

## The Heavens and the Scriptures in the Eyes of Johannes Kepler

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*"The heavens declare the glory of God..."*

*Ps. 19:1*

Acclaimed as one of the most accomplished and influential scientists of his time, the subject of this paper was also a passionate defender of the Christian faith who believed he had been called by God to glorify Him in the study of His Creation. We see a man who was so immersed in both the Scriptures and his exploration of the heavens that his scholarly writings often burst forth with biblical quotations and songs of praise for God the Creator. Though always magnanimous and tolerant of others, he suffered persecution from both Lutherans and Catholics for differing with them in points of doctrine, and risked his professional reputation by publicly upholding a scientific theory not yet accepted by most Christians or scientists. Such a man was the German astronomer and mathematician Johannes Kepler.

Sir Isaac Newton is believed to have exclaimed, "If I have been able to see further than others, it is because I have stood on the shoulders of giants." E. T. Bell asserted that one of the tallest of these giants was Johannes Kepler (Bell, p. 93). His laws of planetary motion were foundational to Newton's law of universal gravitation and revolutionized the field of astronomy. According to Kenneth Howell:

It was Kepler who first searched systematically for physical causes of celestial phenomena and whose mathematical application achieved a degree of accuracy previously unknown. (Howell, p. 109)

Indeed, his mode of operation and standards of rigor transformed the nature of scientific inquiry in general. His genius also produced such treatises as *Stereometria*, an exposition of his method of *smallest divisions* which ultimately paved the way for the discovery of infinitesimal calculus (Caspar, pp. 146, 383), and *Dioptrice*, a pioneering work in the study of optics.

As imposing as was Kepler the scientist was Kepler the man of faith, emphatically proclaiming his belief that God sovereignly rules the universe and has revealed Himself to man in the pages of His two books, Scripture and Nature. Of utmost interest to Kepler were the chapters dealing with the heavens:

For it was by all means the will of God the Creator that the human being, His image, should lift up his eyes from these earthly things to those heavenly ones, and should contemplate such great monuments of His wisdom. Hence the entire arrangement of the fabric of the world tends to bear witness to us of this will of the Creator, as if by a voice sent forth (*Optics*, p. 323).

Thorough examinations of the relationship between Kepler's religious beliefs and his scientific investigations have been conducted by historians and theologians, e.g., *Die Theologie Johannes Keplers zwischen Orthodoxie und Naturwissenschaft (The Theology of Johannes Kepler between Orthodoxy and Natural Science)*, by Jurgen

Hubner, and *Kepler's Tübingen: Stimulus to a Theological Mathematics*, by Charlotte Methuen. No such comprehensive treatment will be attempted here. Rather, this paper intends to demonstrate Kepler's complete absorption in the Scriptures, exploring his understanding and application of them as gleaned from the many biblical quotations, paraphrases, and allusions found in his scientific works and in his personal letters. His perspective on the Bible's authority, its interpretation, and its bearing upon knowledge of the cosmos, will be addressed. Also, a biographical sketch will be given, emphasizing Kepler's call to vocation, position on the creeds, and personal character, in the context of his life and works.

### **Biographical Sketch**

Johannes Kepler was born on Dec. 27, 1571 in Weil, a Roman Catholic city in the Protestant duchy of Württemberg in what was then the Holy Roman Empire. Smallpox nearly claimed his life as a youth and probably caused the visual impairment he endured from boyhood on (Baumgardt, p. 22). He was raised as a Lutheran and developed a profound love of God and the Scriptures which would characterize him as an adult. Groomed for the ministry because of his intelligence and piety, he entered the Lutheran University of Tübingen in 1589.

At Tübingen Kepler studied philosophy, mathematics, and astronomy in addition to theology. Two sightings as a boy had piqued his interest in the heavens: the great comet of 1577 and a lunar eclipse in 1580 (Caspar, pp. 37-8). Now he had the opportunity to learn astronomy at the feet of a master, the renowned Michael Maestlin, Germany's finest astronomer (Tiner, p. 39). Maestlin and Kepler were to remain lifelong friends.

Orthodox Lutherans believed Copernicus' heliocentric theory to be contrary to the Scriptures and consequently only Ptolemy's time-honored geocentric view was taught at Tübingen. Nevertheless, Maestlin was quietly a Copernican and conveyed this perspective to his apt pupil Kepler, who would become its greatest champion (Baumgardt, p. 24).

Kepler's carefully laid plans to enter the clergy upon completion of his studies were altered in a way he would have described as providential. In 1594 Tübingen's faculty highly recommended him for the post of district mathematician and teacher in the city of Graz in northern Austria, also part of the Holy Roman Empire, and he accepted the position, "while explicitly reserving the right to return and enter the clerical profession" (Caspar, p. 51). His duties there included teaching, surveying, and judging the fairness of weights and measures (Tiner, pp. 63-65). He was also called upon to cast horoscopes and to publish his prophecies in a yearly calendar, an endeavor in which he gained respect and popularity despite his ambivalence about its validity. However, he held astronomy in the highest esteem and the allurements of the heavens proved greater than that of any pulpit:

I had the intention of becoming a theologian. For a long time I was restless: But now see how God is, by my endeavors, also glorified in astronomy (Baumgardt, p. 31)

## *Call to Vocation*

Kepler subscribed to the time-honored view that God had authored two books, namely the Holy Scriptures and Nature, for the spiritual enlightenment of man. Concerning this latter book Kepler declared:

I may say with truth that whenever I consider in my thoughts the beautiful order, how one thing issues out of and is derived from another, then it is as though I had read a divine text, written into the world itself, not with letters but rather with essential objects, saying: Man, stretch thy reason hither, so that thou mayest comprehend these things (Caspar, p. 11).

Kepler held that man, having been made in God's image (Gen. 1:26, 27), comes to know His goodness more fully through a systematic investigation of His works:

For He Himself has let man take part in the knowledge of these things and thus not in a small measure has set up His image in man. Since He recognized as very good this image which He made, He will so much more readily recognize our efforts with the light of this image also to push into the light of knowledge the utilization of the numbers, weights and sizes which He marked out at creation. For these secrets are not of the kind whose research should be forbidden; rather they are set before our eyes like a mirror so that by examining them we observe to some extent the goodness and wisdom of the Creator" (*Harmonies* as cited in Caspar, p. 381).

He believed that astronomers were commissioned by God to unravel the mysteries of the skies and convey these truths to the masses "in the same way that a priest or apostle is called to his work" (Methuen, p. 206). He explained the primary purpose of this priesthood:

As we astronomers are priests of the highest God in regard to the book of nature, we are bound to think of the praise of God and not of the glory of our own capacities (Baumgardt, p. 44)

Man's contemplation of the heavens, Kepler maintained, serves to elevate his mind and his spirit:

Should... the kind Creator who brought forth nature out of nothing... deprive the spirit of man, the master of creation and the Lord's own image, of every heavenly delight?... We must not ask therefore why the human spirit takes such trouble to find out the secrets of the skies. Our creator has given us a spirit in addition to the senses, for another reason than merely to provide a living for ourselves... But our creator wished us to push ahead from the appearance of the things which we see with our eyes to the first causes of their being in growth, although this may be of no immediate practical avail to us... But man's soul is something quite different from the other part of man, and the soul is kept alive, enriched and grows by that food called knowledge. The man who does not long for these things is therefore more of a corpse than a living being. Now nature sees to it that there is no shortage of food for the living beings. We are therefore well justified in saying that the variety of the phenomena of nature is so great, the hidden treasures in the dome of the universe so rich, that nature should never run short in material for the human spirit, that the human spirit... ought never come to rest, but that there should be always in this

world a workshop open for the training of man's spirit (Baumgardt, pp. 34-5).

For if there is anything that can bind the heavenly mind of man to this dusty exile of our earthly home and can reconcile us with our fate so that one can enjoy living – then it is verily the enjoyment of ... the mathematical sciences and astronomy (Baumgardt, p. 190).

So in Kepler's eyes God not only approved but actively endorsed the mathematical sciences and astronomy -- indeed, his profession was in no wise subordinate to theology or the pastoral ministry. He believed that man as the divine image-bearer was endowed with the desire and the ability to comprehend the manifold marvels of the works of God. Those with the requisite giftedness to undertake such explorations were divinely authorized to convey their discoveries to others, that they in turn may come to a fuller understanding of the Creator and glorify Him accordingly. To Kepler the acquisition of knowledge of the heavens provided man with spiritual as well as intellectual enrichment, and that his going beyond sensory experience in pursuit of underlying causes was a sign of being truly alive. It is no wonder that Kepler was the first to seek physical explanations of celestial phenomena.

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*Mysterium Cosmographicum* (Secret of the Universe), Kepler's first major work, appeared in 1596, during his tenure in Graz. Though his major thesis (that the five regular solids fit nicely between successive planetary orbits) was later disproved, it was an early indication of his lifelong conviction that God in His consummate wisdom had rationally ordered the universe according to basic mathematical laws. That man was capable of discerning the cosmic structure was a reflection of his being created in the image of God (Gen. 1:26-27), which imbued him with, among other things, the requisite mathematical understanding. (Kaiser, pp. 174-175) He expressed this thought in a 1599 letter to Herwart von Hohenburg:

Those [laws which govern the material world] are within the grasp of the human mind. God wanted us to recognize them by creating us after his own image so that we could share in his own thoughts... and, if piety allows us to say so, our understanding is in this respect of the same kind as the divine, at least as far as we are able to grasp something of it in our mortal life (Kaiser, p. 175).

Kepler married Barbara Mueller, the twice-widowed daughter of a wealthy mill owner, in 1597, and became the doting step-father of her seven-year-old daughter Regina. The next two years would see the couple bury two infant children, Heinrich and Susanna. Barbara would eventually give birth to Susanna (1602), Friedrich (1604), and Ludwig (1607) (Caspar, pp. 71-7, 174).

With the accession to power of Archduke Ferdinand in Dec. 1596, the Catholic Counter-Reformation brought ever-increasing suffering to Protestants living in Austria. Those who wouldn't convert to Catholicism were harassed and ultimately forced to flee the country. This became Kepler's fate in Aug. 1600. With the aid of Bavarian chancellor Herwart von Hohenburg, an enthusiast of science and supporter of his work, Kepler secured an interview and ultimately a position with the Danish astronomer Tycho Brahe, then imperial mathematician in Prague, Bohemia (Baumgardt, p. 58). Kepler and his family would spend the next twelve years in Prague.

Brahe boasted the world's most accurate and complete collection of astronomical observations; on his deathbed in 1601 he pleaded with Kepler to have them and his theories published, that his name and work would live on. Insofar as he could agree with Brahe's point of view, Kepler complied with his wishes, publishing the *Rudolphine Tables*, in honor of German emperor Rudolph II, in 1627.

Kepler was named successor to Brahe as imperial mathematician in Prague and began perhaps the most uninterrupted and productive years of his professional life. Benefiting from having Brahe's superb collection at his disposal, he discovered the orbit of Mars to be elliptical rather than circular, which enabled him to deduce his first two laws of planetary motion. These results were featured in his *Astronomia Nova* (*New Astronomy*) (1609), representing the first truly modern work in astronomy and the pinnacle of Kepler's achievements. His comprehensive studies *Optics* (1604) and *Dioptrice* (1611) revolutionized the science of optics and "earned [him] the universally recognized epithet of founder of modern optics" (Caspar, p. 144).

The laborious and prolonged process of discerning the Martian orbit required him to overcome seemingly insurmountable difficulties, further demonstrating his twin beliefs that a rational God had imparted a simple geometric structure to the cosmos and that man as the divine image bearer could discover it (Kaiser, pp. 174-175).

Still worse tragedies were to befall Kepler in 1611. Six-year-old Friedrich succumbed to smallpox in January and the grieving Barbara contracted typhus and died in July (Caspar, pp. 202, 206).

With the deposition of Emperor Rudolph in 1611 by his brother Matthias, political turmoil reigned in Prague and Kepler sought a livelihood elsewhere. Desiring to return to his native Wurtemberg, he hoped for an appointment to Tubingen's faculty but was refused by the Wurtemberg consistory on religious grounds (Baumgardt, p. 101). He was denied for his failure to consent to certain points of the Formula of Concord (1580), orthodox Lutheranism's official statement of doctrine (Howell, p. 43).

### *Position on the creeds*

Though Kepler regarded himself as a lifelong Lutheran, he could not subscribe to his church's official confession. He took exception to the beliefs that Christ's body was omnipresent and that His body and blood were present with and permeated the bread and wine during the Lord's Supper, a viewpoint called consubstantiation. He favored the Calvinist position that Christ was spiritually but not bodily present with the elements during the sacrament (Hubner, "Kepler's Praise of the Creator," pp. 369-382).

The Formula of Concord (1577) asserted that those who do not accept the Lutheran view are subject to "judgment and damnation if they do not repent and reform" (Methuen, p. 44). In good conscience Kepler could not subscribe to a doctrinal system that would condemn brothers of other creeds, namely Calvinists and Catholics. This barred the door of any possible return for him to Tubingen. In later years at Linz he would be denied communion and even excommunicated from the Church for his refusal to assent to the divisive formula (Caspar, p. 213). So the man who had suffered persecution at the hands of Catholics for his Lutheranism was now being ostracized by fellow Lutherans.

In *The Harmonies of the World* (discussed below), Kepler included a prayer patterned after Jesus' high priestly prayer of John 17, for unity in the Church, noting the harmony among the persons of the Trinity and that displayed in the heavens (Howell, p. 134):

Holy Father, keep us in the concord of mutual love, so that we may be one, as You are one with Your Son, our Lord, and the Holy Spirit, and as You have made all Your works one by the delightful bonds of consonances; and so that from the restored concord of Your people the body of Your Church may be built on this earth just as You have constructed the heaven itself from harmonies. (*Harmonies*, p. 452)

Christians should commend Kepler's courage of conviction and commitment to ecumenicity, especially considering the religious dogmatism and intolerance of the age in which he lived. Admittedly, formulating an unambiguous statement of belief serves each branch of Christianity in general and Protestantism in particular in its promotion of doctrinal consistency and church unity. Yet strict adherence to standards that damn proponents of alternative viewpoints, excepting positions that reject such fundamental doctrines as Christ's deity, His atoning work on the cross, and the Trinity, is divisive and damaging to Christendom as a whole. The notion that one's faith is invalidated by his/her perspective on Holy Communion is not supported by Scripture and the resulting disunity can serve only to bring disrepute to the Church and by association, Christ. It can be argued that by rejecting such exclusionary thinking, Kepler brought upon himself the *persecution for righteousness' sake* Jesus spoke of in His Sermon on the Mount. Such righteous sufferers, however, were promised admittance into *the kingdom of heaven* (Matt. 5:10).

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Kepler's opportunity to leave Prague came in 1612 when the nobility of Upper Austria offered him the position of district mathematician in Linz, near Graz and on the Danube River. There he would continue his scientific activities and there he would remarry, choosing amidst the advice of many well-wishers from eleven *candidates* (Baumgardt, pp. 105, 114). In October of 1613 he was wed to the much-younger Susanna Reuttinger and their union would produce seven children, only three of which would survive childhood (Caspar, pp. 222-3).

Kepler would remain in Linz for fourteen years and produce such masterpieces as *Harmonice Mundi* (*The Harmonies of the World*), a discussion of the harmonic proportions divinely imbedded in the cosmos that featured his third and final law of planetary motion (*Harmonies*, p. 147); *Stereometria Doliorum Vinariorum*, a mathematics treatise whose imaginative methodology helped to pave the way for the discovery of calculus (*Epitome*, p. viii); and *Epitome of the Copernican Astronomy*, "the first systematic complete presentation of astronomy to introduce the idea of modern celestial mechanics" (Caspar, p. 297).

#### *Personal character*

Given his emergence as one of the premier scientists in all of Europe, let us pause to consider Kepler the man. Max Caspar, perhaps the greatest of Kepler scholars, claimed that

The best sought his company. His frankness, his strength of character, his

amiability, his faithfulness, his warmth of feeling, the purity of his way of thinking -- no less than his wealth of knowledge, the ready wit of his judgment and his sociability in conversation attracted all who had taste and understanding for human goodness and greatness (Caspar, p. 370).

No less remarkable than the profundity of his scientific thought was his perseverance through unrelenting trial and hardship. He suffered the loss of his first wife and seven of his children and was plagued by a frail constitution and a host of chronic illnesses, including poor vision, fever, stomach ailments, and boils (Caspar, p. 369). Nevertheless, he found time to author eighty books and numerous other smaller works (Tiner, p. 194). Ongoing religious persecution had disheartened him but could not break his resolve to follow his conscience. Undaunted by the innumerable laborious calculations he must perform, he succeeded in discovering the orbit of Mars, the first step in his transformation of astronomy.

Kepler was professionally magnanimous and genuinely humble, rare attributes for one so accomplished. After a quarrel with Tycho Brahe, Kepler became so remorseful that he penned a poignant letter to Brahe, accepting all the blame and asking for forgiveness; the two men were easily reconciled. A work of Kepler's which far surpassed the accomplishments of Copernicus he modestly entitled *Epitome of the Copernican Astronomy*, subordinating his achievements to those of his mentor (Caspar, pp 106-7, 298). Though Galileo had remained silent when asked by Kepler to appraise his masterpiece *Astronomia Nova*, "Kepler wholeheartedly acclaimed the immense contributions to astronomy that were made by Galileo's *Conversation with the Starry Messenger*" (*Conversation*, p. xix).

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An ominous new threat beset the Kepler household in late 1615: His mother had been accused by authorities of witchcraft, a serious charge often carrying deadly consequences in those days. Mrs. Kepler's main accuser was a former Leonburg (in Wurttemberg) neighbor and friend who attributed the former's peculiarities to bewitchment and Satanic possession.

Though her son argued vigorously and persistently on her behalf, Mrs. Kepler was taken to the torture chamber in September 1621 in order that a confession might be coerced from her. She courageously and resolutely denied the charges lodged against her, and received her vindication when she was acquitted in October 1621; she died six months later (Baumgardt, pp. 161-2).

As had happened in both Graz and Prague, political upheaval engulfed Kepler in Linz and precipitated his flight out of Austria in 1626. In Ulm on the Danube River he published his *Rudolphine Tables* in 1627, fulfilling the promise he made to Tycho Brahe twenty-six years earlier. But he was in dire need of income to support his sizeable family. The emperor owed him a considerable amount in back salary, dating to his days in Prague, but repeated efforts on his part to secure payment had been in vain. Relief was extended by Duke Albert von Wallenstein, commander-in-chief of the emperor's armies, when he offered Kepler a salaried position in Sagan in Silesia (Connor, pp. 354-358).

The year 1630 began joyously for Kepler as his eldest daughter Susanna married a trusted protégé and his wife gave birth to another daughter, Anna Maria. But political

and religious turmoil in Germany forced the ouster of Wallenstein and again Kepler sought to collect from the imperial treasury what he was owed (Connor, p. 361). In late fall in adverse weather he made a long and perilous journey by horseback to Regensburg to appeal his case before an imperial congress assembled there. He caught a cold as he reached his destination and soon developed a high fever. His condition worsened and clergymen were brought to his room. To a minister who asked the basis on which he pinned his hopes of salvation he replied emphatically, "Solely by the merits of Jesus Christ, our Savior" (Burke, p. 129). He breathed his last on Nov. 15, 1630.

## Kepler and the Scriptures

### *Authority of Scripture*

To Kepler, the Scriptures were of divine origin and therefore held supreme authority as a rule of interpretation of all truth (Methuen, pp. 213-214). Authored and anointed by the Holy Spirit, the Bible took precedence over all other sources of truth, e.g., reason, the patristic witness, church councils, etc., and was the standard by which "all teachings and writings are to be weighed." (Hubner, *Die Theologie*, pp. 160-4) Kepler expressed these sentiments in the following quotes:

I declare hereby, against any and all of my friends or opponents, spiritual or worldly, that I establish and build the foundation of my faith, by which I am emboldened to serve God, my Creator, in this world and to reach blessedness forever, exclusively on the most clear sayings of the written word of God, known for all times, in their original language. In no way will I allow others to slander me by saying that I have accepted or defended some points of my faith in opposition to the clear word of God, on the basis of reason or of the view of some worldly rabbi (Hubner, *Die Theologie*, footnote on p. 160).

There is nothing in all the sciences which could hold me from my opinion [concerning Copernicus], nothing, except solely and alone the authority of the Holy Scriptures (Caspar, p. 300).

Consistent with Lutheran (and generally Protestant) orthodoxy, Kepler affirmed the unity, the sufficiency, and the perspicuity of the Word of God. The Bible was without contradictions, as all parts were complementary and merged into a unified whole (Howell, p. 117). In addition, Scripture was perfectly sufficient and complete as a rule of faith and life, amply explaining all that man must know concerning the will of God, the duties of man, and the way of salvation. Finally, Scripture's clarity respecting key doctrines, especially salvation, rendered its truth accessible to all without necessitating ecclesiastical interpretation (Hubner, *Die Theologie*, pp. 163-4).

The priority Kepler afforded Scripture in the numerous biblical allusions found in his scholarly works and personal correspondences amply testifies to its importance in his thinking. Indeed, he governed his life by principles found in the Scriptures: Kepler overcame numerous obstacles in his road to success (*Let us run with endurance the race that is set before us – Heb. 12:1*); he chose to endure persecution rather than compromise his religious convictions (*Blessed are those who are persecuted for righteousness' sake – Matt. 5:10*); he routinely elevated others above himself (*In lowliness of mind let each esteem others better than himself – Phil. 2:3*); he



passionately promoted unity in the Church, that it might reflect this attribute of the Persons of the Trinity (*And the glory which You gave Me I have given them, that they may be one just as We are one – Jesus' prayer in John 17:22*); and he tirelessly labored to glorify God in his study of the heavens (*And whatever you do, do it heartily, as to the Lord and not to men – Col. 3:23*).

Perhaps Kepler's veneration for Holy Scripture is most eloquently captured by the Apostle Paul in 2 Tim. 3:16-17:

*All Scripture is God-breathed and is useful for teaching, rebuking, correcting and training in righteousness, so that the man of God may be thoroughly equipped for every good work.*

Kepler would likely have claimed that his grounding in the Scriptures uniquely equipped him for the good work to which he had been called.

#### *Biblical interpretation and accommodation*

According to Kepler, the correct interpretation of a given text required the determination of the author's intention, which, in turn, depended upon a thorough familiarity with the language employed. Holding to the doctrine of Scripture's perspicuity, he employed the time-honored hermeneutical principles of contextual and historical analysis; interpreting Scripture by Scripture, i.e., illuminating darker passages via comparison with similar clearer ones; and appealing to a biblical accommodation to man's common yet flawed understanding, when established physical truths require this type of non-literal interpretation (Howell, pp. 117-119, 124-131).

Committed to the truth of God's two books, Kepler insisted that scientific and biblical truth are one, that they are never in conflict with each other – therefore every effort must be made to reconcile them (Methuen, pp. 218, 224). He believed the intention of Scripture was not instruction in natural science but spiritual illumination. Thus commonly-accepted expressions and descriptions of nature that were contrary to verified scientific truths were sometimes employed by God in the Scriptures to effect a nobler purpose, namely the attainment of the "knowledge of God and His plan for the salvation of men" (Hubner, *Die Theologie*, p. 221). Proponents of this theory of accommodation, whereby God condescends to man's limited understanding through His written revelation, predates Kepler and includes such notable figures as the Church Fathers, Augustine, Thomas Aquinas, and John Calvin (Hubner, *Die Theologie*, pp. 223-5). As God reveals Himself in the heavens as well as in Scripture, He likewise accommodates Himself to man's perception in this realm, in particular, that certain celestial and terrestrial events are related. For instance, Kepler interpreted the nova of 1604 as a message from God to man analogous to the Star of Bethlehem at the time of the birth of Christ. In his eyes God's most profound accommodation to man was the incarnation of His Son, who took upon Himself man's whole nature, including his frailties and weaknesses, yet was without sin (Hubner, *Die Theologie*, pp. 226-8).

As observed earlier, Kepler enthusiastically subscribed to the Copernican heliocentric theory, but theologians adamantly opposed it, arguing that it violates the clear teaching of Scripture that the sun traverses the heavens above an immobile earth, e.g., Ps. 19:1-6, Josh. 10:12, 13. In the introduction to his *New Astronomy*, Kepler gave

a plausible and natural interpretation of these passages compatible with what he believed to be scientific truth. In Ps. 19 David declared that in the heavens God

... has set a tabernacle for the sun, which is like a bridegroom coming out of his chamber, and rejoices like a strong man to run its race. Its rising is from one end of heaven, and its circuit to the other end; and there is nothing hidden from its heat. (Ps. 19:4-6)

Concerning the sun's motion across the sky, Kepler pointed out that the author simply described what appeared and was commonly understood to be true, in order to prefigure Christ's (the Bridegroom) coming into the world:

Here, under the image of the sun, are sung the spreading of the Gospel and even the sojourn of Christ the Lord in the world on our behalf, and in the singing the sun is said to emerge from the tabernacle of the horizon like a bridegroom from his marriage bed, exuberant as a strong man for the race. The psalmist was unaware that the sun does not go forth from the horizon as from a tabernacle (even though it may appear so to the eyes). On the other hand, he considered the sun to move for the precise reason that it appears so to the eyes. ... He expressed it so because in either case it appeared so to the eyes. He should not be judged to have spoken falsely in either case, for the perception of the eyes also has its truth, well suited to the psalmist's more hidden aim, the adumbration of the Gospel and also of the Son of God (*New Astronomy*, p. 60).

In *Optics* he expressed it thus:

For Scripture does not speak falsely, but affirms with perfect truth that the sense of vision says this, or better, that [Scripture] accommodates to its own purpose this thing suggested by the sense of vision. The astronomer, on the other hand, or rather, the optician, convicts the sense of vision of error without any affront (*Optics*, p. 338).

We read in Joshua 10 that God granted Joshua's request that the sun would stand still in order that he defeat the Amorites in battle:

Then Joshua spoke to the LORD in the day when the LORD delivered up the Amorites before the children of Israel, and he said in the sight of Israel: "Sun, stand still over Gibeon; and Moon, in the Valley of Aijalon." So the sun stood still, and the moon stopped, till the people had revenge upon their enemies... So the sun stood still in the midst of heaven, and did not hasten to go down for about a whole day. (Josh. 10:12, 13)

Concerning this passage Kepler echoed his earlier argument that Scripture is speaking according to man's visual perception of the sun's movement. At issue for Joshua was obtaining sufficient daylight for successful prosecution of the battle, not astronomical correctness:

Joshua meant that the sun should be held back in its place in the middle of the sky for an entire day with respect to the sense of his eyes, since for other people during the same interval of time it would remain beneath the earth.

That thoughtless persons pay attention only to the verbal contradiction, 'the sun

stood still' versus 'the earth stood still', not considering that this contradiction can only arise in an optical and astronomical context, and does not carry over into common usage. Nor are these thoughtless ones willing to see that Joshua was simply praying that the mountains not remove the sunlight from him, which prayer he expressed in words conforming to the sense of sight, as it would be quite inappropriate to think, at that moment, of astronomy and of visual errors. For if someone had admonished him that the sun doesn't really move against the valley of Ajalon, but only appears to do so, wouldn't Joshua have exclaimed that he only asked for the day to be lengthened, however that might be done? He would therefore have replied in the same way if anyone had begun to present him with arguments for the sun's perpetual rest and the earth's motion.

Now God easily understood from Joshua's words what he meant, and responded by stopping the motion of the earth, so that the sun might appear to him to stop. For the gist of Joshua's petition comes to this, that it might appear so to him, whatever the reality might meanwhile be. Indeed, that this appearance should come about was not vain and purposeless, but quite conjoined with the desired effect (*New Astronomy*, pp. 60-1).

Kepler also discussed passages of Scripture that do not bear directly upon the question of geocentrism, but for which a literal physical interpretation leads to absurdity (Howell, p. 120):

Suppose someone were to assert from Psalm 24, that the earth is founded upon rivers, in order to support the novel and absurd philosophical conclusion that the earth floats upon rivers. Would it not be correct to say to him that he should regard the Holy Spirit as a divine messenger, and refrain from wantonly dragging Him into physics class? For in that passage the psalmist intends nothing but what men already know and experience daily, namely, that the land, raised on high after the separation of the waters, has great rivers flowing through it and seas surrounding it. Not surprisingly, the same figure of speech is adopted in another passage, where the Israelites sing that they were seated upon the waters of Babylon (Ps. 137), that is, by the riverside, or on the banks of the Euphrates and Tigris.

If this be easily accepted, why can it not also be accepted that in other passages usually cited in opposition to the earth's motion we should likewise turn our eyes from physics to the aims of Scripture? (*New Astronomy*, pp. 62-3).

Time and again Kepler insisted that God's purpose in Scripture is nobler than merely educating in astronomy, as Max Caspar explains:

To this literal interpretation Kepler repeatedly [maintained] the thesis that it is not the purpose of the Holy Scriptures to instruct men in natural things. This he had already done especially impressively in the introduction to the *Astronomia Nova* and now also did in the *Epitome*. Rather in this domain it is better to conform to the human use of language to speak with humans, in the human way in order to be understood by the humans, and to make use of such expressions only to impart to them higher and divine things and to place before their eyes the size and power of God in His mighty and glorious creation (Caspar, pp. 299-300).

Another way in which God accommodates to man's level of understanding, according to Kepler, is in man's contemplation of the immensity of the earth and sky. While astronomers acknowledge the enormous disparity in magnitude between the two,

Scripture regards them as comparably immeasurable and interminable, and this because of man's limited perception:

What absolutely all men imagine, the first line of holy scripture presents. 'In the beginning,' says Moses, 'God created the heaven and the earth,' because it is these two parts that chiefly present themselves to the sense of sight. It is as though Moses were to say to man, 'This whole worldly edifice that you see, light above and dark and widely spread out below, upon which you are standing and by which you are roofed over, has been created by God.'

In another passage (Jer. 31:37), Man is asked whether he has learned how to seek out the height of heaven above, or of the depths of the earth below, because to the ordinary man both appear to extend through equally infinite spaces. Nevertheless, there is no one in his right mind who, upon hearing these words, would use them to limit astronomers' diligence either in showing the contemptible smallness of the earth in comparison with the heavens, or in investigating astronomical distances. For these words do not concern measurements arrived at by reasoning. Rather, they concern real exploration, which is utterly impossible for the human body, fixed upon the land and drawing upon the free air (*New Astronomy*, p. 62).

We do not see in Kepler a man who bends Scripture to fit his scientific beliefs, but rather, one who perceives the subtlety and nuances of its speech. Instead of superficially searching for verses to support his preconceived notions, Kepler has painstakingly analyzed the Scriptures as a whole, employing time-honored hermeneutical methods, to discern the true meaning of passages concerning the physical universe. What joy must this man who was defined by his love for God's Two Books have experienced as he discovered the compatible and complementary nature of the truths each proclaimed! It is no wonder that his enthusiasm for both nature and Scripture and what each reveals of the other so overflows in his many writings. For one who shares these loves reading Kepler is a devotional experience as well as an intellectual exercise.

### *Scripture applied to the heavens*

Kepler's many written works persuasively and powerfully integrate first-rate scientific thought with profound religious belief. In them he expounds the Scriptures while exploring the heavens, drawing from a host of biblical passages to "show that God has written His own grandeur in the fabric of the heavens" (Howell, p. 113). In his *Secret of the Universe* he appeals to the Psalms to reflect upon God's marvelous Creation:

We are concerned with the Book of Nature, so greatly celebrated in sacred writings. It is in this that Paul proposes to the Gentiles that they should contemplate God like the Sun in water or in a mirror. Why then as Christians should we take any less delight in its contemplation, since it is for us with true worship to honor God, to venerate Him, to wonder at Him? The more rightly we understand the nature and scope of what our God has founded, the more devoted the spirit in which that is done. How many indeed are the hymns which were sung to the Creator, the true God, by the true worshiper of God, David, in which he draws arguments from the marvels of the heavens. "The heavens are telling," says he, "the glory of God. [Ps. 19:1] I shall see thy heavens, the work of thy fingers, the Moon and stars, which thou has created. [Ps. 8:3] Great is our Lord, and great is his excellence, who numbers the multitude of the stars, and calls them all by name. [Ps. 147:4] "

Elsewhere, full of the spirit, full of holy joy, he exclaims, and acclaims the very universe, "Praise the Lord, ye heavens, praise him ye Sun and Moon, etc." [Ps. 148:3-4] (*Secret*, p. 53).

Kepler most eloquently embeds reference to the five regular solids, central to his planetary orbit hypothesis in *The Secret of the Universe*, in his paraphrase of Psalm 8:

Great God, Creator of the Universe, and our eternal power, how great thy fame in every corner of the whole wide world! How great thy glory, which flies wondrously above the far-flung ramparts of the heavens with rushing wings! The babes salute it, spurning the breast, replete, and with his halting lips bears powerful witness – witness which confounds the haughty enemy, who shows contempt for thee, and shows contempt for law and justice. Yes, to believe thy Godhead is within this spacious sphere, let me look up astonished at thy achievement of this mighty heaven, the work of the great Craftsman, miracles of thy strong hand; see how thou hast marked out the five-fold pattern of the starry spheres, dispensing light and spirit from their midst; see by what law thou dost control the reins of their eternal course; see how the Moon varies her path, her toils, how many stars thy hand has scattered over that boundless field.

Great Builder of the Universe, what plea of the poor, humble, small inhabitant of this so tiny plot compelled thy care for his harsh troubles? Yet thou doest look down on his unworthiness, carry him up on high, a little lower than the Gods, bestow great honors on him, crown his head nobly with diadem, appoint him king over the tokens of thy handiwork. Thou makest all that is above his head, the great spheres with their motions, bow before His genius. All creatures of the Earth, the herds bred for his works, and fitted for the smoking altars, and the generation of wild beasts which remain to dwell in woods, the birds, which with light feathers strike the air, the fish, which swim through rivers and through seas, over all these by thy command he rules by his dominion and his strong right hand.

Great God, Creator of the Universe, and our eternal power, how great thy fame in every corner of the whole wide world" (*Secret*, p. 225).

In *The Harmonies of the World* Kepler equated his new cosmology with Moses' construction of the tabernacle in the wilderness. It is likely that he saw himself building upon the astronomical foundation laid by Ptolemy (who resided in Alexandria) in much the same way that the Israelites had utilized raw materials provided by the Egyptians (Howell, p. 115). He also acknowledged the possibility that *Harmonies* may have to wait 100 years to be understood and appreciated by its readers:

It is my pleasure to taunt mortal men with the candid acknowledgment that I am stealing the golden vessels of the Egyptians to build a tabernacle to my God from them, far, far away from the boundaries of Egypt... Let it await its reader for a hundred years, if God Himself has stood ready for six thousand years for one to study him" [Ex. 12:35, 36; 25:1-8] (*Harmonies*, p. 391).

Kepler represented the glory of God and the misery of man as the sun and the earth, respectively, in his *Conversation with Galileo's Sidereal Messenger*:

In the center of the world is the sun, heart of the universe, fountain of light, source of heat, origin of life and cosmic motion. But it seems that man ought quietly to shun that royal throne... Heaven was assigned to the Lord of Heaven, the Sun of

Righteousness [Mal. 4:2 – an allusion to Christ]; but earth, to the children of man. God has no body, of course, and requires no dwelling place. Yet more of the force which rules the world is revealed in the sun (in the heaven, as various passages of Scripture put it) [e.g., Matt. 24:29, Mark 13:25] than in all the other globes. Because man's house is otherwise, therefore, let him recognize his own wretchedness and the opulence of God (*Conversation*, p. 45).

The sphere, beautiful in its symmetry and simplicity, provided Kepler with a model of both the relationship between the Persons of the Trinity and the cosmos. We observe in his works *Optics* and *Epitome* that the center of the sphere corresponds to God the Father and its outer surface, the Son, reflecting that Christ is “the image of the invisible God” (Col. 1:15), the exclusive path to God (John 14:6), and “the brightness of His glory and the express image of His person” (Heb. 1:3). The sphere's intermediate space, which “results from a comparison of the center with the surface and proceeds from both,” represents the Holy Spirit, indicating His relationship with and equality to both the Father and the Son and His “intercession for the saints” as described in Rom. 8:27. Cosmologically, the sphere's center symbolizes the sun; its outer surface, the fixed stars; and the intermediate space, the heavens, demonstrating Kepler's commitment to heliocentrism (Howell, pp. 128-129).

Also Kepler likens the stars in the heavens to a garment:

The sphere of the fixed stars keeps the heat from flowing out, like a wall of the world, or a skin or garment – to use the metaphor of the Psalm of David [Psalm 104:1-6] (*Epitome*, p. 15).

Likely Psalms 48 and 148 moved Kepler to compose the majestic hymn of praise that concludes his *Harmonies of the World*:

Great is our Lord, and great is His excellence and there is no count of His wisdom. Praise Him, heavens; praise Him, Sun, Moon, and Planets, with whatever sense you use to perceive, whatever tongue to speak of your Creator; praise Him, heavenly harmonies, praise Him, judges of the harmonies which have been disclosed; and you also, my soul, praise the Lord your Creator as long as I shall live. For from Him and through Him and in Him are all things, “both sensible and intellectual,” both those of which we are entirely ignorant and those which we know, a very small part of them, as there is yet more beyond. To Him be praise, honor, and glory from age to age. Amen (*Harmonies*, pp. 497-8).

Clearly, Scriptural allusions to the heavens moved Kepler to glorify the God of the Bible for His many attributes. In Kepler's references to the Psalms found in *The Secret of the Universe* and *Harmonies of the World*, God was exalted as the all-powerful and all-wise Creator of the universe; in his paraphrase of Psalm 8 he celebrated God's sovereignty, eternity, and omnipresence; in biblical passages cited in *Conversation* he affirmed God's righteousness and incorporeality; in the references to Exodus found in *Harmonies* Kepler depicted God as longsuffering. He acclaimed God's Trinitarian nature in New Testament allusions found in his *Optics* and *Epitome*. It seems Kepler was most attuned to God's self-revelation in His Book of Scripture in passages touching upon His Book of Nature.

## **Conclusion**

To many in an age that is so detached from orthodox spiritual and historical moorings, a study of the life and works of a religious scientist who lived 400 years ago must seem uninteresting and irrelevant. Yet those who invest themselves in this study cannot help but be drawn to Kepler's vibrant personality and awed by the impact he had on his world and has on our world today. The French astronomer and historian Jean Sylvain Bailly ranked Kepler as one of the greatest men who ever lived and the English astronomer Horrox declared, "He who has Kepler, has everything." According to Leibniz he was an "incomparable man" who "did not know how rich he was" (Caspar, p. 387).

The breadth and depth and import of Kepler's works, coupled with his revolutionary way of thinking, establish him as one of a handful of fathers of modern science. His originality, standard of rigor, and thoroughness; his relentless pursuit of the physical causes of astronomical phenomena; and his founding of the principle that observation must verify theory, forever changed the nature of scientific inquiry. He transformed astronomy by convincing the world of the truth of Copernicus' theory, discovering the laws of planetary motion, and conjecturing that a force in the sun causes this motion (Caspar, p. 67). The English astronomer Edmond Halley, noted for the comet which bears his name, wrote in his review of *Principia* that Newton's first 11 propositions were "found to agree with the Phenomena of Celestial Motions, as discovered by the great Sagacity and Diligence of Kepler" (Gingerich, p. 51).

The innovative mathematics he used in his works *New Astronomy* and *Stereometria Doliorum Vinariorum* led to unprecedented developments in that discipline as well:

What in the *Stereometria* also amazes everyone who likes mathematics is the boldness in putting the question and the inventiveness in the attempts at solution of the problems set. Just as Kepler had prescribed new ways and goals for mathematics by the integration problems for the models of motion which he attempted in the *Astronomia Nova*, so also with the infinitesimal considerations in his *Stereometria*, he put himself, as will be generally recognized, as creative mathematician in the forefront of the men who paved the way for the revolutionary method of the integral calculus, which was being ushered in (Caspar, p. 235).

His contributions to optics, most notably his exposition of the physical principles by which light is transmitted through a telescope in his book *Dioptrice*, establish him as the "father of modern optics" (Caspar, p. 199). The French philosopher and astronomer Pierre Gassendi asserted that, "The world will marvel whenever it contemplates the Herculean accomplishments and the incomparable genius of this man" (Caspar, p. 361).

History can boast of few who have so altered the course of science as Kepler, but perhaps even fewer who so wholeheartedly sought to glorify God in their interpretation of nature. That great works of science should overflow with biblical allusions and praise for the Creator was noteworthy in his time and unprecedented today – yet amongst Christians this should not be the case. For them all truth is God's truth – nothing in creation is apart from His sovereign control. Studying His handiwork is tantamount to studying Him. Scripture teaches that *the heavens declare the glory of God* and during his lifetime Kepler served admirably as their mouthpiece. Imagine the impact upon our age if all scientists and mathematicians who profess the Christian faith would follow Johannes Kepler's consummate example.

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