

The Bible and Science

Dr. Arthur T. Pierson (1837 – 1911)

Great discoveries of modern times could not, in the nature of the case, have been known to any writers of the Bible; and yet the phraseology of the Bible is found in every case marvellously accommodated to them. The discoveries referred to are such as the following: The vast number of the stars and the immensity of space, the universal laws of motion and rotation, the nature and properties of light and of lightning, the weight of the atmosphere, and the circulation of the blood.

(1) The Vast Number of Stars. This is entirely a modern discovery. The first reliable catalogue of the stars was made by Hipparchus, about 150 B.C., and the second by Ptolemy about 150 years after Christ. Both these catalogues give, in the entire southern and northern celestial hemispheres, about 3,000 – a very easy number to count, and there was no idea of any other stars invisible to the naked eye. When Galileo turned his telescope toward the heavens on the 7th of January, 1610, for the first time it was known that there were stars never before seen; he saw the four satellites of Jupiter, and announced his remarkable discovery. From this point, as telescopes improved, discovery went forward until now it is known that the stars are absolutely countless. When the elder Herschel erected his monster telescope, forty feet in length, and turned it to the heavens in 1789, he talked of “star dust.” He threw new light on the Milky Way and the constitution of nebulae, and, in fact, was the first to give to the human mind any conception of the immensity of the universe. He found that what appeared to be dust on the surface of the firmament was simply groups of stars so thickly crowded that they could not be distinguished by the naked eye. When Lord Rosse mounted his giant reflector weighing twelve tons, in his park at Parsonstown, in 1845, within the range of its speculum, he computed that about four hundred millions might be rendered visible, and yet that was only the third great stage in discovery of their innumerable multitude. As to the number of stars, Herschel computed that in one hour 116,000 passed over the field of his telescope. Up to the sixth and seventh magnitude, they number 14,000, but beyond that, are countless multitudes only

revealed by most powerful telescopes. Others, too far off to be seen even by the telescopic eye, started on their journey long before we were born, perhaps thousands of years ago.

This is a notable modern discovery, first hinted at by Galileo; yet the Bible anticipated it as far back as the time of Abraham. When God appeared to him and gave him the great covenant promise, He told him that his seed should be ultimately as numerous as the “dust of the earth” and the “stars of the sky.” There must have seemed to Abraham a great difference between the number of the stars and the number of the atoms of dust, yet they are alike countless. God knew these facts when He told him that his terrestrial seed should be as numerous as the dust, and his celestial seed as numerous stars. But it was reserved for remote generations to find that both comparisons are equally apt. So Jeremiah wrote (33:22), “As the host of heaven cannot be numbered, neither the sand of the sea measured,” – comparing the host of stars to the grains of sand on the sea shore. The language of the Holy Scriptures is thus exactly adapted to facts not then known, but as unfolded by recent astronomical investigation. The enigmatic expressions of the Old Testament waited for a score of centuries for a scientific interpreter.

(2) The Immensity of space. Of this the ancients had no idea. To them, the “firmament” was a firm or solid sphere as of metal, and all of the celestial bodies moved around it once in every twenty-four hours. The stars, points of light, or lamps, hung in the concave as in a dome; they had no conception of these immeasurable, inconceivable dimensions and distances.

It began to be noted, however, that as some of the stars were fixed, - did not change their relative position, notwithstanding the change of position of the earth in its orbit – they must be at immense distances. The earth being about ninety millions of miles from the sun, has an orbit of some hundred and eighty millions of miles diameter. Even the modern era of the telescope only began to reveal the immensity of space. Some further conception of it is furnished in the fact that the unit of measurement, as to the distances of the stars, is the velocity of light. Light moves 186,000 miles a second; yet even that is too small for a unit of measurement: astronomers have to take for this purpose the distance over which light travels in a year, or over 60,000 times the distance of earth from the sun. That is the unit of measurement, so it is

customary to say that α Centaurus is 4 years off as light travels, Arcturus, 25 years off, Polaris, 46 years off, and Canopus, 108.

Yet even this immensity of space is similarly anticipated in the Word of God! For example, Jeremiah says (31:37), "If heaven above can be measured, and the foundations of the earth searched out beneath, I will also cast off all the seed of Israel." He used the immensity of space as the argument for God's boundless fidelity to His people. When man can measure the heavens above, then God's care for Israel as his beloved people finds its limit. Here the immeasurable spaces of the heaven are assumed. So, in the 55th chapter of Isaiah, verse 9, it is said, "As the heavens are higher than the earth, so are My ways higher than your ways, and My thoughts than your thoughts;" that is to say, the infinite height of heaven above the earth becomes the symbol of the infinite height of God's grace above the deserts of man. Again, in Psalm 103:11, "As the heaven is high above the earth, so great is His mercy toward them that fear Him. As far as the east is from the west, so far hath he removed our transgressions from us." The writer of the 103rd Psalm himself had no conception of what is known by us – that go as far as you will to the east there is still an east, and as far as you will to the west, there is still a west; but God who spoke through him knew that only when you can measure the distance between the remotest east and west can you measure how far away from the forgiven sinner God has removed his sins. Astronomical infinities are brought in to illustrate the infinity of the love and grace of God! There is no accident about that! It is manifestly intelligent design.

(3) The Universal Law of Motion is a difficult subject to touch upon in a brief space. No discovery of modern times has been, in some respects, more startling. Science constructs a sort of vibratory ladder according to the number of vibrations per second, running from sixteen and a half up to 480,000,000,000 – those of the violet ray of light.

Beginning at the lowest audible note and going up eleven octaves, the limit of sound is reached at 38,000 vibrations to the second. Then, passing an unknown region, electricity is reached with about one hundred million vibrations; then dark heat, about 130 thousand million vibrations; then comes the octave of colour, corresponding to the octave of sound, the red rays

with about 400 thousand millions and so on up the spectrum to violet with 480 thousand millions. These vibrations, it is claimed, have been at least approximately reckoned or calculated. Thus not only sound is found to be the result of vibration, but likewise electricity and heat, colour and light. The ear does not detect colour, as it does sound, because the auditory nerve is less sensitive and delicate than the optical. Light really sings, only our ears are not attuned to its melodies and harmonies; we do not hear but see it. But light and sound are closely akin, both of the same nature, both produced by vibrations such as those of the chords of a musical instrument. Bible language singularly anticipates even this discovery. In Job 38:7 we read that “the morning stars sang together,” – “gave forth vibrations,” like a musical instrument, as the Hebrew word literally means. Again, in Psalm 65:8, “Thou makest the outgoings of the morning and evening (sunrise and sunset) to give forth vibrations.” The translators rendered it “rejoice,” but the fact is that Nature, like a great orchestra, gives forth vibrations in different notes and chords of colour, which peal into the ears of the Lord God of Hosts; every morning sunrise and every evening sunset are as choral anthems in His ears! And they would be so in ours if our ears were delicate enough, as perhaps they will be, in the body of glory, in the future life, to detect this “music of the spheres.”

The poetic language of Holy Scripture thus again anticipates or forecasts one of the most recent and striking of all modern discoveries. To such scientific facts is adapted the language of the 19th Psalm, verses 1-3. “The heavens declare [or speak forth] the glory of God... Day unto day uttereth speech, and night unto night showeth knowledge. There is no speech nor language where their voice is not heard.” The psalmist is describing the sun, moon and stars in the heavens, and their radiations of light, in the language of song and anthem, speech and conversation. God knew from all eternity that light and sound were akin, and it is natural that He should so guide the writers of the Bible that their words should accommodate themselves to all these marvels of scientific fact not to be known for millennia afterward.

(4) The Refraction of Light is another discovery, comparatively modern. Ptolemy, the astronomer, is credited with the first intimation of it. Refraction is bending of the ray out of its direct course as it meets different media of transmission. If the sun’s rays were not thus refracted, only the direct or perpendicular rays would reach the earth, the others glancing off

and being reflected into space, so that man would get little benefit; but the atmosphere surrounds the earth in strata or layers, and when the indirect rays encounter these at an angle they are caught and bent round, like the fingers of the hand, and so retained for use. That also seems forecast in the Bible.

In the 38th chapter of Job, verses 12 and 13, we read: "Hast thou commanded the morning since thy days; and caused the dayspring to know his place...?" The original suggests the idea of "coming up to his post in time," which is true to fact, for the diurnal rotation of the earth on its axis is so regular that the day dawn "has not varied the one thousandth of a second, from the exact time due, for the last two thousand years." Then follow these words: "That it might take hold of the ends of the earth," literally bend round like the fingers, and so lay hold – poetic phraseology, but containing within itself all the suggestion of the scientific truth of refraction.

(5) The Weight of the Atmosphere. The discovery of the law of gravitation has been comparatively recent, but it was supposed, even after this force began to be suspected, that certain substances, such as those that we call ethereal and volatile, were not affected by it. Newton demonstrated that its action is universal. Galileo, before him, had found reason to believe the atmosphere to have weight, or gravity, but the thought had never dawned on the mind of the ancients, and no hint of it is found in Plato, Aristotle, or other philosophers of old time. In the Bible it is boldly stated, that it is a part of God's administration "to make the weight for the winds" (Job 28:25), literally to "balance the winds" – exactly the fact – for by their weight they help to keep in equilibrium the great scales of the universe. The actual weight of the atmosphere is found to be 14.73 lbs to the square inch, and the total weight of the air, 11,67085 trillion lbs, or 1-188,000,000th of the entire weight of the globe. Thus, unknown to the ancients – undreamed of by their wise men – this fact is definitely affirmed in the mystic language of this old poem.

(6) The Circulation of the Blood, discovered by William Harvey, in 1619, is, therefore, a very recent discovery. Certain rudimental facts about this system of circulation every schoolboy understands, such as that there are practically two hearts, each having two parts; and that the

auricles receive the blood from the veins, and the ventricles pulse the blood through the arteries. When the blood, forced out through the arteries, deposits its nutriment, it is drawn back through the veins, to be reinvigorated in the lungs. Thus one part of the heart is of the nature of a fountain or spring; but, there being no pulsation in the veins, the other part is a receptacle – a cistern rather than a foundation – a reservoir for the reception of venous blood.

Again, the lung is somewhat like a “pitcher,” and the tube by which air enters it is like the spout of a pitcher. The lung is closely connected with the heart’s cistern, and a great conduit carries the blood from the lung to the auricles.

In Ecclesiastes 12:6-7, the substance of this great discovery is hinted at mysteriously by Solomon: “Or ever the silver cord be loosed, or the golden bowl be broken, or the pitcher be broken at the fountain, or the wheel broken at the cistern.” What this means, we are told: “Then shall the dust return to the earth as it was, and the spirit shall return unto God who gave it.” These are four poetic descriptions of death. Life is a kind of quadruped, moving on four legs: the energy of the brain, the nervous system – cerebro-spinal and sympathetic; and the lung and heart systems, with their great mysteries of respiration and circulation.

“Or the wheel broken at the cistern.” In the East to this day are wells where a wheel pumps up the water through one pipe to discharge it through another. This is what the heart does, pumping up the blood through pipes of blue, to propel it through pipes of red, and long before William Harvey dreamed of the circulation of the blood, God inspired Solomon to use language which not only suggests the general facts of the heart’s action but hints at the two parts of the organ, the “fountain” and the “cistern,” the ventricles and auricles. William Harvey himself might have coveted this inspired description as a poetic statement of the facts he had made known to the human race.

(7) The Universal Law of Rotation. The diurnal rotation of the earth, already referred to in passing, was not known to the ancients, who thought it a stationary body. Yet we read, for instance, “It is turned as clay to the seal, and stands like an embroidered garment” (Job 38:14).

The reference is to the cylindrical seal, which revolved somewhat as, in a printing machine, the cylinder that holds the type and the cylinder that holds the paper roll over each other, and so the paper takes the impression of the type, and stands forth in more or less beautiful forms. So the earth is revolved as the clay under the seal, and takes the impression of light and heat and appears like an embroidered garment. If this be the meaning of this rather obscure figure in Job, it suggests, thousands of years before this was known, the diurnal rotation of the earth. Moreover, all these stars and suns are moving. As the earth revolves on its axis every day, and in its orbit around the sun, once in 365 days, so the sun has its own axial rotation and its own orbit of revolution. But it was reserved for modern times to prove that in a similar manner the whole of the visible universe is in motion, all heavenly bodies circling about their respective centres and the universe as a whole through its orbit in incredibly long periods of time. Mädler believed he had discovered the universal centre, in the star Alcyone, in the little group of seven, called the Pleiades, and suggested that this star might be the throne of God.

In the 38th chapter of Job, we read: "Canst thou bind the sweet influences of Pleiades?" The Pleiades were so called from "pleo," to sail, because the rising of this constellation brought spring rains, but the Chaldaic word means a "hinge," a "pivot," an "axle," the word meaning what moves itself and moves everything else with it. Here the language is accommodated to the fact of universal rotation and suggests that the Pleiades form at least one of the hinges, pivots or axles for this universal motion.

(8) The Nature, Properties and Uses of Lightning. For thousands of years lightning was to man nothing but a disastrous mystery accompanying violent storms and often doing immense damage. It was reserved for Benjamin Franklin to follow out the lines of previous experimental investigation, until he proved that lightning could be laid hold of and utilized. His experiment with his kite, bristling with points, which he flew in the thunder storm, showed that this mysterious force, conducted down the string and gathered in the key at the end, passed with a spark and a slight shock into his knuckle; and so was suggested to him the device of the lightning rod, drawing down the wrath of heaven and turning it harmlessly into the earth, so often used in illustration of the work of the Lord Jesus Christ in Redemption. To that great discovery, we owe it that, in the twentieth century, lightning has become a motor, a messenger

and illuminator, and is fast becoming also a therapeutic agent for the discovery and remedy of disease.

The discoveries in electricity since Franklin's day have come with such rapidity that they seem to surpass any previous unveiling of scientific truth. They constitute the wonder of the ages, and no one can tell what the next few years may develop in electrical science.

But the ancients knew nothing about the lightning flash, which seemed capricious and lawless – it came, they knew not whence, and went, they knew not whither; the lightning suddenly appeared in connection with the storm, then vanished as suddenly as it came; it was impossible to trace it to its dwelling place or determine anything about its philosophy. Man has now found that he can summon the lightning and bid it go on his errands; that he can make it flash intelligence to the earth's ends; that he can control the artillery of heaven, drawn down the volleys of destruction and make them the means of construction – his servants on the earth; that he can cause the lightning, which once destroyed and killed, to heal and make alive, - in fact, totally turning about this most destructive agent of the universe.

Even this is forecast in the Holy Scripture! Look again to the 38th chapter of Job. Here in this old poem arises one of those lofty peaks of inspiration where God seems to set aside human instrumentality, and Himself appears as the speaker.* “Canst thou commission the lightnings that they may come and say to thee, Here we are? Canst thou inspire them with intelligence? Canst thou give them understanding to obey thy behests?” (Job 38:35 – Hebrew).

Other great discoveries are similarly anticipated in Scripture. For example, the correlation and conservation of force.

Such expressions as these are found side by side with others: “He hangeth the earth upon nothing” (Job 26:7) when no one had suspected as yet that so balanced are the great correlative forces of the universe, centrifugal and centripetal, that the earth is hung in space upon nothing,

and has no foundations; its pillars are set in no sockets, because God has so arranged the invisible and silent working forces that they keep the whole universe in a state of equipoise.

While men are assaulting this Book of God, and speaking in terms, sometimes unmeasured, of what they call its errors and its absurdities, all the material worlds and forces of the universe stand as a great orchestra, peeling forth their anthem to Him, Who, in His infinite love and grace, gave such a revelation of His will to the sons of men! “In his temple doth every whit shout, glory!” (Psalm 29:9 – Hebrew)

The Bible and Science: New Horizons

Richard Ward

We are indebted to Dr. Arthur T. Pierson (ATP) for pointing out, in the previous article, phrases in the Bible which did not match commonly held ideas in the ancient world, but which fitted well with what was known by the start of the twentieth century. Further discoveries have been made which vindicate over half of the points which ATP made.

Since his time, astronomers have realised that faint clouds or nebulae are collections of vast numbers of stars thousands of times further away than was suspected in the nineteenth century. Imagine the entire Sahara to be covered with sand to a depth of 50 metres, and the number of grains of sand will match current estimates of the number of stars in the universe (cf. Jeremiah 33:22).

The daily rotation of the earth is not constant as was thought in the nineteenth century. It now takes two thousandths of a second longer than it did in 1900. Broadcast time signals have to be adjusted occasionally to keep clocks in step with the rotation of the earth.

ATP referred to “the correlation and conservation of force”. This was the embryo of an idea which developed into “the principle of conservation of energy”, or “the first law of thermodynamics”.

The air has weight: the translators of the AV did well to render Job 28:25 as indicating that the winds could be weighed in a balance, as there is no other sense in which the winds can be said to be balanced.

Regrettably, the statement that light and sound are of the same nature is incorrect, as is the statement that electricity is a vibration. ATP also appears not to have been rightly informed about the refraction of light. The effect of refraction by the atmosphere is to extend daylight by about four minutes.

The astronomer Mädler was quite right to claim that the sun and visible stars rotate about a common centre. It is now known to be the middle of the Milky Way, and about 60 times further away than the Pleiades.

Benjamin Franklin demonstrated that lightning is a flow of electricity, but ATP calls electricity “lightning.” This is like calling water a raging torrent. In Job chapter 38, Job is humbled and impressed with God’s creative power and use of great natural forces, which are far beyond the ability of man to control. ATP, by a leap, turns verse 35 into a prediction that man would be able to control the flow which powers electric appliances. This is almost opposite to its plain meaning that man cannot control the violence of the lightning flash.

The idea that the earth stays in orbit because there are two balanced forces acting on it is a fallacy that persists despite the efforts of generations of Physics teachers. The plain sense of Job 26:7 stands. The earth is not supported by the four elephants of Hindu myth, or any physical substance; rather God has commanded a force, which Isaac Newton called universal gravitation, to keep the earth circling the sun, and to do much else besides. This is a scientific description of one way in which Christ upholds the universe. Colossians 1:17, Hebrews 1:3.

Knowledge of the Solar System has increased greatly in recent decades. Voyager flew past Io, one of Jupiter's moons, in 1979 and shocked scientists by sending back photographs of continual volcanic activity, far more than was expected. This has been observed ever since, most recently by the New Horizons spacecraft in 2007. Various models for maintaining this activity for billions of years have been proposed, but none match the observations.

On the 14th July this year New Horizons achieved its designers' goal of flying past Pluto and its moon Charon. Scientists who expected to see long-inert frozen spheres were stunned. "Who would have expected to see such young surfaces?" "They have surface areas that have no craters. There must be craters unless they are very young." Given that by "very young" geologists mean less than ten million years, these observations are no surprise to those who take the time scale of Genesis at face value.

Today, many Christians have allowed themselves to be persuaded by beliefs rooted in atheism, but disguised as science. Rather than interpreting the Bible to fit the current consensus, we must use Scripture to inform our understanding of the claims made in the name of science.