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“What Evolution Means to Me”

CHARLES E. PACKARD

Randolph-Macon College, Ashland, Virginia

“. . . Darwin's theory has been outlawed by my religion . . . in high school, my teachers refused to explain or even to discuss the theory on the grounds that (it) was detrimental to my religion. Naturally my curiosity was aroused. I made a visit to the public library, and was soon immersed in the teachings of Darwin. . . . without a proper background I was unable to understand clearly the reasoning which Darwin employed. Nevertheless, his hypothesis seemed sound even to my untrained mind. I became an embryonic believer of his theory.”

So wrote a GI in May toward the end of his course in General Biology, following some class discussion of organic evolution, nearly twenty-five years after the famous Scopes trial in Tennessee. There had been brisk interchanges of opinion, showing a variety of ideas and no little confusion of mind. To encourage complete participation as well as to bring forth matters causing concern an exercise on the above topic was assigned. Any other pertinent title dealing with “doubts, questions, and problems concerning organic evolution” was per-

mitted. All thirty-six members wrote to the point, ranging from about one to three and a half pages and approaching the matter from greatly varied standpoints.

A second veteran wrote similarly to the preceding. His fundamental reason for coming to college was to learn to think critically (“or scientifically, if you choose”); to observe facts, analyze them and arrange them systematically into a logical solution. He had used this procedure in all his studies, including biology. This led to belief in organic evolution. We had traced the phyletic trends and relations of both plants and animals but had not done other than to indicate progressive development. He continued, “Belief in the literal inspiration of the Bible, in the strict truth of every word in the particular translation followed is inconsistent with biological findings and equally so with discoveries in almost every other field of science as well as with true religion.”

There had been no conscious instructional intent nor studied effort to form such thinking as these two men expressed. Care has always been taken to

present the facts and let the student draw his own conclusions independently. Both men were of the same great religious connection. Catholics, Protestants, and Hebrews were all represented in class in an approximate division of 11-20-5. An example of diametric opposition within a denomination was shown by two girls from families of the same Protestant faith. One wrote that organic evolution was more logical than the Adam and Eve story and that man's progress had been clearly shown from early times to date. The other stated that her father became very annoyed when questions were raised concerning origins for with him "God created man and the scientists be (condemned)." She had learned that there were no "ifs, ands and buts" about it. With her, then, if God was disregarded as Creator what happened to religion? Yet she accepted biological explanation. No student rejected organic evolution.

Under the headline "Town Marks Date of 'Monkey' Trial" the local current Sunday newspaper reviewed most interestingly the colorful battle which raged over organic evolution in 1925. John Scopes, now a respected gas company geologist, was quoted: "The primary issue at stake was, could legislation decide what was to be taught in the schools? But it turned out to be a clash of two different lines of thought."

Likewise, with the student papers, two general views prevailed. Six saw definitely no need for conflict between science and religion, nine felt there was one. The biological interpretation was accepted in every case but not without some adjustments for a number of individuals. A girl typified the upholders of evolution thus: "Evolution to me means the most glorious tribute to God and his power that man can hope to realize and pay." A man, taught that human beings were created by God

through a miracle, felt that the Bible gave us aims for improving life and morals. Organic evolution by seeming to lower "Man's standards to that of a common animal" made incorrect attitude possible. One could try to believe each in part or throw out either for full reliance on the other. A second male, doubting that a middle road could be taken, was clearly troubled as to whether a person brought up on the Adam and Eve story could "change in the middle of the stream."

Thirteen commented on the evidences in greater or less detail. Others outlined causes and methods. Seven mentioned general evolution, referring to the earth and spatial worlds. The biggest problem proved to be the original appearance on the earth of life forms. "How, where, and when did it all start?" was a common theme. Several witnessed to consciousness of phyletic progression through structure, function, and embryology. Six speculated on further advance, especially as related to man.

One who had changed his religious affiliation from a great system to another more orthodox stressed the curiosity of the mind mulling over natural phenomena. Science concerns itself with the known, faith with the unknown. Astronomy, chemistry, geology, physics rest on natural explanation, why should not biology? "Evolution is the most outstanding concept of natural science", he said. Contrasting the volume of evidence favoring organic evolution with the lack of it for special creation he declared he was not an atheist but assuredly believed in God. Calling evolution "positivism" he concluded that without faith and inspiration the world may well go asunder. Man is responsible only to God.

Opinions from the women were less voluminous but well stated. One asked

pertinently why it would not be better to emphasize "ascent with change" rather than "descent". A second called attention to the inseparability of the origin and the evolution of life, citing the revelations of progressive differences in man's embryology. A third asked "What really constitutes species?, a fourth "Where is the missing link between Cro-Magnon and present-day man?" A fifth cited Shaw's "vitality with a direction Theory", while a sixth dwelt upon the adaptive process and environmental influence.

Some striking sentences taken from the analyses are:

One of the greatest books ever to be written was "The Origin of Species."

Bible truths are fundamental.

Ignorance determines the horrified attitude toward evolution.

The theories of Darwin have actually strengthened my religious beliefs.

We shall never clearly understand the workings of the all-powerful mind which directs life. . . .

Homology, so common in life, is explained logically only by organic evolution.

As a result of further study I now realize the importance of the human and just how high in the scale of life the human body occurs.

Most evidence for organic evolution is indirect.

Organic evolution has had a very wide influence on thought.

Biological evolution is defined as animal and plant descent through the interaction of natural forces.

The most important meaning for me is that today I am living!

The above mentioned newspaper account closed with a reminder that the presiding judge was still alive "puttering in his library". Interviewed, he said, "I don't think our children should be taught any theory that would tend to destroy their faith in the integrity of the Bible. That was in my heart then

and is there now." Speaking of the law which he was called upon to adjudicate he declared that it was a "wholesome law and should be enforced." Today, therefore, we still face the problem of the statutes attempting to erase truth. It is even now, in the minds of some, not a crime to make the Bible a textbook in science rather than a great storehouse of human experiences and guidance by precept and example.

Compare the judge's thinking with that of a third veteran of strong religious conviction, son of a minister. ". . . evolution does not disprove the existence of God, but rather—it provides substantial proof that there is a God. Five basic facts about evolution are undeniable; (1) the beginning of life in extremely simple form; (2) evolution into more and more complex forms; (3) the result of this age-long process, i.e., man with a human brain; (4) the birth in man of abstract thought; (5) the spontaneous growth of moral and spiritual ideas in various parts of the world."

After reading the thirty-six papers several times with profit and pleasure it is pardonable to be humbly proud that one had that class to instruct. Many a session was enjoyed with them, mature as they were in outlook. Surely young people cannot be wronged by the sympathetic teaching of facts. Careful interpretation and sober analysis with an eye to implications and adjustments should be invoked. To try to educate by legislation and according to what any board or body of people may conceive to be true constitutes a real crime. We should not be afraid of what youth will believe and will adopt as its program for self development when we stick to the truth as recognized by the highest authorities and to observation itself. It is more likely that damage will result later if it is discovered that truth has been concealed and error has been zealously but mistakenly substituted.

Here, a quarter of a century after law was given precedence over reason, we find intelligent students shaping their lives for useful endeavour and living in harmony with one of the most stimulating and forceful thoughts of all time. We find some of them bewildered because of past failure. But it is comforting to

know that the majority do not question what their common sense has revealed, and to know that they recognize God as creating man through natural means and as an integral part of the universe, not as a puppet creature of artificiality to be pulled by invisible strings totally unrelated to the rest of cosmic existence.

Heredity in High School Biology

RICHARD F. THAW

Corvallis High School, Corvallis, Oregon

Many high school biology courses include a unit on heredity as such, or the subject has been "integrated" into the year's work. Oftentimes it is included in the course at the end of the year with too little time left to give the pupil a sound introduction to heredity. It has been the writer's experience that heredity and genetics as a unit of study is one of the most interesting units in biology from the pupils' standpoint. In some high schools, heredity is a topic of general dislike by the pupils *because too little informative material is included in the study*. There is a prevailing idea among many educators that high school is not the place for a biology course to incorporate much science terminology. Whether or not this is justified is not the question here. It is perhaps the reason that many teachers do not go into the topic in some detail but deal with generalizations and the history of genetics and heredity as a subject-field in biology. Another reason is that the teacher has not had, in college, a major in biology and therefore is not familiar with the subject. It is not the writer's contention that one must include a detailed unit on heredity in high school biology. It is however, suggested that a course of study can be improved if heredity is placed on an equal footing with the other units in the biology course. In order

for pupils to understand heredity, background knowledge of the cell is essential. There are certain biological principles that the teacher should understand before he attempts to teach a class in heredity. It is the purpose here to list some of the principles of heredity, with the idea that the novice teacher will find such information helpful in his own preparation.

1. All life comes from preceding life and all cells come from pre-existing cells.
2. All multi-cellular organisms grow by means of cell division and the chromosome number is preserved at each cell division.
3. All cells of an individual multi-cellular organism, except the sex cells, are characterized by the same chromosome content and this number is constant.
4. Every cell in an organism contains two sets of chromosomes, one set of paternal origin contributed by the sperm and the other of maternal origin contributed by the egg.
5. Reduction division results in each sex cell, gamete, or spore, having half the chromosome content of the somatic cells.
6. In organisms developed by parthenogenesis, reduction division does not occur.
7. The segregation and distribution of genes during maturation and fertilization is a matter of chance. Chance alone seems to determine distribution of chromosomes.