Review Article

EZ water and the Origin of Life

Abstract

To create life, the first step should logically be the formation of the condensed system that defines a cell. If the original contents were dispersed widely, then those components would require condensation. Absent the needed condensation forces, those prime substances would have remained scattered, with no particular proclivity to form a cell. Energy is needed for the above-described process. Without energy for the splitting of water molecules, EZ cannot build. The required energy comes from light. Particularly effective, we found, is infrared light. The impacted water is presumably its EZ fraction, whose crystal-like structure allows for information-storage capability. Ordinary liquid water has no such capability: its randomly oriented, rapidly fluctuating molecules would be expected to show no capacity for retention of information. EZ water, on the other hand, seems practically "designed" to carry information.

Keywords: water molecules, origin of life, EZ fraction, genetic information

Introduction

The origin of life is one of those issues that has challenged scientists since Darwin's two-century old voyage on the HMS Beagle. Since then, and notwithstanding many relevant molecular level discoveries, life's origin has remained resistant to elucidation. Nobody knows how it started.

Among the many questions regarding life's origin, two stand out. First, how could initially dispersed substances have aggregated to permit the formation of a cell (condensation)? And second, how could that cell have incorporated the genetic information that ensured its perpetuation (information acquisition)?

Fresh potential for answering those questions may come from the recent discovery of water's fourth phase, otherwise known as "EZ water" (Pollack, 2013). That phase of water exhibits molecular order. And, elements of that ordered array may take on any of multiple states. Much like a computer memory, therefore, the EZ array has the potential for carrying information, which may hold central relevance for understanding life's origin and its perpetuation.

I argue below that both of the aforementioned processes, condensation and information acquisition, may have arisen from features of water's fourth phase, and that the presence of that phase may ultimately have set the stage for the creation of DNA, the seat of enduring memory.

1. Material Condensation and Creation of Pre-cells

Few of us were around to witness the birth of planet Earth. We may presume that it began as an accretion of gaseous matter, or perhaps as debris from exploding supernova, condensed by gravitation and constrained to orbit around the sun.

Either way, the primitive Earth likely contained an array of substances. Those “prime substances,” including various atoms, small molecules, and minerals were presumably spread widely over the planet, with no particular organization, some of it dissolved or suspended in water.

To create life, the first step should logically be the formation of the condensed system that defines a cell. If the original contents were dispersed widely, then those components would require condensation. Absent the needed condensation forces, those prime substances would have remained scattered, with no particular proclivity to form a cell. Thus, the emerging question: how could widely scattered substances possibly condense?

I suggest a simple mechanism involving three entities: charges, light, and water.

For substances that are oppositely charged, the tendency to coalesce is clear: positive attracts negative. For similarly charged substances, divergence might be anticipated *a priori*. However, that is not necessarily the case: paradoxically, similarly charged substances suspended in water come together. This unanticipated behavior led the renowned Nobel physicist Richard Feynman, in his own inimitable way, to label the phenomenon “like-likes-like.” Like charges “like” each other; hence they come together (Feynman et al., 1964).

Feynman went a step further. He argued that the reason those like-charged substances draw together is that opposite charges gather in between them; those opposite charges then pull the two substances toward one another. Thus, Feynman amended his description to the following: “Like-likes-like because of an intermediate of unlikes.”

Our studies confirmed Feynman’s prediction and went on to uncover the source of those unlike charges (Nagornyak et al., 2009). When suspended or dissolved in water, substances commonly build layers of interfacial (EZ) water around them (Pollack, 2013). Those distinct layers develop from liquid water. Since that liquid-water source is neutral, while EZ water is generally negatively charged, buildup of those EZ layers must be accompanied by the release of protons from water. Those positively charged protons, we found, get cast into the water lying beyond the EZ layers (Pollack, 2013).

Figure 1 illustrates that scenario. As negatively charged EZ water builds around each substance, protons are released into the water. Their highest concentration should lie between the two substances, because contributions come from two EZs, not just one. Those protons’ positive charges draw the negatively charged EZs toward one another. Hence, the substances condense, in much the same way that oppositely charged substances condense.

Figure 1. Expected distribution of charges when
two negatively charged spheres in water lie in proximity of

one another (see text). The positives attract the negative charges, drawing the spheres together. Similar behavior is predicted if spheres are positively charged instead of negative.

Energy is needed for the above-described process. Without energy for the splitting of water molecules, EZ cannot build. The required energy comes from light. Particularly effective, we found, is infrared light (Chai et al., 2009). With its natural abundance in the environment (roughly half of solar energy is infrared), the needed energy exists bountifully. If that same energy were present early on, as solar physics models suggest (https://tinyurl.com/sun-in-time), then the like-likes-like mechanism should have been operative from the outset.

We can thus envision the possible first step in the evolutionary process: the light-driven condensation of widely dispersed matter into condensed clusters, clusters that might fall under the rubric of "pre-cells."

2. The Membrane: A Requirement?

Following condensation into pre-cells, we might presume the need for creating something to ensure long-term containment of those cellular constituents. Hence, cell-membrane formation might be thought of as the logical next step. However, I lay challenge to that expectation.

Asserting the need for a cell membrane comes from two well-recognized cellular features. First, electrolyte composition inside the cell differs from that outside; something needs to keep those ions separated. Second, a sustained electrical potential exists between the inside and outside of the cell. For maintaining those two features, the presence of an insulating barrier has seemed necessary. Presumably, that barrier appeared early on.

Multiple observations challenge the membrane's seemingly necessary presence (see Pollack, 2001). Here, I mention only one: the electroporation experiment. In this long-established microbiological procedure, the intact cell is subjected to an electric field. The barrage of current supposedly blasts open "pores" in the cell membrane. Those pores allow genetic materials placed outside the cell to demonstrably enter the cell and get incorporated into the cell's genome. No question that those large molecules enter.

Now the critical question: if the pores are large enough to permit a molecule as large as DNA to pass, then why wouldn't they allow the smaller sodium and potassium ions to pass as well? If the separation of ions is necessary for life, then shouldn't obliterating that separation cause death?

To appreciate the magnitude of the problem, consider the numbers. Typical of the genetic material introduced during electroporation is DNA containing a thousand base pairs. Each base pair measures roughly 2 nm wide x 0.34 nm long. If packed solidly, the aggregate volume would come to ~1,000 nm^3. A randomly folded, solidly packed spherical entity of that volume would have a diameter of ~16 nm. Thus, ~16 nm ought to be the minimum pore diameter. More realistically, as molecules pass through easily, we might anticipate a pore diameter on the order of ~50 nm — some smaller, others larger.

Could 50-nm pores keep the critical electrolytes from passing through? The sodium ion has a diameter on the order of ~0.2 nm. Relative to that diminutive dimension, the anticipated pore diameter is 250 times larger. For perspective, think of the common household dog door: when open, an aperture large enough to allow your St. Bernard to pass through would need to be able to simultaneously exclude a baby mouse.

The problem is especially serious in situations in which those pores remain long open. In some experiments, the DNA is placed outside the cell hours or even days after the holes are created (Schwister and Deuticke, 1985; Serpersu et al., 1985). During such extended openings, even notwithstanding countermeasures taken to minimize transmembrane flow, ion concentrations inside and outside ought to have largely equilibrated. The membrane potential should have vanished; and the cell should theoretically have lost its capacity to function. Yet, it obviously hasn't: Given that new genetic material still gets incorporated into its genome, the cell obviously continues to function. It remains alive and well despite gaping membrane holes persisting for extended durations.

These experimental results, along with various other relevant considerations (see: Pollack, 2001), challenge the notion that an insulating membrane is *necessary* for life. Certainly, the presence of a cell membrane is supported by multiple pieces of evidence (albeit not without challenge – Hillman and Sartory, 1977), but I argue that an insulating barrier surrounding the condensed matter is not a *necessary* condition for life to perpetuate, and hence not a necessary condition for life to originate. Condensation appears to be sufficient.

Lipid-bilayer membranes, which keep many molecules out of the cell, may have appeared eventually. Possibly, they came into being through aggregation forces similar to those driving condensation of other materials, but their formation does not appear to be a condition necessary for function. Potentially, some of the features purportedly explained by the presence of an insulating cell membrane can be explained by the cell's gel-like nature (Frey-Wyssling, 1948; Pollack, 2001).

The upshot: material condensation remains the necessary first step in the origin of life. Life appears able to build on that feature, without needing to deal with the complexities of how insulating membranes (and their various embedded components) might have arisen to envelop that condensed material. We can proceed straight away, absent that complication.

3. A Key Role of Water?

The next step arguably involves the imparting of information into the condensed pre-cell. Without consistent information distributed throughout that condensed mass, any pre-cell breakup would create progeny without persisting features. No hope could exist for the continuity that is the essence of life. We know today that such information is held in DNA, but to think that a molecule so complex might have been present at the outset seems implausible. Something more primitive must have held the information.

I suggest water. I don't mean liquid water. I'm referring to the interfacial, EZ-water fraction lying in or around each condensed aggregate. Once "informed," I will argue, EZ water may have served as a template for the buildup of larger, biological molecules such as DNA, the ultimate retainer of information.

To get there, I will cite experimental evidence that water does indeed store information. Ordinary liquid water may have no such capacity; but I will argue that it is the EZ-water fraction that constitutes the site of that information storage.

We first ask: can water of some kind store information?

4. Evidence for Information Storage in Water

While seemingly implausible, let me briefly summarize several points of evidence bearing on the issue of information storage in water.

> 1. In 1989, the prominent French scientist, Jacques Benveniste, purported to demonstrate the existence of water memory (Davenas et al., 1989). When originally advanced, the idea that water could store information was viewed as preposterous. Although published in the prominent journal, *Nature*, the editor of that journal wrote a powerful disclaimer, relegating the results to sloppy science. Benveniste's career took a nosedive, and his work became a scientific joke: "Having trouble remembering? Try drinking Benveniste's water, for it remembers."
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> A comprehensive review of the Benveniste affair can be found here: https://www.persee.fr/doc/reso_0969-9864_1994_num_2_2_3277.
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> Benveniste's results have now been confirmed in multiple laboratories (e.g., Belon et al., 2004). As a result of those confirmations, a goodly fraction of the water-science community now recognizes Benveniste as a scientific hero. The early skepticism came in part from the contemporaneous understanding of liquid water's character: molecules randomly oriented and vigorously dancing on a femtosecond time scale. Given such active behavior, the capacity for memory seemed all but impossible.
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> However, that's not true of EZ water, whose liquid-crystalline structure is both ordered and stable. At the time, though, EZ water had not yet been discovered. Had it been known and acknowledged, scientific reaction might have differed.
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> 2. The water-memory field has attracted distinguished scientists, supporting the reality of water memory. Among them are two Nobel laureates: Brian Josephson (Physics), and the late Luc Montagnier (Medicine). Montagnier has shown that DNA-sequence information can be imparted to a flask of pure water some distance away from the original DNA sample (**Figure 2**). That water is then used in the standard PCR method to create new DNA — whose sequence turns out to be essentially the same as that of the original DNA (Montagnier et al., 2010, 2015) A scientific group has independently confirmed those results (Tang et al., 2019), and has applied the same technique in a practical context (Chen et al., 2019).

> 3. At the *Annual Conference on the Physics, Chemistry, and Biology of Water* (which I organize), typically, several presentations each year deal with evidence for water memory. The phenomenon has become standard fare at that conference (of now ~200 conferees) — so much so that at said venue, the concept of water memory is largely taken as established fact.
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> 4. Commercial applications are increasing: For example, a local company, *EMulate Therapeutics* (formerly, *Nativis*), exploits the water-memory principle to achieve therapeutic impact, now including cancer therapy. Increasing interest in the water-memory concept is reflected in the tens of millions of dollars in investment that *EMulate* has been able to attract. Water memory is no longer reflexively shrugged off as some weird kind of woo-woo mysticism. It's becoming increasingly mainstream.

Thus, while water memory is by no means a household concept, abundant evidence implies that the phenomenon is likely to be real.

5. Does the Information-Storage Site Lie in EZ Water?

To judge whether the site of information storage might be EZ water rather than liquid water, it's helpful to examine the way information is stored in other systems. Consider, for example, standard computer memories. If the features of standard computer memories match the features of EZ water, then such likeness would lend credence to the view that water's information-storage site likely lies in its EZ fraction.

Standard computer memories consist of ordered arrays of elements (transistors), each of which has two states: on/off. I suggest that water's fourth phase (EZ) has similar features, along with the added benefit of potentially much higher storage density.

The deduced structure of the fourth phase of water, as described in the eponymous book, is shown in Figure 3. It consists of layers of honeycomb sheets. In each of those sheets, atoms of hydrogen and oxygen are regularly arrayed, as are the transistors in standard computer memories. Both systems feature regularity.

In the EZ, the oxygen atoms are of particular interest: Standard chemistry textbooks describe oxygen atoms as having multiple states, generally referred to as "oxidation states." The most common is negative two; however, other oxidation states include -1, 0, +1, and +2. Thus, instead of having only two states common to standard computer memories, each (potentially) functional element in the fourth-phase array has *five* states, leading to theoretically greater memory capacity.

Hence, the similarity between EZ structure and computer-memory structure seems evident. Oxygen atoms of the honeycomb sheets may be thought of as analogous to the transistors in the computer memory, with the advantage of five states to store information instead of two. This edge, along with the diminutive size of each atom-scale memory element, leads to a potentially huge increase of information-storage density relative to transistors, by up to nine orders of magnitude (one billion times).

Calculation of that edge is straightforward, with only a few (quantitative) assumptions:

- Storage density for a hard disk is about 5 terabits/in^2;
- Mean width of EZ is approximately 100 µm;
- Five oxidation states are equivalent to 2.25 bits; we simplify to 2 bits for this calculation.

With the approximations above (and given the size of the water molecule, approximately 0.3 nm), we calculate that a representative 100-micrometer EZ span will contain ~3.3*10^5 EZ layers. For one square inch of that multilayered EZ, there are roughly 2.4*10^21 oxygen molecules. Furthermore, each oxygen can carry ~2 bits of information. So, permitting each oxygen to be addressed individually (an assumption that requires testing) yields a potential information density of approximately 5*10^21 bits/in^2. In other words, the EZ-based information-storage potential is up to *a billion times* higher than the hard disks currently used. In theory, computer memories could be reduced to the size of miniature pinheads.

Apart from the commercial potential of any such advance, the point is that EZ water does have the features that largely match those of standard computer memories: ordered elements, and multiple states of each element. Hence, we presume that any confirmed storage of information in water likely takes place in the EZ water fraction, rather than in the liquid-water fraction.

The emerging question: If EZ water is indeed the site of biological information storage, then how might relevant information be imparted into the EZ?

6. EZ Water as Template for Creating Biomolecules

The EZ has a generic structure (**Figure 3**). Any imparted information should therefore take the form of some variant of that generic structure. Logically, that could happen if certain oxygen atoms were to take on oxidation states differing from the generic.

Many such variants would seem possible. With numerous oxygen atoms populating the array and each oxygen atom having the capacity to occupy up to five different oxidation states, options should be numerous.

Generally, EZs grow next to hydrophilic (water-loving) surfaces. In Figure 3, the hydrophilic entity is labeled “material.” From that material surface, EZ layers grow, one by one. We may think of those layers as having the generic structure shown in the figure. However, the actual structure is more likely a variant, depending on the nature of the nucleating surface.

How this might play out is illustrated in the following example. Suppose the nucleating surface contains an array of positive charges that match the negative charges on the first EZ layer. Any such perfect match would create the generic EZ. Suppose, however, that one of those positive charges is missing from the nucleating surface. If so, then the first EZ layer might contain a corresponding oxygen atom with oxidation state of zero instead of negative two. That deviant would then appear in subsequent layers, creating a pole-like projection running through all EZ layers. That would represent one example of a variant.

Now consider the distal plane of one of those EZ variants. It should contain a checkerboard of charges. In the generic EZ, that checkerboard would be regular. The variant would contain irregularities, whose charge distribution would depend on the nucleating material. That is, each nucleating material would produce a corresponding distal charge distribution.

That distal plane might serve as a template. Assembling onto that template would be certain simple molecules whose charge distributions are complementary, like matching puzzle pieces. Envision a small molecule, for example, with surface-charge distribution appropriate for latching on to a region of the template. Now imagine other such puzzle pieces adhering to the template near the first piece. If those assembled puzzle pieces could bind naturally to one another, then the possibility exists to create a larger molecule. The template, in other words, could serve as an information source for the growth of larger molecules common to biology. That would include DNA.

If that concept is deemed plausible, then the obvious question arises: how does all of this start? What creates those EZ templates to begin with, and how is information imparted to them?

7. How Does the EZ Acquire Information?

The simplest and most primitive way of imparting information into the EZ is from the prime substances, i.e., from the atoms and molecules populating the Earth at the outset. As suggested, those prime substances naturally condense into aqueous clusters. Within each cluster, we might expect differing contents and arrangements. Differing clusters should create differing EZs, i.e., EZs with different charge distributions.

In this way, random “information” would be imparted to the respective EZs, creating numerous variants.

Most such variants would be null for templating anything “useful.” Other variants could template the buildup of larger molecules, as outlined above. By repeating this kind of synthesis again and again, progressively larger molecules could emerge, including the macromolecules that ultimately constitute today’s functional biomolecules.

Initially, those biomolecules would be linked to their initiating clusters through bridging EZs. If the bridge were to break, then the biomolecule would be freed from its initiating cluster. Impetus for breakup could come from chance events, e.g., from thrashing wind, lightening, earth tremors, even turbulent rainfall. Any such breakup would leave the biomolecule as an independent entity. In such a way, various biomolecules could be birthed. Each such molecule would have a unique structure, derived from the EZ variant responsible for its creation.

In similar fashion, the freshly minted biomolecule itself could eventually reproduce. EZ buildup around one such biomolecule would template the growth of another, etc. Through this process, biomolecules could proliferate, yielding a cluster of like molecules. Should the resulting aggregate break up from the kinds of natural forces suggested above, progeny would both contain repeats of those biomolecules.

Thereby, we have a beginning signature of “life” — progeny retaining information derived from the parent pre-cell. The information will have come initially from clusters of primary substances. Some of those clusters would randomly produce EZ variants capable of templating the growth of larger molecules, which ultimately became today’s molecules of life. With enough copies of those molecules, any serendipitous breakup of a condensed mass would assure that the information is passed on to progeny. Continuity is assured. Life is assured.

8. The Rise of Genetics

In the same way that various biomolecules might have arisen, the bases of DNA could likewise have arisen. Thus, adenine, cytosine, guanine, and thymine might be nothing more than biomolecules that arose in the same way as suggested for other biomolecules: from EZ templates.

Evidence for such water-DNA linkage is provided in recent studies by Luc Montagnier. Following execution of the experiments outlined in Figure 2, Montagnier carried out follow-up studies with lowered DNA concentration. Through serial dilutions, the original DNA concentration was reduced to the point at which, statistically speaking, no DNA molecules should have remained — only water that had been associated with the DNA.

Notwithstanding the statistical absence of any DNA, the results remained the same (Montagnier et al., 2015; Montagnier, personal communication). The newly created DNA had the same sequence as the original DNA. Since the primary vial (panel *i*, **Figure 2**) should have contained only water, the structural information must have come from that water, itself. The implication, if Montagnier’s results stand the test of time, is that the information contained in the DNA must also be contained in the water associated with the DNA. This lends credence to the view that the “genetic” information may well have come originally from the EZ water.

If the critical information is already contained in the EZ water, then why bother creating DNA? Why not rely on EZ water itself to pass on information to progeny? What pressure might have driven nature to prefer DNA-based information over EZ water-based information?

Two possible reasons come to mind: (i) stability; and (ii) mechanistic reliability.

As for the first, the question arises: which is more stable, the DNA or the EZ water surrounding the DNA? I suggest that it may be the DNA. Put another way, I suggest that the EZ water may be susceptible to external influence, and here I refer to the so-called “subtle energies” or “biofields,” which may come from outside. If EZ water is indeed susceptible to such influence, then that would compromise its long-term stability, leading nature to perpetuate itself by creating compounds with greater stability.

Further to this point is evidence for external influence on (presumably EZ) water. This comes from multiple sources. I cite one example, carried out in the laboratory of the late German scientist/engineer Berndt Kroeplin and his colleague Regine Henschel (Kroeplin and Henschel, 2016). The investigators placed pure water droplets on multiple glass slides, allowing them to dry. Residues remained on each slide, presumably made up of EZ water, which sticks to hydrophilic surfaces such as glass, thereby preventing evaporation. They then examined the patterns of those residues.

In their protocol, Kroeplin and Henschel gave multiple droplet-containing slides to each subject to hold as the droplets dried. For each subject, the resulting residue patterns were consistent over the multiple slides (**Figure 4**). However, that similarity failed to extend to the patterns of other subjects. Different subjects showed different, albeit internally consistent, repeatable patterns. Thus, the investigators could conclude that differing subtle energies coming from person to person were impacting the water, each in its own way.

Since the only obvious variable within an EZ is its distribution of charges, some aspect of that distribution is presumably what those subtle energies had impacted. If so, then the EZ's charge distribution could not be rock solid: it would be subject to environmental influence, and hence not fully stable over the long term. On the other hand, the DNA molecule enveloped by that EZ water could conceivably be more stable, especially if those subtle energies failed to impact that molecule itself. The issue remains to be addressed.

If DNA were indeed the more stable of the two species, then this feature could resolve the issue of perpetuity: As pre-cells break up, their DNA should more reliably pass on consistent information to progeny. Information could thus survive unscathed, even following many divisions. This feature may explain why DNA persists today as the principal vehicle for information transmission: it may better resist alteration by outside energies.

As for mechanistic reliability, the second issue, the argument is more straightforward. Information from strands of DNA is passed down to progeny by well-known mitotic mechanisms that have evolved over time. Those mechanisms assure that as the cell divides, each one of DNA's two strands winds up in one or the other daughter cells. Hence, information reliably passes on. Daughter cells assuredly contain the same structural information as the parent cell, assuring continuity, and hence preservation of the species.

In sum, DNA genetics may have supplanted water-based genetics because of superior performance: DNA may more reliably retain information; and, the double-stranded DNA evidently had the capacity to evolve into a mechanistic process that ensured accurate transmission of information to progeny. With both these features in place, species have enjoyed persisting continuity.

9. Mutations and Evolution

Species, on the other hand, have evolved. The evolution of man can be traced back through several million years. Presumably, those evolved variants better able to cope with environmental pressures have survived; the less able, not. Along with that evolution, genetic information has evidently changed. We are told that the change arose from mutations, but the reason for those "chance" mutations has never become clear. What causes mutations?

For evolution to occur, the information contained in the cell must change in some way, and a mechanistic possibility is through the influence of the subtle energies mentioned in the previous section. If those energies can indeed impact EZ water (**Figure 4**), then a possible mechanism may exist to explain such change.

One may envision the following sequence of events. Incident subtle energy alters the charge distribution of an EZ variant. The DNA associated with that variant, being more stable, resists change. On rare occasion, however, if the water is profoundly enough altered, the associated DNA may be impacted as well, which means that the genetic information has changed. Likely, the proteins created by such altered DNA will be non-functional, leading to cell death. In rare cases, however, the altered protein may function better than the original, in which case the organism will become the "fittest," eventually becoming the dominant species.

Thus, species could evolve by such a subtle energy mechanism, targeting EZ water as its initial landing site.

The high threshold for change in DNA implies that evolution ought to be slow, and that is certainly true in most cases. Under the right circumstances, however, the mechanism in question could bring about the uncharacteristically rapid evolution that has occasionally been observed. In this context, I'm reminded of the penetrating book by Arthur Koestler, "Case of the Midwife Toad." Koestler tells the tragic story of Paul Kammerer, an Austrian naturalist who studied those Midwife toads. Two species exist: terrestrial and aquatic. The terrestrial species lacks the forelimb's "nuptial pads," which, in the aquatic species, help grip the female during copulation. Hence, the two species differ in rather obvious ways.

When Kammerer hatched the eggs of the terrestrial species in water instead of on land, some of the newly aquatic males immediately developed those nuptial pads. Even more surprising, the pads persisted in subsequent generations. Kammerer concluded, therefore, that acquired characteristics could be inherited.

The "problem" with that conclusion was that it seemed to support the long-discredited view of the once-prominent scientist Jean-Baptiste Lamarck. Lamarck had suggested the idea of "soft inheritance," i.e., that acquired characteristics could oftentimes be passed on to future generations. That view had seemed obsolete.

Because Kammerer seemed to resurrect the Lamarckian view of evolution, he was roundly criticized, eventually becoming despondent enough to shoot himself in the head. That ended his unorthodox pursuit. On the other hand, if Kammerer's aggressively disputed results turn out to be valid, then one can envision a possible interpretation that conforms to the scenario just presented. Conceivably, subtle energies coming from the naturally aquatic species swimming nearby, or from the water itself, could have impacted the EZ water of the transplanted species. If profound enough to pressure DNA alteration, then that impact could have been sufficient to create those nuptial pads. The altered DNA would then be passed on to subsequent generations. Hence, acquired characteristics could be transmitted to subsequent generations.

Any such action might now be interpreted in terms of epigenetics. As the toads move from land to sea, a different set of genes could get expressed. Such expression would be controlled in a manner similar to above: subtle energies coming from the environment would impact the toads' EZ water, which, if profound enough, could then impact contiguous DNA. In such a way, the genes responsible for expressing nuptial pads could be turned on epigenetically.

More generally, a possible mechanism underlying gene expression can now be identified: external information impacting EZ water. The EZ water would act as a kind of gate: if opened sufficiently by absorption of external information, the associated DNA would get expressed; otherwise, it would not. With such an information-based mechanism, one could begin to understand issues such as how gene expression varies through the course of fetal development. Could maternally derived information impact EZ gateways, thereby turning on sets of genes sequentially?

In the framework outlined above, Lamarckian concepts should not necessarily be dismissed out of hand. Species could evolve primarily within the Darwinian context, but the EZ-information paradigm leaves room for some elements of Lamarckian (epigenetic) theory to play a role as well. Linking the two paradigms may offer a pathway for exploring some evolutionary role of subtle forms of information.

10. Conclusions

The question of life's origin has stymied scientists for centuries. Until now, no widely accepted view has emerged.

This work puts forth a fresh paradigm, based largely on the identification of a type of water that may acquire and store information: EZ water. EZ (otherwise known as “fourth-phase”) water may behave much like a computer memory, capable of storing biological information.

Along with the notion of information acquisition comes evidence that EZ water may be impacted by subtle energies. Long known but only recently coming under serious study, those energies can demonstrably influence water. The impacted water is presumably its EZ fraction, whose crystal-like structure allows for information-storage capability. Ordinary liquid water has no such capability: its randomly oriented, rapidly fluctuating molecules would be expected to show no capacity for retention of information. EZ water, on the other hand, seems practically “designed” to carry information.

Thus, the information required for perpetuating life may have been stored initially in EZ water. The EZ may then have served as a template for the construction of today's more stable, information-storing molecule, namely DNA. As a more durable molecule, DNA could ensure the perpetuation of information that is fundamental for all life. Yet, the abutting EZ, as the recipient of powerful enough information, could eventually pressure the DNA to revise its information, leading to evolutionary change.

The considerations above all rest on the early existence of condensed matter; otherwise, no cell could form. With no obvious basis to presume the existence of condensed matter at the onset of

Earth's existence, a condensation mechanism is necessary. I argue that the mechanism lies in the so-called like-likes-like phenomenon, which brings dispersed substances together in a natural way. Although not widely appreciated, that light-driven mechanism is essentially simple. It sets the stage for the existence of the cell as we know it.

Any such understanding of life's origin can of course never be proved, as nobody was present to witness the event. On the other hand, the framework outlined here may open the possibility of a more detailed, step-by step understanding.

The current offering merely attempts to set the stage for such understanding.

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