philadelphia on my invitation and gave an illustrated lecture in the medical laboratories of the University of Pennsylvania in which he showed the results arrived at by Grünbaum and himself through faradization of different cortical areas of the brain of a gorilla. These experiments demonstrated among other things that the motor area in the brain of the gorilla was almost entirely cephalad of the central fissure, and that this area was much subdivided into special centers. Some years before this time (in 1888), as a result of personal observations made by necropsies or during operations, I had arrived at the same conclusion with regard to the human

12. Mills, Charles K.: The Motor Area of the Human Cerebrum, Its Position and Subdivisions, with Some Discussion of the Surgery of the Motor Region (with Dr. C. H. Frazier), Univ. Penn. M. Bull., July and August, 1905.

brain, namely, that the motor region was in front and the sensory areas behind the central fissure.¹³

Sir Arthur Keith indicates that one must look into the details of the selection which goes on in the development of the human brain to comprehend the subject of its evolution. In every respect this study points to the correctness of the Darwinian opinion. Going further, he furnishes additional evidence favoring the idea of evolution.

Sir Arthur directs attention to the influence of the sex glands on the growth and development of the human brain. He refers to Starling's great law of hormones, which are missives sent from one of the glands of internal secretion to bring about a harmony of action with other glands for the benefit of the entire body, but I leave this part of the discussion to Dr. Dercum. Darwin, Sir Arthur declares, would have welcomed this discovery, as it would have given him "a rational explanation for so many of his unsolved puzzles including that of 'correlated variations.'"

One thing that has proved somewhat disturbing to the evolutionist who believes that man has descended from a primate ancestry is the fact that primates of intermediate types, such as the baboon and gibbon, or the higher anthropoids, such as the orang-utan, chimpanzee and gorilla as they are now found in the wilds of Africa, the Malayan Islands or elsewhere, show little if any evidence of man's kinship to them.

Tilney, in the announcement of his great biologic work "The Brain from Ape to Man,"¹⁴ truthfully says that: "To consider any of the living apes the possible ancestor of man is an inconsequential, trifling and incomplete view of the situation which requires a much more extensive understanding of the biological process for the complete appreciation of its significance. It does not seem sufficient to linger among the modern apes in search of our ancestors. These animals belong to families totally divergent from man. . . ."

A larger consideration must be given to the subject in order properly to understand the steps by which man emerged from a primate ancestry. The retrospect must take in at least a million years of evolution, and at the same time must not disregard Hughlings Jackson's theory of dissolution which can be applied not only to man, but to animals lower than man in the scale of development. After prehistoric man had appeared on the scene in widely distributed parts of the earth and after man was well on his way in the process of higher evolution, it is probable that the

13. Mills, Charles K.: *Cerebral Localization in Its Practical Relations*, Tr. Congress Am. Phys. & Surg., Washington, D. C., vol. 1, 1888 and *Brain*, July, 1889, vol. 12.

14. Tilney, Frederick: *The Brain from Ape to Man*, New York, Paul B. Hoeber, 1928.

primates most nearly approaching man in stature and other physical conditions passed into a period of primate dark ages.

The gorilla, for instance, is found today in largest numbers near the western coast of the mid-African region and in the Kivu plateau region of the interior. Here he roams unmolested over a region a hundred or more miles in extent, at odds with the dwarf-men who are his most immediate neighbors. As far as can be determined, his age of darkness is increasing rather than diminishing. After all, however, supposing the truths to be as just surmised, the facts are not a valid objection to man having reached his human estate by way of the higher primates.

The history of man's progress has afforded well known illustrations of his tendency to relapse into comparative barbarism for a time, this to be succeeded by a renaissance and further advances toward a more perfect state. I believe with Tilney, as regards the human brain, that man is only in a certain stage in the upward process of development.

It may perhaps be futile or foolish to theorize on the method by which the transition from the primate to prehistoric man took place, and yet such speculation has its attractions and may not be without value in the consideration of the question of the descent of man. The first steps taken in primate development of man from the lower animals were probably shown in the use of language and of the limbs. With respect to the latter, it may be said that the anthropoid or intermediate primate began to use the terrain, and found he could do this best by employing his hind limbs for station and progression and his fore limbs for prehension and combat. It must be remembered that only a portion of the intermediate and higher primates separated themselves from the general stock and came to play a higher rôle.

With regard to the linguistic phase of evolution, the first step in the prehistoric development was the use of language, largely emotional or instinctive, just as in the human being of today emotional and instinctive speech is the first to come as it is the last to go. The primate parents made use of certain sounds to call to their children, and the latter sought out their parents by the use of similar sounds. Feeling of fear and hate, on the one hand, and of satisfaction or joy, on the other, resulted in an ejaculatory or interjectional speech. Such emotional language became more or less fixed for the same animal group, and thus language was started.

Later in the history of the advancing primate, reason began to play its linguistic part. The animal recalled the sounds made by its foes or by destructive agencies like the wind and flood, and in imitation and in response made use of sounds which became additions to the language.

Words at first merely represented the concrete: rock, trees, birds of the air, beasts of the field, sun, moon and stars. Later, other sounds became necessary to express actions of the things seen and heard; thus,

step by step, a simple form of language developed, and this language, simple and imperfect as it was, marked an important step in human evolution.

As might be expected, written language at first was largely pictorial, as illustrated by the rough representations on the rocks which have been traced to the neolithic times.

Some believers in evolution seem to be worried by the idea that man's descent should be traced through anthropoids and the intermediate primates. Apparently, according to some, man himself was an order set apart, although there is not a particle of evidence in favor of this supposition. The truth would seem to be that man, after he started on his prehistoric journey, more or less rapidly fell away from his primate progenitors and has continued to do this through the ages down to the present.

Some one has said that speech, the ability to talk, is what separates man from the lower animals. As matters stand in the world today this may be true, but in the early stages of human evolution developing speech formed one of the links that joined man with his primate forebears. In his methods of worship, in his control of the family, in following the chase or war, names became useful or necessary to prehistoric man. These names, as I have already said, first sprang from emotions like affection, fear and joy. Undoubtedly these also originated from the necessity to indicate parts of himself and also the world which surrounded him.

Brinton, well qualified for the actual task, made a careful study of the dialects of the many tribes or nations of Mexico, Central and South America. Important studies of the dialects of tribes of North America have been made by other well known American archeologists. Much in these dialects served to link the American race together and served also to separate it from the races with other primate ancestry. These studies embraced not only the vocabularies of these tribes, but the methods of inflecting and vocalizing them; in other words, what might be termed their primitive grammar and methods of pronunciation.

Of course, since the coming to the American continent of the Spanish, Portuguese, English, French, Dutch and other European people, the original Indian dialects may have undergone changes due to European admixture; but since these linguistic studies of Brinton and others were begun, there have been regions in North and South America where the native dialects continued to be spoken in an unadulterated form.

As I have said, one of the first steps taken in the development of man from the higher primates was in the use of language. An experiment made some years ago in the psychologic department of the University of Pennsylvania is interesting in this connection. Professor Lightner Whitmer, Professor Fernberger and other members of the

psychologic staff tried what they could do in teaching a chimpanzee to speak as well as to perform other purposive acts. After numerous attempts, the chimpanzee learned to say with lip movements a simple word such as "mama."

In the course of time, Professor Fernberger told me that they were able to recognize five distinct vowel sounds used by the chimpanzee in response to certain emotional stimuli. These were cries of modulated sounds which were used to express terror, fear, sex instinct, feelings of pleasure on the one hand, and of annoyance on the other. It would be childish to believe that in a few short weeks or months language could be acquired by an anthropoid, but the fact that in this chimpanzee a form of responsive speech could be brought out by training seems to make it not improbable that some members of the present anthropoid stock might have acquired the same form of language.

Recently, in a current periodical, I saw Professor Osborne cited as one who was doubtful of man's close relationship to the anthropoid apes. Professor Osborne, if I have read his contributions to scientific literature correctly, has really done much to link man with anthropoid ancestry, to show that the anthropoid is at least his second cousin. Like him, we all feel that much remains to be done in order to complete the chain by which we have arrived at the Darwinian idea of man's descent. I see no reason why we should not face honestly the question of man's origin, through a process of evolution. To my mind, to think of man as the final outcome of evolutionary development is a higher and nobler concept than to believe in a fiat or out-of-hand creation.

The question of evolution and religion is one that apparently cannot be downed. Whatever its origin, there seems to be a widespread opinion in the community that men of science who believe in evolution are irreligious. The foundation of such beliefs are several-fold. In the first place, they are largely the results of ignorance on the part of those who hold them and who are not trained to comprehend the facts of science and hence must form their opinions through the teaching of others. Too often the only instruction they receive bearing on the points in question is of the clerical sort. The word evolution, for some strange reason, seems to arouse in many churchmen the same effect as the waving of the red flag before a bull.

In the second place, the opinion that scientific men, and especially evolutionists, are irreligious is dependent on a false idea of what religion really is. Every one is incurably religious and this is due, in large part at least, to the fact that human nature is two-fold. Men and women the world over are both emotional and intellectual, and emotion or instinct plays a larger part than the intellect in most lives. To use a common form of simile, man is a creature of the heart as well as of the head.

Religion with scientific men is not a matter of creed or ceremony. They believe that creeds are man-made, and in not a few instances are based on pagan superstition.

Heresy is not irreligion. Creeds are not Christianity; they have led to most of the horrors for which Christianity has been held responsible.

So great is the untoward influence of creeds on real Christianity or real religion of any sort that great thinkers like Franklin have advocated the adoption of some sort of creed to which men of all sects and opinions could agree.

With regard to the subject of evolution, it is a healthful sign of the times when an American bishop and American professors and students in theological seminaries and when an English bishop and dean are inclined to support the Darwinian theory of evolution. Kings and archbishops, religious synods and assemblies may fulminate against those who teach evolution, but the truth has found its way through the crust of conservatism.

In conclusion, I believe with Cicero and Seneca that age has its advantages and compensations as well as its trials and vexations. One of these advantages lies in the fact that the man in advanced years can look back and balance mentally the results of his experience. This is especially true when one's long life has been spent in the period of the world's history in which science, art and literature have made their greatest advances. When I look back through the more than forty years of the history of the Philadelphia Neurological Society, the survey of what has happened in this time fills my heart with thankfulness. The doctrine of evolution sixty years ago, largely decried and frowned on by society and the church, is today accepted openly by a constantly increasing number.

Finally, why all this ado about chance, design and first cause, about Paley and Huxley and all the rest? God lives with us, forever revealed in the laws of His universe. Man sprang not into being full panoplied like Minerva from the brain of Jove, but came to this earth as the sum and summit of ages of evolution as taught by Charles Darwin, the greatest of modern sages and scientists.



