

Appendix 1

On the Origin of Left-Handed Components in Proteins

IN REVIEWING THE main attempts to explain why amino acids in proteins are exclusively left-handed, in connection with the study in chapter 3, we will follow primarily summaries by A. I. Oparin.¹ John Keosian has also listed succinctly a good number of such efforts.² A recent book entitled *Asymmetric Organic Reactions*³ goes into great detail on one-handed molecules of other types, but has little on the subject of proteins. That book, when dealing with proteins, primarily refers the reader to studies by Oparin, Keosian, and others, and takes for granted that natural reasons for the left-handed phenomenon have been found, without giving any adequate basis whatever for such an assumption.

Here is a summary of efforts to account for this mystery:

1. *Photochemical Reactions.* Between 1904 and 1930, there were reports by German scientists on the use of circularly polarized light to bring about a photochemical reaction, in the attempt to obtain asymmetric results.⁴

Along this line, Werner Kuhn, in 1930, "using circularly polarized light of a wavelength chosen for its disruptive effect,

¹ A. I. Oparin, *Life, Its Nature, Origin and Development* (New York: Academic Press, 1961), p. 60. Also:

Oparin, *Genesis and Evolutionary Development of Life* (New York: Academic Press, 1968), pp. 80, 81.

² John Keosian, *The Origin of Life* (New York: Reinhold Publishing Co., 1964), p. 75.

³ James D. Morrison and Harry S. Mosher, *Asymmetric Organic Reactions* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1971).

⁴ *Ibid.*, p. 47.

preferentially broke up one of the members of a 50-50 molecular mixture of a certain ester."⁵ This was not an experiment with amino acids. Moreover, the outcome was not an all-one-handed result, but merely a very slight excess, namely 0.7 percent of one enantiomer.⁶

Such experiments have always been inconclusive. Oparin is therefore quite vague in reporting these cases, although he hints that they might have had some success. This can be unintentionally misleading, because their "success" was actually far from convincing.

Light can be circularly polarized by reflection, and such polarized light may be present in moonlight.⁷ Natural circular polarization of light "could at most be slight," and "the activities producible photochemically in the laboratory have always been extremely small."⁸ (Consider the less-than-one percent result mentioned!)

2. *Formation on Quartz Crystals.* In 1950, crystallographer J. Bernal advanced the hypothesis that these amino acids may have been formed "on the surface of asymmetric crystals of quartz."⁹ Two Russian scientists, Terent'ev and Klabunovskii, were mentioned by Oparin as attempting laboratory experiments of this type.¹⁰ Again, Dr. Oparin vaguely implies success, but leaves the matter in serious doubt by his lack of explicitness.¹¹

Quartz is composed of symmetrical molecules of silicon dioxide. It crystallizes, however, into dissymmetric crystals, "the two mirror image forms being formed with equal probability,"¹² in contrast to living things. Morrison and Mosher are skeptical how quartz could help in this dilemma.¹³ Its molecules are not one-handed. Only the crystals are dissymmetric. Bias produced is low.

3. *Selection of Alpha Spirals in Proteins.* George Wald, in 1957, "expressed doubt, however, that any of these abiogenic factors could create conditions for the emergence of stable

⁵ Philip Morrison, Book Reviews, *Scientific American*, Vol. 225, July, 1971, p. 120.

⁶ Morrison and Mosher, *Asymmetric Organic Reactions*, p. 47.

⁷ Keosian, *The Origin of Life*, p. 75.

⁸ *Encyclopaedia Britannica* (1967), s.v. "stereochemistry."

⁹ Oparin, *Life, Its Nature, Origin and Development*, p. 60.

¹⁰ *Ibid.*

¹¹ Dr. Oparin's vagueness here contrasts with his usual clarity and frankness.

¹² J. M. Barry and E. M. Barry, *An Introduction to the Structure of Biological Molecules* (Englewood Cliffs, N.J.: Prentice-Hall, 1969), p. 52.

¹³ Morrison and Mosher, *Asymmetric Organic Reactions*, p. 47.

asymmetry.”¹⁴ Instead, he theorized, the selection of L-amino acids was made from both types at the time of the selection of alpha spirals in proteins.

An “alpha spiral” is a helical form of protein chain. Pauling and his colleagues discovered in 1950 that this was one of the most common types of protein secondary structure. (Left-handed amino acids form a right-handed helix, when such a spiral is produced.)

If, by chance, a helical chain had gotten started, using L-isomers fortuitously, there is no adequate reason to suppose that *only* L-amino acids would link up at the end of such a forming chain. (Appendix 2 discusses the matter of possible preference exerted for the same enantiomorph, but either L- or D- forms can and do join such a growing chain in the laboratory, and usually they seem to join with equal readiness.)

After both forms are used, the *spiral* conformation may be discontinued, but the chain can continue to grow, with units of either hand. Chapter 4 gives calculations on what the probability factor would be even if there were such a preference.

Actually, if the same isomer tended to join up next, this would result in about an equal number of each, in the long run. Sooner or later in any chain, by the laws of probability, the opposite hand would join up regardless of the degree of stereoselectivity. Then the preference would no longer favor the hand that had been predominant, and the other would take the lead. Blocks of each would occur in equal numbers. Even if the helical portion exerted a preference beyond the adjacent new monomer or unit just added, the eventual result by probability considerations would still be equal numbers of blocks.

The only way to obtain an all-left-handed chain would be to reach it by random polymerization, in spite of the almost infinite odds given in chapter 4 against such a result. This is unthinkable when viewed realistically.

As to the idea of alpha spirals being “selected,” this would have been impossible, even if any such chains existed. Natural selection could not have operated at all before there was a complete duplicating system for all essential parts.¹⁵ This logical precept is developed more in detail in chapter 5.

¹⁴ Oparin, *Genesis*, pp. 80, 81.

¹⁵ Theodosius Dobzhansky, *The Biology of Ultimate Concern* (New York: New American Library, 1967), p. 48.

We are left with a situation where, in the first place, there would have been no way to produce *any* all-left-handed chains, as is shown in chapter 4. In the second place, natural selection could not have been involved for lack of any reproductive arrangement for all the components.

4. *Asymmetric Polymerization.* A. Pasyanskii supposed that this left-handed phenomenon came about when "high molecular weight asymmetric catalysts were first formed as a result of stereospecific polymerization, and then, from this starting point, the optical asymmetry of low molecular weight components developed."¹⁶ This assumed stereospecific linking is an idea concerning which I have found no evidence in the literature of its ever having been accomplished with amino acids to bring about the result described. If such a process is imagined to have happened in the time before life existed on the earth, it is strange that it is impossible to discover a similar procedure in present-day versatile laboratory settings. It is probable that this hypothesis is but another example of wishful thinking in the absence of anything better.

5. *Irradiation with "Chiral" Electrons.* "Chiral" is another term for one-handed, or asymmetric. A report, assertedly unconfirmed, tells of experiments in which irradiation with the chiral or handed electrons from the beta decay of strontium 90 destroys the D- form of one amino acid, tryptophan, at smaller dose than the L- form. Disappointingly for evolutionists, however, the D-L mixture "was not made measurably more left-handed during a few months of exposure."¹⁷

6. *Earth's Magnetic Field.* Another hypothesis, which has not gotten much attention, assumes "that the earth's magnetic field produced the necessary dissymmetric environment," but it also suffers from lack of laboratory or experimental confirmation.¹⁸ Attempts by using the magnetic field of magnets failed also to produce the desired results,¹⁹ because of the symmetry of the field perpendicular to the lines of force.

Morrison and Mosher, in 1971, made this telling admission with regard to all the attempts to achieve a solution: "Attempts to demonstrate true absolute asymmetric synthesis, as contrasted to this example of absolute asymmetric decomposition, have

¹⁶ Oparin, *Genesis*, p. 81.

¹⁷ Morrison, *Scientific American*, p. 120.

¹⁸ *Encyclopaedia Britannica* (1967), s.v. "stereochemistry."

¹⁹ Morrison and Mosher, *Asymmetric Organic Reactions*, p. 427.

been either negative, inconclusive, or controversial.”²⁰ (Absolute asymmetric synthesis refers to synthesis without using already-existing asymmetric molecules such as enzymes from living things.) The decomposition to which this quotation refers produced merely a 0.7 percent excess of one enantiomer—less than 1 percent.

The simple fact is that no natural solution has been found which can even remotely be considered a satisfactory explanation for the exclusive use of L-amino acids in naturally occurring proteins. In spite of valiant efforts using every possible approach they could find, evolution adherents have found no answer to fill the gap left when they exclude intelligent planning by a Creator.

Even if such a solution were ever discovered, there are multitudes of other conditions, necessary for living things, which are far more improbable. Under the multiplication rule, these make the chance production of life completely unreasonable to consider as a rational hypothesis.

²⁰ *Ibid.*, p. 48.

