

THE INCREDIBLE PHOTON

A new and bold look at the world of energy by using common sense to describe events we observe daily but don't fully understand.

By

John Kallenbach
Richmond, Virginia
Jkallen01@AOL.COM
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A single photon has such a small amount of energy it practically doesn't exist. Every photon has a definite amount, or quanta, of energy and there is no variance between photons. Photons in concert, however, provide each of us with energy required to live on this planet. The fact is that my single purpose for writing this paper is to provide logical evidence that there is no other energy than photonic energy. I will be discussing the role of the photon in the following five areas: Friction, electricity, weather, gravity, and the human body. I will not be discussing visual light per se. Most of our energy comes to us from the sun in the form of visible light but visible light is composed of photons streaming at certain precise frequencies. My discussion pertains to photons that have reached earth and have been captured by an atom. Every atom on earth contains photons from the sun and these photons may be transient or they may be held for long periods within the atomic structure.

Since I have already stated, "There is no energy other than photonic energy", I am going to state my case. Sir Isaac Newton stated in his highly respected and time tested first law, "For every action there is an equal and opposite reaction." The case I wish to present is "Every action is caused by photonic energy". There are no exceptions. The word "action" describes how work is done. The words "action and work" are intrinsically connected since you cannot have one without the other, but they are not synonymous. Since an action can range from the blink of an eye to a nuclear explosion, an infinite number of possibilities exist. I am limiting my discussion to certain aspects of the five areas I mentioned above.

In general, we measure the presence of photons by means of measuring temperature. Usually, when we think of temperature we are thinking of heat. Heat always indicates the presence of transient photonic energy. The two terms are interchangeable in their meaning. A photon is pure energy and it contains no heat as we think of heat. Heat results when an atom absorbs photonic energy. The more absorption the more heat. Consider a piece of iron being heated. If enough heat is applied, the iron will first become red hot, then it will become pliable, and finally it will become molten, or liquid. So many photons are packed into the iron atoms when it is red hot, or molten, that visible light emanates from it. In general, we tend to think of an object as being hot, cold, or lukewarm. If it feels hot to the touch then photonic energy is streaming into our body. Our nervous system is very sensitive to any change from the normal to the transfer of photonic energy. If we were holding ice cubes in our hand, we would feel the loss of photons from the skin of our hand and we would consider the ice to be cold. It would seem the ice has little photonic energy. The truth is that the ice cubes are far from being deplete of photons since the total depletion of photons is called absolute zero,

(-459 degrees Fahrenheit), and absolute zero does not occur in nature. Every object in the universe and every atom within the object do contain photonic energy.

It is important to understand that photons move about freely within an object or, I should say, within the atoms of an object. I will illustrate this with a simple example. We are all familiar with the process of ice cooling a liquid but do we understand how it happens? I believe some would say the ice cools the liquid just because the ice is cold but there is more to it. Say we have a glass of water at room temperature, about 78 degrees F., and we add 5 or 6 ice cubes to it. The ice begins to melt as they absorb photons from the warm water. The cold melted water is more dense than the surrounding molecules of water and it begins to stream to the bottom of the glass. As the ice melts, the level of cold water at the bottom begins to rise. The ice melts fairly rapidly during this process but when the level of the cold water reaches the surface, the melting stops. The ice cannot absorb any more photons from the cold water because the temperature of the cold water is nearly equal to the temperature of the ice. There are no available photons left to melt the ice. So the water that was warm is now cold but where did the warmth, or heat, go? Actually, it went nowhere. It is still in the water and is contained within the molecules of water that were formerly frozen. In order for molecules of frozen water to become liquid, heat is required. More heat than was available in our original glass of water. Of course we know the ice would eventually melt if left standing but this experiment could have been done using a high quality vacuum bottle where the ice could last for days. The point is, the photons moved from the molecules of warm water to the molecules of the ice or frozen water but the total number of photons within the glass of water is unchanged. It is very important to understand that photons move between atoms, or molecules. This movement could be considered as a fluid movement. Every action requires a movement of photons. Since the Laws of Physics say that energy cannot be created or destroyed, then every action requires the accumulation of photons in one place and then their movement to another. All work is accomplished in this manner. There are no exceptions. I believe that at this point that I should mention that this concept does not agree with the current theories of physics. If it did there would little reason or purpose for me to be writing this paper. More surprises that do not agree with the current theories of physics are to follow. Every statement that concerns photonic energy contained within this paper is a product of my mind. Although I have BS in physics, I learned little of this in any physics class. I have come to believe that photonic energy is the only energy available to us and to make this point clear is my sole intent in writing this paper. This paper is not lengthy but it has been 20 years in the making and I wholeheartedly believe in the truth of what I am saying. With that being said, lets go to my first topic, Friction.

FRICTION

A good example to illustrate that all atoms contain photonic energy is that of friction. The well-known example of “rope burn” has been experienced by most of us in gym class. When two substances are rubbed together, or slide across each other, the exposed outer atoms are disturbed and are subject to the force we call friction. This force simply strips photonic energy from the two materials. This results in heat being released. This is not difficult to understand. We know from the model of an atom that the protons and neutrons form the nucleus of the atom and that they contain most of the mass of the atom. The electrons, which have very little mass, orbit around the nucleus. It is the electron, however, that is able to capture and retain photonic energy. When two surfaces move against each other the outer electron orbits will be disturbed and this retained photonic energy may be released. If the movement is rapid and with some pressure applied, the amount of heat released may be significant. In some cases the substances may burst into flames. The common friction match uses this heat to ignite the sulfur match tip. Another well-known use of friction is the creation of sparks to ignite butane gas in the common cigarette lighter. The flintlock rifle used sparks to ignite gunpowder centuries ago. These sparks are the result of the friction between the steel and the flint. The much harder steel simply strips atoms from the surface of the flint and some of the photonic energy contained in the electronic orbits of the flint atoms is released to the atmosphere as sparks. These sparks travel in the general direction from which they were struck and are used to ignite the gunpowder.

In general, friction is very beneficial to us as in walking or traveling in an automobile. Friction keeps us where we want to be. Friction will be reduced if oil is introduced between the two surfaces. It keeps the two surfaces from coming into direct contact. Ice also reduces friction to near zero and makes walking or driving hazardous. This is because frictional heat melts a thin sheet of water on top of the ice and the water acts as a lubricant between the two surfaces. Even though friction is generally beneficial in nature, it is not necessarily beneficial in machinery. In some machines friction results in excessive heat and must be dealt with by elaborate measures. The automobile engine requires both a cooling system and a lubricating system to deal with frictional heat. Although it is the combustion of gasoline that creates the most heat in an automobile engine, frictional heat can be considerable. If the oil level becomes too low to provide adequate lubrication, the engine will not continue to function.

Friction may be a nuisance in machinery but, in general, it is a natural and useful aid in our day-to-day living. If you place a book on a table you can be confident it will remain in place but a ball may roll off. The ball has negligible friction but the book will remain in place even though the table is not perfectly level. In fact, the table may be tilted and the book will still remain in place. This is due to the friction between the book and the table surface. If the angle of the tilt is increased, the book will eventually begin to slide. This may be a fairly large angle. The reason the book doesn't slide at a slightly

lower angle is called frictional adherence. This adherence or “sticking power” is an important factor. I will elaborate on this key factor in my chapter on gravity.

The two principle points of friction are that objects in contact tend to stay in contact and that two objects moving across each other will release heat from both objects. Heat, by definition, is always due to a concentration, or an abundance of photonic energy in matter, whether the matter is gas, solid, or liquid. The pure energy of the photon has no mass and, therefore, no heat in itself. It is the energy of the photon, which produces heat in matter. Photonic energy changes the atomic structure of atoms by expanding the orbits of the contained electrons. Iron, for example, which is very rigid and has great strength, can be turned into a molten, freely flowing mass providing an adequate amount of photonic energy, or heat, is added to it as I mentioned in the previous chapter. Frictional heat illustrates that every atom contains photonic energy in its electron orbits and that this energy can be released as heat if the atoms are disturbed by frictional action. A beautiful illustration of this is the falling star, or meteor. The great speed of the meteor striking the relatively stationary atmosphere literally strips atoms away from the meteor and the photons contained within its electron orbits are released in a short time resulting in a bright streak of light high in the atmosphere. This release of photonic energy results in a rapid heating of the adjacent molecules of air and they rapidly expand away from the meteor's path. If it is a fairly large meteor, this may be visible because the still white-hot ash of the meteor are carried out with the expanding air and creates a beautiful, momentary display. The air quickly cools and collapses back, probably causing a thunderclap as lightning does, but much too far away to be heard. This same atmospheric friction is a great problem for the space shuttle program. Extensive precautions must be made to protect the fragile shuttle spacecraft from the extensive heat encountered upon reentry. Although this reentry period only last a relatively short time, ceramic tiles are required to capture and dissipate the tremendous heat that results from the reentry phase. This great heat is no different than the heat produced by the friction of rubbing your hands together. Friction will always produce heat. The heat may not be noticeable in many cases, as in walking, but if not dealt with properly, as in machinery, it can have devastating results.

The conclusion of the frictional heat phenomenon is that every atom contains photonic energy in its electronic orbits and this energy can be released if the atoms are disturbed by frictional action. As I previously stated, photonic energy is the only physical energy in the known universe; therefore, every action that occurs is caused by photonic energy. This will become more evident as we advance through the following chapters on electricity, weather, gravity, and the human body.

ELECTRICITY

Electricity has become so familiar to us we scarcely give it a thought until the power goes off. When the power does go off, it is a distressing situation and we definitely miss it. But, do we truly understand electricity? The answer for most people is “no”. Those who are directly involved with electricity, such as engineers and physics professors, still refer to the “Theory of Electricity”. We have learned very well how to put electricity to use but because it is composed of elements at the atomic level, it is not fully understood because we cannot observe atomic level actions. I hope to shed some light on the subject by sticking to my original assertion, “Every action is caused by photonic energy”. We do know that electricity involves the movement of electrons from atom to atom but how do electrons perform work or how do they accomplish the electrical actions we are familiar with? The primary question is, can electrons do work? And how is it that electrical signals travel at the speed of light yet electrons move only at, or about, the speed of sound. How can this be? We know that free photons travel through space at light speed or 186,000 mps. If electrical signals travel at light speed, it seems there must be a connection. If every action is caused by photonic energy, it should be apparent that electricity and photonic energy have very much in common. In fact, the power of electricity is due to photonic energy.

To begin, then, all electrical circuits require a source of generating power. It follows that if there is a power generating station then some specific action is required to generate the electrical power. To say that there is an action implies that work is being done. The work being done at an electrical power generating plant is, in most cases, the spinning of a turbine. The turbine consists of wire coils being moved through a magnetic field. Power generating plants are usually driven by hydro, fossil fuel, or nuclear power. The “work” of spinning the turbines through the magnetic field induces a current of electrons in the electrical circuit. The great benefit of electricity is its’ ability to transfer this “work” to a distant location at light speed. There is nothing inherent in electricity to do work but it is extremely beneficial in being able to transfer an action, or work, from the power generating station to a distant location. Just as electrical current is induced by a magnetic field, it, in turn, produces a magnetic field. This field is present whenever and wherever an electrical current exists. It can be greatly amplified, or concentrated, if the current is passed through a coil of wire, as in a transformer or a motor. By virtue of the transformer, high voltages can be used for long distance transmission and then reduced to lower voltages for home or factory use. The motor is, of course indispensable in our homes and factories. Neither the electric current nor the magnetic field, however, can do any work of themselves. If the connection to the power generating station is broken by any means, the action of the circuit is immediately halted.

A simple illustration may make this more understandable. Consider a pool player sinking the nine ball into the corner pocket. The player strikes the cue ball with the cue stick. The cue ball strikes the nine ball, which falls into the corner pocket. It should be obvious that the cue stick or the cue ball accomplished no work. The arm of the shooter in moving the cue stick did work. The cue ball and the nine ball moved, but they did no work. They merely transferred work from one location to another. (Some work was

done by gravity by causing the nine ball to fall into the pocket but I will be discussing this later.) This simple illustration is to enforce the fact that it is the power generating station that is doing the work in an electrical circuit, just as the shooters arm provided the work to move the cue stick and cue ball. There are many examples of the transference of work. The lever, the axe, the shovel, or any other hand powered tool, but my purpose is to explain that electricity is the lever that moves work from one location to another.

Now, since I have declared that all work is done by photonic energy, you may be asking what part photonic energy plays in an electrical circuit. Let me say first that all work done at the power generating plant can be traced to photonic energy. I am not going to elaborate on this but you can determine it yourself, especially after you have completed reading this paper. In my chapter on friction, I tried to make it clear that every atom contains photonic energy. This is especially important in metallic atoms since it is metallic atoms that enable electrical circuits. Electrical circuits require a conductor to allow for the movement of electrons. Metallic atoms have fewer electrons in the outer orbital bands. This allows electrons to move from atom to atom with relative ease. Insulators, on the other hand, have the outer orbital bands filled and electron flow is basically impossible. Both conductors and insulators are key elements of an electrical circuit.

In a conductor, if a positive charge is present, the outer electrons of a metallic atom will move toward the positive charge. Since most of our electrical circuits are alternating current or AC, the electrons are moving back and forth at the rate of 60 times a second. So now we come to the role of the photon in the electrical circuit. If the electrical circuit is not operating, we know from previous discussion that the electrons in orbit contain, or are holding photonic energy. We also know, from experience, that photons can not pass through metal. We do know, however, photons can pass easily through some substances such as the atmosphere, glass, and clear water. The solution of the photons moving in an electrical circuit is that when the electrons move, the photons move with them. Electrons will move nowhere but to an adjoining atom in an electrical circuit. The photons also move to an adjoining atom but in so doing, they release another photon, which does likewise. Since photons travel at light speed, the electrical signal moves down the conductor at light speed. Photons are slowed, somewhat, when traveling through a solid material, such as glass, since they travel from atom to atom, but even so, the delay is so slight it is not noticeable by human perception. Photons moving in concert with electrons are the secret of electricity. When electrons move to an adjoining atom, the photons that were within its orbit move in the same direction but at light speed. The result is that the photons are moving through the metal conductor as easily as if it were glass or a fiber optic cable.

It is this cascade or flow of photons that have the ability to do work. In fact, the release of photons is the only way that the original work done at the power generating station can be transferred and put to use. As long as the photons are held in the electrical circuit, no work can be done. When they are released from the circuit, work can, and will be done.

What is the means whereby electricity does work? We are all familiar with electrical circuits but now I will discuss the means by which only photons can accomplish any work in them. Some of the most common and basic uses of electricity are electric heaters. These could range from the space heater to the water heater or even the electric

stove. Electricity is invaluable for its ability to give off heat. The electrical circuit easily accomplishes this production of heat. A resistive substance, which impedes the movement of electrons, also impedes the flow of photons. Resistance in an electrical circuit is the key to how photons do work. The photons collect in the atoms of the resistive substance until they overflow at the surface of the substance into the atmosphere. Depending on the power applied, the release of photons can be adjusted from a barely warm output to a red hot one, as in an electric stove. In the case of the electric light bulb, this emission is in the form of visible light. We can thank the arduous labors of Thomas Edison for this. He spent much time in finding a substance, which would glow white-hot in an electrical circuit, but would not burn up in a short time. This is history now but it makes clear that photonic energy is not created in the element of the light bulb but that it is already present in the electrical circuit and is simply released to the atmosphere. There are many examples of photonic energy being released from an electric circuit, such as the battery-powered flashlight, but I believe one of the best is the electric welding arc. This is essentially a controlled short circuit between the welding rod tip and the metal being welded. So much photonic energy passes to the metal that it will melt the metal around the point of entry. The electrons jumping the gap merely continue their way through the metal structure. Although the metal is melted by the photonic energy, much of this energy is lost to the atmosphere and causes a blinding bright light. So bright the welder must wear a mask with a very dark lens to protect his eyes. Here is the point, "Where did the heat and the light come from if not already present in the electrical circuit? The electrons provide the means for the flow of photonic energy but have nothing to do with heating anything or producing light. The photons are held in atomic orbits in the electrical circuit but once released, they simply provide heat to the environment. In the case of welding, this heat is intense.

It is only when photonic energy is lost from the electrical circuit that some form of work can be accomplished. It would be more concise to say that the work done at the power generating plant is transmitted to a distant location and put to use. This can be compared, although inexact, to a water pipe system. The water system provides pressure for the water line but no purpose is served until the water is released, or vented, at some point in the line. When water is vented, it serves its purpose. If venting occurs, the pressure in the line drops and the system must do work to restore the pressure. Water doesn't do work in itself but can transfer work from one place to another and the same is true of the electrical circuit. Electrons provide a means to transfer work but until photons are released from the circuit, no work is performed. This is not so apparent in the case of the electric motor but you can be sure that if work is done by an electric motor, photons were released to the atmosphere. In fact, the heat loss of an electric motor is considered a nuisance and measures must be taken to dispose of it. However, it is this "heat loss" that is the measure of the work done. No work, transferred from the power generating station, is done without heat loss to the outside world of the electric circuit. Of course, we now understand that "heat loss" is basically the escaping of photonic energy to the atmosphere. Any loss of photonic energy in the electrical circuit represents work, whether intentional or unintentional.

Coincident with electrical circuits are electronic circuits. Electronic circuits such as radio, TV, computers, etc., have become prominent in our lives basically within the last 50 years or so. The invention of the transistor led to many further innovations of almost

astonishing proportions. Even as recently as 20 years ago most of us didn't foresee the advent of the cell phone or the Internet.

There are too many avenues and too much diversity in electronic circuits to discuss them at any length. It is obvious that photons play a role in any device that has a viewable screen but my assertion remains the same, "Every action is caused by photonic energy". There is one area that remains, however, that I would like to discuss. That is the area of radio transmission. Radio or Electro-magnetic waves is a misnomer that has done much to confuse this subject. The waves that enable the reception of broadcast information over a distance are photonic waves very similar to visible light. The only difference is the frequency of the wave. High voltages at high frequencies drive electrons into an antenna. The electrons only move a short distance within the antenna but since the frequencies are high, this is all that is needed to broadcast. The associated photons have no place to go but to congregate within the atomic structure of the antenna. On each high frequency voltage reversal their only avenue of escape is to the atmosphere in waves, whether directional or omni-directional. Broadcast frequencies are lower than visible light frequencies and therefore behave differently. We all know we have a blue sky because blue light behaves differently than lower light frequencies. Likewise, broadcast waves behave differently than other waves of higher or lower frequencies. This is evident since our radios and cell phones work inside buildings. The reason is that broadcast waves can penetrate the walls of most buildings, much the same as visible light can penetrate a pane of glass. When these waves encounter a receiving antenna, the energy of the original signal is induced into the receiving antenna and we can then gather and use the original broadcast information, an extremely valuable and useful asset in our modern world. This induction of information into the receiver is the reversal of the original broadcast energy.

Electric and electronic circuits are critical to our modern society. We tend to take them for granted even though their introduction has occurred fairly recently. While we can understand how valuable they are and also, in general, how they function, it is imperative that we should not forget that every action is caused by photonic energy. I believe that understanding this important fact will actually enhance future discoveries and developments.

WEATHER

In general, we are blessed with good weather on our planet. Most people tend to live in the areas with moderate weather. Even in these areas, though, sometimes the weather is too hot or too cold or too stormy for our liking. We, in general, just adapt to these extremes and go on with our lives since we can do nothing else. Today, with modern computers, the weather forecasters can give us a good idea of what to expect in the weather several days in advance. Often, however, the forecast is not precise or it is completely wrong. The reason for this is that there are too many variables connected with weather. I intend to discuss these variables but, primarily, I will discuss what drives our weather. Obviously, a lot of energy is contained in the motion of our atmosphere. This becomes more apparent during storms. I will begin by discussing the factors that are important in weather and then give my explanation of the energy that drives it. The foremost factor in our weather is that we have an atmosphere. Obviously, we couldn't exist on earth without our atmosphere but compared to the size of the earth, it is very thin. It is about the thickness of an apple peel as compared to the apple. The second factor is the rotation of the earth. Fortunately, the atmosphere adheres to the earth due to its' relative thinness and to frictional forces. Gravity, of course, is essential to holding the atmosphere in place. This allows the atmosphere to rotate with the earth and we do not notice any lag. Associated with the rotation of the earth is a force known as "Coriolis". Coriolis force is very slight but it has a very important role in our weather. This force is not an actual force but is called an apparent force and it is due to the rotation of the earth. The result of this force causes our trade winds and it causes high-pressure systems to rotate clockwise and low-pressure to rotate counter-clockwise. In the Southern Hemisphere, this is reversed. These highs and lows determine our weather patterns. Highs, or rising air, are generally associated with fair weather and lows, or descending air, with cloudy or stormy weather. The energy needed to drive these pressure systems obviously comes from the sun. Sunlight is more intense near the equator and tends to heat the air more. Heated air rises, and due to the factors just mentioned, moves toward colder regions and eventually sinks back to lower altitudes. This constant movement causes the constant changes in our weather as high and low pressure systems develop and move across the landscape.

Another important aspect of weather is the fact that the earth has more oceans than land areas and it is from the oceans and seas that our weather is enabled because it is from the vast bodies of water on earth that we get our moisture, or rain. Sometimes we get too little rain and sometimes too much, but on the average it is about right and provides for our existence. Lifting water up into the atmosphere requires energy and, of course, this energy is my theme.

When we speak of sunlight we are talking about photons moving through space at high frequencies. This simply means that each photon is followed very closely by

another. Upon, reaching the earth (about an eight-minute trip) the photons first encounter the atmosphere. Fortunately, our atmosphere is opaque and the photons absorbed by atoms or molecules in the air are ejected in the same direction of travel as a following photon encounters the same atom or molecule. As a photon is absorbed, the following photon causes its ejection. In glass, or any transparent material, this happens to result in a straight path so that the photons appear to have passed directly through. As I mentioned previously, certain frequencies of photonic waves do behave differently. We see this illustrated when those frequencies in the blue range scatter in the atmosphere and shine in our eyes as blue light, hence blue skies. (This is also why deep ocean water, which is pristinely clear, looks blue or, more correctly, an ink-like dark blue. It is blue light from the sun shining up out of the water.) When the photonic waves from the sun reach the surface of the earth, the surface atoms absorb them. When an object absorbs visible light, it will reflect the light from its surface at a frequency dependent on its atomic structure. This frequency or mixtures of frequencies will determine the color of the object. The average absorption rate equals the average reflection rate of any object and this maintains the temperature of our planet. This crucial point will be discussed in my chapter on gravity. The key to this discussion of weather is primarily the absorption of photonic energy by our oceans and seas.

Since ocean waters are clear, sunlight penetrates the water for several hundred feet. This means energy from the sun is warming the surface waters. We know that the ocean is warmer in the summer than in the winter yet the ocean temperature follows a predictable pattern. It stays within an expected range according to the season. My point is, if the sun is constantly providing energy to the ocean waters where does all that energy go. The answer is, of course, that it is given up at the surface to the atmosphere. If the waters are warmed, they will rise above the cooler waters beneath. It is at the very surface that the warmest waters, then, will give off this energy to the atmosphere. If the atmosphere is warmed then it also will rise, bringing in cooler air from above. By these means, the ocean waters will maintain its' temperature and remain relatively constant according to the season. This release of energy into the atmosphere, however, is the beginning of a cycle that produces our beneficial and all-important weather. Although much of the energy obtained from the sun is radiated back into the atmosphere, another important process is taking place. This is the process whereby some of the surface molecules of water absorb enough energy that they become vaporous and separate themselves from the surrounding waters and waft up into the atmosphere and, in a sense, become part of it. We all understand that water can exist in three states; frozen, liquid, and gaseous (or vaporous). It is the vapor state in which we are interested because it is the molecule of water vapor that carries the energy from the ocean waters up into the atmosphere and thereby plays a major role in causing our weather to occur. The molecule of water vapor is slightly less dense than the surrounding atmosphere so it slowly begins to "float" upward. This movement of water molecules up into the atmosphere represents, in total, a huge amount of work. The work was done by the sun's rays heating of the water molecules and in changing them to the vaporous state.

A tiny molecule of water vapor can lift a significant amount of photonic energy up into the atmosphere. This energy is contained within the electronic orbits of the molecule and as long as it is in the vapor state, it will retain that energy. When, eventually, the molecule returns to the liquid state, then and only then, will it give up this energy to the

atmosphere. I think of them as tiny firecrackers that explode and release their contained energy out into the atmosphere. This release of energy will occur at or near the dew line. The dew line is like a fence to the molecules of water vapor because there is no room for them on the other side. The air on the other side of the fence contains as much water vapor as it can hold. It is an impasse until a point is reached that some of the vapor molecules are compacted and begin to condense. It is this condensation that begins the process of cloud formation and this is the key to our weather.

When we see nothing but blue-sky overhead we know that it is going to be a nice day but if we see a few cumulus, or fair weather clouds, we also know the weather will not affect us too much for the time being. It is the cumulus cloud, however, that signifies there is a surplus of energy in the atmosphere. As the molecules of water vapor reach the dew line and begin to condense, certain actions begin to occur. The energy released by the molecules into the atmosphere cause heating of the atmosphere. This heated air begins to rise. This rising air passes upward through the dew line. It also carries the molecules of condensed water, which is the substance of the cumulus cloud. The rising air begins a process of drawing up more molecules of water vapor that condenses at, or near, the dew line, which marks the relatively flat base of the cloud. This adds fuel to the fire, so to speak, and will begin to build the cumulus cloud. Cumulus clouds look like big balls of cotton and seemingly placid, but, in fact, this is not the case. Inside, these clouds are turbulent with rising currents of heated air and aircraft avoid them, if possible. These clouds exist only because the air below contains a sufficient quantity of water vapor. Since these clouds are moving with the atmosphere it is likely that conditions below them may change. If the cloud moves into an area with less water vapor, it will begin to dissipate and may disappear altogether. If the water vapor is fairly constant, it may maintain its structure for a considerable period of time. However, if the supply of water vapor increases, it will begin to grow larger and may become a cumulo-nimbus or what we call a thunderstorm. As these clouds form and grow, they become a structure of water molecules with turbulent air currents, which increase with their size. A key point of the cloud structure is that since they are floating on the air below them, they are separate from the earth and have their own center of gravity. This center of gravity explains why the clouds maintain their size and shape for a period of time. Even though the rapid air currents within the cloud will cause large protrusions to jut out from the cloud, these protrusions will generally settle back into the cloud. This is because as they jut out into the colder atmosphere they rapidly lose energy and the weak center of gravity pulls them back toward the clouds' center.

Cumulo-nimbus clouds, or thunderstorms, form if the energy is available in the atmosphere. The heated air rises rapidly and draws up more water vapor to sustain the growth of the cloud. However, if the cloud is associated with a cold front, the cold air near the surface of the earth, being more dense, slides under the warmer air and lifts it up more rapidly. This can intensify the storm dramatically and may result in a line of storms along the front. As the water vapor molecules condense into water droplets, they will begin to merge into larger droplets and eventually will overcome the force of the rising air currents and will begin to fall back to earth as rain, completing the cycle.

Large thunderstorms can result in violent and damaging conditions beneath them. Strong surface winds may occur due to the rapidly rising air currents within the cloud. These rising air currents cause a low-pressure area beneath the cloud and surface air

rushes in as a result. Tornadoes are rare, fortunately, but do occur if conditions are right. I believe tornadoes occur because there is so much lifting of air up into the upper regions of the storm that, eventually, upon cooling and becoming more dense, it begins to descend. Since it must descend through the currents of rising air, it forms rivers through the cloud, turning and twisting its way toward the surface. The Coriolis Force comes into play and may cause the descending streams of colder air to begin to spin. Just as you observe the tiny whirlpool when you drain water in your bathroom basin or tub, the descending cold air begins spinning, due to the Coriolis Force, and forms a low pressure area in its' center. This low-pressure center draws up fresh energy and sustains the tornado. These tornadoes are dangerous but do not become destructive until they reach the surface of the ground. When they extend downward to the surface, then their low-pressure center is impeded and this, in turn, hinders the flow of air up through the eye of the tornado. This can be likened to the blocking of a vacuum cleaner hose. The pressure inside the center becomes lower, which compacts the swirling air even more. This is much like a spinning skater, who, upon pulling their arms in close to the body, spin faster. In like manner, the rotational speed and force of the tornado is increased even further. Its destructive power to the surface of the earth can become very great.

Lightning is another serious threat when thunderstorms are in our area. We know, from my chapter on electricity, that electrons will leave their orbit and travel to a new orbit if they are under the influence of a positive charge. Since water is a good conductor of electricity, the electrons can move through the cloud of water droplets rather easily if a strong enough positive charge is present. Since the cloud is floating on the atmosphere, it moves across the face of the earth along with the prevalent winds. Thunderstorms generally move at about a rate of 20 to 30 miles an hour. Since the cloud is also moving through the earth's magnetic field, electrical charges are produced just as surely as they are produced in the coils of wire at an electrical generating plant. This causes the electrons to move collectively through the cloud. This results in a concentration of electrons in certain areas of the cloud, much the same as a giant condenser or capacitor. The Laws of Physics must always be obeyed and when the charge in one area of the cloud becomes great enough, it will discharge in the form of lightning, a gigantic arc or spark, just as in a short circuit. This lightning may discharge within the cloud or it may discharge to the earth. Also, the lightning can arise from the earth to the positive area of the cloud if conditions are right. Just as in electrical circuits, this arc is accompanied by the photons associated with the electrons. As these photons enter the atmosphere along the path of the arc, instantaneous heating of the air occurs along the path and this results in the thunderclap that always accompanies a lightning strike.

The key to weather, to sum up this chapter, is the tiny molecule of water vapor with its tiny charge of photonic energy. Although tiny, in numbers they lift the ocean waters to the sky where they eventually fall back to earth as rain to refill the reservoirs. These waters sustain the hydroelectric power plants, which, through electrical conductors, transfer the electrical force to our homes so we can flip on our living room lights without so much as giving it a second thought. It is this ongoing cycle that we depend on for our comforts and needs.

There are many more aspects of weather but if you understand the role of the photon in developing cumulus clouds, you understand a lot and can apply what you know to

other areas of weather. The hurricane, for example, puts all of these forces into play in a dramatic fashion.

GRAVITY

The force of gravity has perplexed mankind from the beginning of time. Sir Isaac Newton developed laws to describe this force along with other basic physical laws, which have stood the test of time. He actually invented calculus to aid in mathematically explaining the movement of the earth, moon, and planets about the sun. These movements were grounded in the fact that gravity is a universal constant. How to actually explain gravity, however, proved to be difficult and elusive.

Sir Isaac Newton's first law states: "For every action there is an equal and opposite reaction". This law is the key to gravity. My discussion will bring this out. Gravity is a formidable force and it affects every aspect of our lives. It holds the earth, along with the other planets, in constant and predictable orbits about the sun. It also keeps the moon in a perfect orbit about the earth. The gravity of the moon provides us, twice daily, with high and low tides, without which life on earth could not survive. It causes the rain to fall back to earth as we discussed in the previous chapter. Gravity causes the reservoir waters to flow down through the electric generating plants turbines to produce the electric force we discussed in chapter two. We speak of the force of gravity but this is incorrect terminology, we should speak of the power of gravity because gravity is a power and gravity does work directly. Whereas electricity transfers work from one point to another, as does a lever, gravity performs work itself and directly. If I throw a ball upward, it will always fall back to earth. Nothing caused the ball to fall back to earth but gravity. No action on my part caused the ball to fall back. It remains, therefore, that if the ball fell back to earth, some work was performed on the ball. If work is performed then this means an action occurred. My whole premise is on this point. If an action occurs, then energy was required to cause the action to happen, and there is no energy other than photonic energy. It remains, therefore, that gravity and photonic energy are related. How can this be? The obvious answer is that if gravity performs work, then the energy of gravity must be photonic energy.

It is difficult to assume that there is a connection between sunlight and gravity. The reason for this is that when we think of photonic energy, we usually think of visible light, but there is actually little connection between visible light and gravity. The only connection is that both are related to photons. The difference lies in the fact that visible light is composed of waves of photons in precise frequencies whereas gravity is composed of random photons. I use the word random just to indicate that there is no set frequency of photons involved. Recall my statement that the earth radiates exactly the same amount of energy as it receives from the sun. If this were not the case, the earth would either become too warm or too cool for human survival. Considering the age of

our planet, then I feel with certainty that I can make this statement. The average temperature of the earth is constant. The question is then, if the earth receives a vast amount of energy from the sun, how is this energy dissipated? The answer is, to be sure, by radiation. If, in a restaurant, we have a cup of coffee before us that is too hot to drink, we know instinctively that it will, in time, cool to a comfortable temperature so that we can enjoy drinking it. The reason for this is that the excess photons will move outward and into the atmosphere. The same is true for the earth. Excess photons will arise to the surface layer of atoms and eventually will radiate into the atmosphere and the atmosphere will eventually radiate them into space. This random emission of photons is continuous and occurs planet-wide. Photons travel, or flow, from atom to atom continuously in all parts of the planet. This is a fluid movement and it is basically undetectable since there is no set frequency involved. It is just random motion of photons but the result is a continuous stream of photonic energy flowing outward from the earth. Of course, the earth is far from unique in this emanation. Every heavenly body does likewise. Our moon, the planets of our solar system, and even the sun emanates a huge amount of photonic energy that is not a part of the visible spectrum. It is these randomly emitted photons that constitute gravity. Not just on earth but throughout the universe.

I have heard that scientists are searching for something called a “graviton”. I even heard that when they found it, they thought it would be similar to a photon. I have never heard that photons had anything to do with gravity. I declare here that I believe photons are the basis and cause of gravity and that there is no other mysterious and elusive particle involved. The secret lies in Newton’s simple but far reaching law that “For every action there is an equal and opposite reaction”. What happens when a photon strikes an atom or is absorbed by an atom? Quantum physics has for years taught that the electron moves to a higher orbit. The electron moving to a higher orbit is the action but what is the reaction? It seems obvious to me that if the electron moves to a higher orbit it would just keep on moving outward from the nucleus unless it was restrained. Of course, it is restrained by the strong attraction of the nucleus and this is the “reaction” of the process. To stop the electrons’ outer movement, the attraction between the electron and the nucleus requires a momentary increase or, more simply, a tug or pull between them. I believe a simple example is this. Imagine spinning a ball on a string around your head. If you suddenly let a foot or two of slack to extend the string, the orbiting ball would move outward until the string became taut once more and you would feel this jerk in your hand. It is this jerk, or tug, of the electron on the nucleus that is the basis of gravity. The tug of a single electron would be minute but considering the numbers of atoms in any measurable object, it would be appreciable. In fact, it works out that any object, regardless of its mass, will fall toward the earth at a set and predictable rate. This is significant since it verifies the fact that photon radiation from the earth is uniform and constant, no matter where you are on the earth. Objects with a small mass accelerate at exactly the same rate as objects of larger mass. This is because the summation of the nuclear “tugs” will accelerate the smaller mass object at exactly the same rate as the larger mass object. This is contrary to logic. Consider the acceleration of a sports car and a transport truck. The truck may have a more powerful engine but it will never match the acceleration of the sports car from a standing stop because its’ mass is so much greater. With gravity, however, this is not the case. The more massive object will accelerate at the same rate as the smaller object. This is due to the simple fact that more

“gravitational” photons will strike the massive object than the smaller object and the summation of the forces will be equal in both objects and the result will be equal acceleration.

I wish I could prove my theory mathematically but I will leave that to others. The way I see it, however, is that if a photon is absorbed into an electronic orbit, certain conditions have to be met. The electron would have to be in an orbit traveling in the same direction as the photon. Upon capturing the photon, the electron would rise in its continuing orbit until it reached its new maximum orbital point. This would be at its farthest point from the nucleus and it is at this point the reaction or “tug” would be felt by the nucleus. This gravitational “tug” then would have to occur at, approximately 270 degrees from the original path of the photon. The summation of the “tugs” would always be toward the center of the earth. 270 degrees is reasonable when you consider that the electron is always under the strong attractive influence of the nucleus and, also, its’ great speed of rotation. It would be inappropriate to concentrate only on the outer electronic orbits because the inner electrons can also gain and hold these gravitational photons. An atom of lead has 82 electrons and gold has 79. I believe that the gravitational photons penetrate deep within the electronic orbits of these heavier atoms. (Imagine a comet entering the solar system.)

This is my case of how gravity works. If you are sitting in a chair, you will feel a force pulling you down. It is inescapable. Every object is emitting photons constantly, including your own body. (A key premise of my next chapter on the human body). In essence, every object in the universe is attracting every other object. This is based on the atomic structure, or mass, of the object and has nothing to do with its’ temperature. There is no shortage of photons anywhere in the universe. Every atom in the universe is far above absolute zero. If you were in space, far from our sun, you would see stars in every direction. Every point in space, therefore, has a continuous stream of photons from each visible star passing through it. This “starlight” is weak and highly diluted but the fact remains that every point in the universe has photons in vast numbers present. Also, each of these visible stars shine on every part of the earth continually. Besides this visible stream of photons, there are also the random “gravitational photons” passing through. These “gravitational photons” are responsible for holding galaxies together. It would seem the gravitational photons would be lost among the visible light photons but this is not the case. Recall that visible light is composed of discreet frequencies with each discreet frequency representing a unique color. These frequencies, or colors, can be separated by the use of a simple prism. Visible light is composed of many different colors and the gravitational photons are merely traveling along with them, mixed in with the visible light photons but completely independent of them. In short, the existence of gravitational photons has little, if anything, to do with visible light. Gravitational photons exist everywhere. Whether they are in the deepest, darkest cave or in outer space. They will, of course, be much more concentrated near a massive object just as visible light is more concentrated near its source.

It is interesting, in the case of friction, that a condition exists called frictional adherence or frictional sticking power. It has always been the case that an object, such as a book or a brick, would not slide on a tilted surface when expected. It always seemed to take more tilt than mathematically computed. This adherence, or sticking power, comes simply from the fact that two objects in contact share gravitational photons between

them. In other words, each object is emitting gravitational photons and if they are in contact, they tend to stay in contact. There is a gravitational attraction between their two masses. I have witnessed the difficulty in separating large sheets of window glass, such as used in department stores windows. They just don't want to separate and it takes real force and effort to do it. I have heard this attributed to atmospheric pressure but atmospheric pressure doesn't explain other cases of frictional adherence.

This is my case for gravity. Gravity is a real force. Gravity can and does perform work, and it takes work to overcome the force of gravity. Every object is emitting gravitational photons at all times but the sum total of all gravitational photons will always be directed to the center of the greatest nearby mass, whether the earth, moon, sun, or star.

THE HUMAN BODY

The human body is an incredible machine. As David said in the Psalms, “I am fearfully and wonderfully made”. We could make a comparison of the human body and an automobile. The automobile requires fuel, oil, coolant, four tires, windows, exhaust, and a steering mechanism. The human body, in comparison, needs food, fat, water, four limbs, eyes, elimination, and a brain. The comparison falls short, however, since obviously the human body is far more complicated than an automobile. The automobile was designed to benefit mankind and requires a human to operate it. It is interesting, though, that the automobile is dependent on gasoline to be useful. In like manner, the human body requires food daily to perform our daily tasks. Although the human body has a back-up system, we just don’t operate very well on stored fat. The point is that both the automobile and the human body require an energy source to operate.

Since it has been previously argued that the only existent energy is photonic energy then it remains that both the automobile and the human body are both driven by photonic energy. Since there is only one primary source of photonic energy, the sun, we can conclude that both the automobile and the human body are driven by photonic energy from the sun. Oil is derived from fossil fuels that were originally living plants or animals. Our gasoline, of course, is derived from fossil fuel oil. One molecule of gasoline contains an incredible amount of energy; in fact, one cup of gasoline is equal to about three sticks of dynamite. Virtually all of the food we eat is also from some type of plant life. We either eat plant life directly, primarily vegetables, fruit, or grain, or indirectly, as meat. All meat, of course, is derived from the consumption of plant life. Even the fish food chain begins with plant life. All of the food we eat provides us with the photonic energy we need to conduct our lives.

As we saw in the previous chapter, molecules of water vapor carry within them a concentration of photonic energy and this photonic energy was not lost or released until the molecule condensed. The molecules of food we eat are similar. Photonic energy gained from the sun while the plant is growing is stored within the molecules of the plant and remains there until the molecules are broken down. The concentration of photonic energy varies with different plants. Meat, of course, has a much higher concentration. Pure fat derived from meat can actually be burned as fuel directly. We prefer certain plants to others while some are not digestible at all and might even be poisonous to us. All of the food we eat, however, contains photonic energy. This energy is measured in calories. Burning the food in a laboratory and measuring the heat released, determine the caloric content. Heat and photonic energy are interchangeable terms. Therefore, calories and photonic energy are also interchangeable terms. When we eat food, it is digested and

the blood stream carries the individual molecules to the various parts of the body for use. Our various body parts draw from the blood stream those molecules needed to function. Although our body parts vary in their requirements, a relatively healthy person eating a balanced diet can provide each part of the body with the energy needed. The body also needs fresh air, water, vitamins, and certain minerals to maintain its health but my area of concern is only with the body's energy requirements.

One of the important functions of the body is to maintain a constant temperature. We determine our well being by measuring our temperature. Since temperature is a measure of heat, it follows that what we are measuring is the amount of free photonic energy within our bodies. This free photonic energy arises from only one source. It arises when work is done. We do not have a dedicated internal organ that produces our body heat. It is the entire body with all parts working together that maintain our proper temperature. When our organs do work, such as the pumping of our heart, heat is released into the body. Our muscles produce most body heat, of course. This heat is monitored and maintained by our brain and nervous system and our bodies are kept warm and at a constant temperature. To accomplish this, except in extreme cold weather, excess heat must be discarded. This excess heat, which is free photons captured by the fluids within our bodies, is radiated primarily from our skin cells. We adjust the amount of clothing we wear to assist this process, depending on the current environment we are in. The body actually radiates so much heat that a person can be seen at night at a considerable distance by using an infrared detector, such as is used by the military. This excess heat is greater when we are exercising or working and is less when we are resting. When we exercise, perspiration may result which helps to get rid of it through the evaporation process. When we are resting or sleeping, we generally use some type of covering to reduce the amount of heat radiated. Today, most homes and even automobiles, can be maintained at a fairly constant inside temperature but this can become a real challenge if extreme conditions occur, and if conditions become too extreme, death can result. We've read of extreme heat waves that resulted in hundreds of deaths in our own country.

The normal, healthy human body will maintain its temperature rather easily and will also have on store enough energy to perform our daily activities. To perform, the muscles must have a supply of energy to operate and this energy must be continually replenished. This replenishment comes from the blood stream. The blood, of course, gains this energy supply from our digestive system, or, in short, from the foods we eat. In order for our muscles to do productive work, we know that direction from a complex brain is required. The brain may be too complex for us to understand how it functions but we do know that in order for us to use our muscles, we require a complex network of nerves. Do our brain and our nervous system perform work? The answer must surely be yes and if work is done then, certainly, photonic energy is required. I have no intention of trying to explain our brain and/or our nervous system but I will go on record as saying no action can occur without photonic energy being the energy that accomplishes it. I feel that our brain and nervous system is a combination of chemical and electrical impulses. All chemical and electrical actions require photonic energy. Therefore, every action of the body is based on photonic energy. An example is our vision. If information in the form of photonic energy enters our eyes and our optic nerves, I believe this same photonic energy reaches our brain and is utilized directly or stored. We know our brain

receives pictures via our optical system and these pictures can be retained and put to use. I believe a good example is the seeing of a familiar face in a crowd. Our brain can compare quickly the face in the crowd with a picture stored in our memory. Doesn't it make sense that photons contained in a molecular structure within our brain are used in storing these "pictures" in our memory and can compare them with a new, and possibly familiar, picture entering our eyes? I certainly believe this to be the case. Visibility, or vision, can only occur within the brain of a complex animal. No visibility, or light, exists except when it enters an eye. The energy of visible light exists throughout the universe but visibility only exists in the brain of the faunal creature that captured it. Sound, as well, only exist inside the brain. Outside of the ear it exists only as silent waves of audio energy.

The complexity of the human body could fill volumes and has filled volumes. I firmly believe, however, that the role of the photon has not been given enough attention. I believe that the importance of the photon has been largely overlooked and I further believe that the photon is a common denominator between practically every field of science and engineering. A common denominator from which future discoveries can spring. Every action is caused by photonic energy. This includes every spark caused by friction, every simple or complex electrical circuit, every cloud in the sky, every moonrise, every step we take, and even every thought we have.

This completes my case for the photon. I don't know if I have said too much or too little but I hope, by what you have read, you will look at the world around you a little differently and will give credit where credit is due. Photonic energy is the key. Every action is caused by photonic energy.