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Observations on Things Measured in the Bible

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Abstract

As a new engineering professor at a Christian university that allows an extra five minutes in each class for spiritual and devotional instruction, an approach in the Engineering Technology Measurements Laboratory classroom sessions was taken by focusing devotions on the topic of *Measurements in the Bible*. This included terms of measurement, things that are or can be measured, and insights into measurable subjects. In general, observations were made systematically based on daily Bible reading, starting with the first words "In the beginning…" and continuing through the Pentateuch during the semester. In addition, some general observations from New Testament and other Old Testament readings were also made. As such, measurement topics can be broken into two main categories: physical substances and metaphysical topics. Physical substances include the obvious metrics concerning weight, size (length and volume), and value (worth), as well as the general numbering (counting) of physical objects. Time (durations and dates), is also considered as a physical quantity. Insights can be gathered based on the emphasis that God seems to place on certain lengths of time or timing of events, numbers or amounts of things, and the value of certain items. Special notice should be taken when God gives someone a measuring assignment (e.g., Rev 21). But even more interesting may be the intangible matters related to Christian living that give expectations of measurement. Jesus speaks often of faith as something that can be *measured* – He cites people as having little (e.g., Mt 6:30, 8:26, 16:8) or much (e.g., Mt 8:10, 15:28) faith. Paul talks about faith growing (e.g., 2Cor 10:15, 1Thes 1:3), as if one should be able to measure it – perhaps relative to our trials requiring a certain amount of faith (should we consider how to measure in "faith units"?). Peter offers his readers grace in abundance (1Pet 1:2, 2Pet 1:2) and expects them to "grow in the grace…of Jesus" (2Pet 3:18), as if grace is something that can be *measured*. Jesus even states how one can measure the greatest love (Jn 15:13). Similarly, hope, joy, and knowledge are all referred to as something measurable in the life of the believer. This paper presents some of these observations from the perspective of an engineer, of both tangible and intangible objects of measurements in the Bible, and offers some associated implications for the believer.

Introduction

This paper was inspired by a few of the observations that were made by myself, with the aid of some of my students over the course of the semester as we focused our devotional experience on the topic of measurements in the Bible[1]. The paper begins by defining what measurement is and then provides an overview of measurement terms found in the Bible. It describes the God who measures, and observes several examples of tangible measurement topics from both Old and New Testaments. These include general observations in Genesis and specific observations on time, followed by two examples from the book of John. Observations are also offered regarding measurements of intangible subjects in the New Testament such as faith and love, from the teachings of Jesus and Paul. Additional background on the inspiration for this paper is provided

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in Appendix A. The paper is by no means a comprehensive reference. Rather, the objective is to highlight that we serve a God who has invented measurements as part of His creation and seems to take measuring things very seriously, including the spiritual growth of the believer.

Measurements Defined

To measure something is to determine a certain set of its properties in reference to a standard. At its simplest, it is a form of counting. Properties can include (but are not limited to) size, weight, duration, quality, or merely amount. Measurements are so important to our daily life that we often communicate in measurement terms without thinking about it. One does not have to be an engineer to measure the height and weight of a child and record it on a growth chart for future reference, or to track the fuel efficiency of a car in miles per gallon upon filling up at the pump. When a package is mailed, or a bag checked at the airport, one is cognizant of the necessity of measuring the weight of the item.

Quantitative measurements use numbers and units. Units can be pure (feet, meters, seconds) or mixed (dollars per pound, miles per hour). But qualitative measurements are also regularly made, typically in terms of general reference. Terms such as all, some, every, most, and their opposites are used in qualitative measurement descriptions. Moreover, qualitative comparisons are used as a form of measurement. For example, higher, wider, larger, and better (and their superlatives – ending in est) are qualitative terms implying that something is in some way bigger than something else (or possibly its own self over time). If something is observed to have increased, one understands that it has expanded in some way over what it used to be. The measurement context may be implied or explicit; the increase may be quantified or relative. Whether the increase is in reference to a child's growth, a person's salary, or the speed of a car, anyone in the discussion has been trained from childhood to understand the measurement, whether or not exact numbers are being used and regardless of the technical background of the participants.

For an engineer, much of his or her profession relies on detailed measurements. The engineer doesn't take measurements for granted as the layman might in the examples previously cited. Typically, correct measurements are critical for the success of projects and mistakes can mean loss of dollars (that managers will measure) or even loss of lives (that lawyers will measure, typically in terms of dollars). One of the most famous engineering measurement mistakes was in 1999 when NASA lost what was intended to be the first interplanetary weather satellite, designed to orbit Mars. Details are easily available on the internet; the root cause of the loss was attributed to the failure of different teams working on the project to coordinate their measurements. The NASA team used metric units while a contractor used English units. The failed translation of English units into metric units resulted in the loss of the $125M probe. The BBC provides a summary of 10 such mistakes, including a miscalculation that cost the lives of the team of explorers to the South Pole on an expedition led by explorer Robert Scott in 1910-1912. As a result, they did not measure out sufficient supplies for the trek and experts determined that they died of starvation[2]. Engineers may refer to such mistakes as "gross blunders" as they are the results of carelessness on the part of the person making the measurement or associated calculations[3].

These extreme examples show the importance of accurate measurements, at least in certain applications. But are measurements important when it comes to reading the Bible and understanding truths that apply to our lives?

The God Who Measures

There are several well-known passages in the Bible that refer to measuring, and when considered as part of a study on the topic of measurements, give us some insight into God's nature. Three aspects of measurements relative to the God of the Bible are examined in this section. First is the biblical requirement for accurate measurements, based on the character of God. Second is God's use of measurements in His judgments. Third are the references, mostly poetic or prophetic, to God measuring His creation.

Accurate Measurements

Proverbs 11:1 says "the Lord detests dishonest scales, but accurate weights find favor with him." (the KJV says dishonest scales are an "abomination".) Two more times in Proverbs, the same sentiment is given (20:10, 23), even mentioning not only weights but differing *measures* that are detestable. Proverbs 16:11 further states that "honest scales and balances belong to the Lord." In the spirit of James 1:17 (every good and perfect gift is from the Father above), combined with the well-known Christian principle that "all truth is God's truth," it can be directly inferred that accurate measurements are godly measurements, regardless of the application. These verses give the sense that God is displeased with dishonest measurements, whether in the literal sense of cheating for dishonest gain, or in the figurative sense of prejudice – using different standards in making judgments and assessments of people. Conversely, God is pleased with those who make an attempt to measure accurately and devise systems for accurate measurements. God's concern for accurate measurements is not isolated to proverbial statements; they are embedded in the Mosaic Law. In Leviticus 19:35-36, the Israelites are commanded to "…not use dishonest standards when measuring length, weight or quantity. Use honest scales and honest weights… I am the Lord your God…". That is, accurate measures flow from the nature and character of the God of Israel, and He requires the same of His people. The same sentiment is reiterated in Deuteronomy 25:13-16 where Moses restates to the people:

> Do not have two differing weights in your bag—one heavy, one light. Do not have two differing measures in your house—one large, one small. You must have accurate and honest weights and measures, so that you may live long in the land the Lord your God is giving you. For the Lord your God detests anyone who does these things, anyone who deals dishonestly.

Micah condemns the people for exactly this crime: "Shall I acquit someone with dishonest scales, with a bag of false weights?" (6:11). By being prepared with two different weights representing the same standard, a person has purposefully designed and implemented a system to deceive using a method of measurement. He can use one standard for buying and another for selling in order to gain a dishonest advantage. Clearly, our God takes measuring seriously and expects honest and accurate measurements. For engineers, whose vocations are directly and

implicitly related to measuring – and doing so accurately – they can be confident that they are fulfilling a godly calling.

Relative to dishonest measurements in the figurative sense of prejudice, in his discussion on living out one's faith, James (chapter 2) offers a direct example of such discrimination in his condemnation of how his readers might treat a rich man and a poor man differently. In verse 9, he minces no words in saying that by showing such partiality or favoritism "you sin". So in a direct sense, measuring rightly and accurately, whether figuratively or literally, even in the case of engineering measurements, is a godly activity and is pleasing to Him.

Measurements in Judgment

The judgment of King Belshazzar in Daniel 5 is a familiar passage to many. When Daniel is finally called on to interpret the mysterious writing on the wall (5:26-28), he finds three phrases directly related to God's measuring of the King:

> Here is what these words mean:
> *Mene*: God has numbered the days of your reign and brought it to an end.
> *Tekel*: You have been weighed on the scales and found wanting.
> *Parsin*: Your kingdom is divided and given to the Medes and Persians.

Daniel explains that because the King did not "honor the God who holds in his hands your life and all your ways," that judgment has come upon him. Although the reference to being "weighed on the scales" is figure of speech, the references to "numbering his days" and "dividing his kingdom" can be understood as referring to God's literal intentions. God not only expects accurate and just measurements, as discussed earlier, but he also uses measurements in his judgments.

God has made it clear that He requires honest measurements from His people. Therefore, it is not surprising to find an example of God's judgment for disobedience of His people in this regard. In the following passage, the prophet provides a reference to dishonest measurement (Amos 8:4-6):

> Hear this, you who trample the needy
> and do away with the poor of the land, saying,
> "When will the New Moon be over
> that we may sell grain,
> and the Sabbath be ended
> that we may market wheat?"—
> skimping on the measure,
> boosting the price
> and cheating with dishonest scales,
> buying the poor with silver
> and the needy for a pair of sandals,
> selling even the sweepings with the wheat.

Another familiar, yet difficult, passage deals with the judgment of the flood. A focus on measurements immediately reveals the basis for the judgment. The narrative is set up by the

statement in Genesis 6:5 that "[t]he Lord saw how ***great*** *the wickedness* of the human race had become on the earth, and that ***every*** *inclination* of the thoughts of the human heart was ***only*** *evil* ***all*** *the time*." Four qualitative measurements terms are used relative to the concept of good/evil and are highlighted in that verse. These four adjectives offer comparison in a way that places each of the references at the extreme end of whatever scale might be used to measure the concept of evil. While it is clear that the literary tool of hyperbole is being used (one can imagine that kindness and generosity were not completely absent from all of humanity), the point of the story seems to be that it was so overwhelmingly bad that God goes on to express in some sense His "regret" and need to "start over." A final conclusion to the story can be drawn once it becomes obvious as the story of humanity continues after the flood, that even by starting over with the single most righteous man on earth, God was not able to find a human solution to the problem of sin. Hence the need for a divine savior is confirmed.

In the New Testament, Jesus also relates measurement as a matter of judgment, as recorded in the synoptic gospels (e.g., Matthew 7:1-2), "Do not judge, or you too will be judged. For in the same way you judge others, you will be judged, and with the *measure* you use, it will be *measured* to you." Jesus goes on to point out how easy it is to identify the "splinter" in someone else's eye while ignoring the "plank" in your own. This is obviously figurative language and while there may not be a definitive physical standard for judging, one can easily understand the implication that God expects fair and honest judgments, even in dealing with people. Jesus appears to warn that "what goes around comes around," in that when you use an unfair standard to judge others, it will eventually be used on you.

Measuring Creation

While the familiar verses of Genesis 1 lay out the creation story, another passage in Isaiah (40:12) relates God's sovereignty over creation as one who does so using measurements:

> Who has measured the waters in the hollow of his hand,
> or with the breadth of his hand marked off the heavens?
> Who has held the dust of the earth in a basket,
> or weighed the mountains on the scales
> and the hills in a balance?

And again in verse 15:

> Surely the nations are like a drop in a bucket;
> they are regarded as dust on the scales;
> he weighs the islands as though they were fine dust.

This is poetic language with the prophet using figures of speech. But even so, the references again leave us with the understanding that our God values measurements, and has used them since "the beginning."

When God finally responds to Job, He does not provide a direct response to Job's demands for a hearing or for justice. Rather, He gives Job some perspective, and relates His power and presence in the original creation with references to measurements (Job 38:4-7):

> Where were you when I laid the earth's foundation?
> Tell me, if you understand.
> Who marked off its dimensions? Surely you know!
> Who stretched a measuring line across it?
> On what were its footings set,
> or who laid its cornerstone—
> while the morning stars sang together
> and all the angels shouted for joy?

God asks Job if he is familiar with the measuring tools He has used. Although the layman may quickly pass over the subtleties, civil engineers immediately call to mind surveying tools, plumb lines, and compaction tests, as well as understanding the proper use of a cornerstone (at least in ancient times), precisely constructed and placed to accurately establish the three construction dimensions of a building. Earlier, in one of Job's discourses, he waxes on about wisdom (28:23-27):

> God understands the way to it
> and he alone knows where it dwells,
> for he views the ends of the earth
> and sees everything under the heavens.
> When he established the force of the wind
> and measured out the waters,
> when he made a decree for the rain
> and a path for the thunderstorm,
> then he looked at wisdom and appraised it;
> he confirmed it and tested it.

Even before his personal encounter with God, Job not only alludes to God's measuring a certain aspect of creation, but even mentions the associated concept of "testing," which any engineer knows may be used to confirm or validate measurements.

Thus, it is easy to see that not only is "measurement" a biblical concept, but our God has been intimately involved in measuring from the beginning of creation. While the passages cited above use figurative and poetic language, the concept is used in a manner that allows the engineer to relate to and identify with the measurement concepts discussed. It is apparent that God has arranged everything He created in its proper position, by design, and has confirmed it with divine measurements.

Description of Bible Measurements

The Bible does not define measurements so much as it simply uses terms, units, and amounts of measurements, as if the reader understands the references. In fact, because they are rarely defined in the text, most study Bibles offer a table of weights and measures. Table 1 provides a list of weights and measures reproduced from the ESV Study Bible[4]. The ESV provides the table in alphabetical order. It provides a caveat that the equivalents are approximate since "weights and measures varied somewhat in different times and places in the ancient world," but

are based on the best generally accepted information. Other study Bibles provide similar information and caveats, also stating that the footnotes go on to explain the biblical terms in modern units. Obviously, similar information is available through a variety of sources, both in print and on the Internet. Appendix B provides an expanded list obtained from BibleHub.com. It can likely be inferred from a glance at this list that most of us are unfamiliar with many measurement terms used in the Bible. The main point here is that the Bible is full of measurements, which had an exact amount in the original context. The original terms were understood by the author and his audience, just as readers of this article would be familiar with gallons, feet, and pounds. For this reason, most Bible versions convert units of measure from the original term to a modern term (an example is given below in the discussion on John 2). Most of these conversions are based on archeology and historical records, as the Bible typically provides no internal conversion. As with any other Bible passage, the author wrote under the assumption that the reader would understand the context. It is beyond the scope of this paper to offer a detailed explanation or evaluation of biblical weights and measures in their original context; rather the point is made to reinforce that measurements in general are an integral part of biblical narrative.

Table 1. List of Biblical Weights and Measures (ESV Study Bible)

Biblical Unit	**Approximate American and Metric Equivalents**	**Equivalent**
bath	6 gallons or 22 liters	1 ephah
beka	1/5 ounce or 5.5 grams	10 gerahs
cor	bushels or 220 liters	10 ephahs
cubit	18 inches or 45 centimeters	6 handbreadths
daric	1/4 ounce or 8.5 grams	
denarius	a day's wage for a laborer	
ephah	3/5 bushel or 22 liters	10 omers
gerah	1/50 ounce or 0.6 gram	1/10 beka
handbreadth	3 inches or 7.5 centimeters	1/6 cubit
hin	4 quarts or 3.5 liters	1/6 bath
homer	6 bushels or 220 liters	10 ephahs
kab	1 quart or 1 liter	1/22 ephah
lethech	3 bushels or 110 liters	5 ephahs
log	1/3 quart or 0.3 liter	1/72 bath
mina	1 1/4 pounds or 0.6 kilogram	50 shekels
omer	2 quarts or 2 liters	1/10 ephah
pim	1/3 ounce or 7.5 grams	2/3 shekel
seah	7 quarts or 7.3 liters	1/3 ephah
shekel	2/5 ounce or 11 grams	2 bekas
span	9 inches or 22 centimeters	3 handbreadths
stadion	607 feet or 185 meters	
talent	75 pounds or 34 kilograms	60 minas

Some measurement terms and items that can be measured that are introduced in Genesis for the first time are listed in Appendix C, as an example for the reader. Terms and concepts introduced in the first book of the Bible include time (days and years, age and calendar), light, counting (numbers – both cardinal and ordinal), direction (east), temperature, music, metallurgy, pain, weight and value.

Standards

At some point, engineers determined that it would be appropriate to standardize measurements. After all, if everyone has their own standard, then how can any measurement be accurate? This paper will not detail the variety of organizations that have established standards that most engineers are familiar with, especially as relates to their own field. But, just as God established measurements as explained above, He also required standards. As referenced in Leviticus 19:35, God refers to standards for length, weight, quantity (volume). It is apparent that standards were established because when Solomon built the temple, the Bible says that he used "the cubit of the old standard" (2 Chronicles 3:3). A cubit was defined as the length of the forearm to the tip of the fingers, or about 18 inches. But since everyone's arm length is different, then a standard was needed. Apparently by Solomon's time, there were *new* standards, and Solomon chose to use the *old* standard. A standard for weight is referenced in 2 Samuel 14:26 as the royal standard of shekels. Ezekiel references a standard for volume: "The ephah and the bath are to be the same size, the bath containing a tenth of a homer and the ephah a tenth of a homer; the homer is to be the standard measure for both." (45:11). The next verse offers a rare Bible reference to a conversion standard, in this case for weight: "The shekel is to consist of twenty gerahs. Twenty shekels plus twenty-five shekels plus fifteen shekels equal one mina." (45:12). Micah condemns the Israelites for using an unapproved standard: "Am I still to forget your ill-gotten treasures, you wicked house, and the short ephah, which is accursed?" (6:10). So just as it was observed earlier that God values accurate measurements, it naturally follows that establishing standards is also a godly pursuit.

Regarding the cubit then, when God gives Noah the directions for building the ark, He says "This is how you are to build it: The ark is to be three hundred cubits long, fifty cubits wide and thirty cubits high" (Genesis 6:15). The NIV footnotes this as "about 450 feet long, 75 feet wide and 45 feet high or about 135 meters long, 23 meters wide and 14 meters high." But if the old standard is used, the ark was probably even bigger. When the angel is measuring out the wall of the new temple with Ezekiel, he is using a measuring rod. "The length of the measuring rod in the man's hand was six long cubits, each of which was a cubit and a handbreadth" (40:5). This is a reference to the "long cubit", perhaps of the "old standard." If Noah used this standard, instead of the default standard, then the ark was much longer than 450 feet. The Ark Encounter, which Answers in Genesis promotes as a life size representation of Noah's ark, is 510-feet long, based on the length of the Hebrew long cubit. They claim that to be 20.6 inches.[5]

Other major topics on which God placed a strong emphasis on measurement were the instructions for building the Ark of the Covenant and the components of the Tabernacle in Exodus, and the measurements of the new heavens and the new earth in Ezekiel and Revelation. But the details will not be pursued here.

Time

To initiate systematic observations of things in the Bible that are or can be measured, the first verse is a good place to start: "In the beginning God created the heavens and the earth." The first subject that can be measured is related to time. Some additional observations on matters related to measuring time in the Bible are made as follows.

The word "beginning" in Genesis 1:1 is an immediate reference to time-based measurement. Several engineering observations can be made regarding this measurement term:

- everything (defined from v1:1 as the heavens and the earth) had a beginning,
- everything was created (a term replete with engineering connotations) by God, and
- everything that had a beginning includes not just physical substances, but also time itself.

Engineers are often concerned with time; for example, they measure process rates and rates of change, they conduct time and motion studies, and they also have projects and contracts – with beginnings, durations, and endings that are defined by a schedule. None of these concepts have meaning without understanding time. But it is interesting that the Bible does not attempt to explain time any more than it does most measurement terms; it merely begins using related terms and assumes some understanding by the reader. One exception perhaps is quickly found in v1:3 where a day is defined as an evening followed by a morning. The first six days, as related by the account in Genesis 1, are so defined. As one continues to read in Genesis, terms related to time stand out to someone focusing on measurement.

In v1:14, it says that God put the "lights in the vault of the sky to separate the day from the night, and [to] let them serve as signs to mark sacred times, and days and years…". Thus, the basis for marking time is established. This purpose is apparently not lost on Adam and his offspring because in v5:3, Adam appears to have taken God seriously about "marking the years," to the extent that he was able to mark the birth of his own son in terms of years from his own "birth." The value of marking time was perpetuated, as the birth and death years for each of Adam's descendants are documented in Chapter 5. By the time the account of Noah is given, a calendar has been established as the exact date of the start of the flood is recorded (measured by the durations listed in Genesis 5 as 1654 years from Adam):

> In the six hundredth year of Noah's life, on the seventeenth day of the second month—on that day all the springs of the great deep burst forth, and the floodgates of the heavens were opened. And rain fell on the earth forty days and forty nights. (Genesis 7:11-12)

And the exact date of the end of the flood is recorded as well when "on the seventeenth day of the seventh month the ark came to rest on the mountains of Ararat." (Genesis 8:4). The reason for these exact dates recorded in Scripture can be studied and debated, but their inclusion is a sign to the Christian engineer that marking time is important to God. In fact, according to Genesis 1:14, it is commanded. Therefore, establishing a calendar and tracking birthdays (as in Genesis 5), for example, appear to have their origin in the Bible.

It is interesting to note that days, years, and months are based on astronomical phenomena. But the basis for a 7-day week has no astronomical source. It is seemingly as arbitrary as a 5- or a 10-day week might be. The basis for measuring by days, months, and years is related to the

observed astronomical relationship of the earth, moon, and sun. But a week, which means seven in Hebrew, has its basis in the creation account of Genesis 1, and the subsequent requirements that God places on his people to observe the seventh day of each week as holy. Thus, the biblical basis of each of these four time-measuring units can be clearly understood; Christians should not be ashamed to point these facts out when explaining their belief in the Bible, and even in the first chapters of Genesis.

Historians are certainly interested in remembering the passage of time relative to certain important events (although often events are not deemed important until long after they have occurred), but engineers are also careful to mark time. As mentioned earlier, the engineer is very cognizant of schedules. It can be observed that whether or not God gave Noah a schedule, He did make certain to record the timing of the important events of the flood account. While schedules are not overly common in Scripture, the engineer would notice that it is not too long after this when God gives Abraham a schedule when he makes His covenant with him saying, "Know for certain that for four hundred years your descendants will be strangers in a country not their own and that they will be enslaved and mistreated there." (Genesis 15:13).

Perhaps the most famous schedule in the Bible is the prophecy of Daniel 9 concerning the timing of the Messiah. Jesus condemned the Jewish leaders for not knowing or understanding this schedule when he weeps over Jerusalem following His triumphal entry and says, "If you, even you, had only known on this day what would bring you peace…" (Luke 19:42). He goes on to prophesy the destruction of Jerusalem and the temple "…because you did not recognize the time of God's coming to you." (Luke 19:44). Jesus expected them to understand and adhere to the schedule of God's salvation and condemns them severely for their failure. Paul confirms the nature of God's schedule for salvation through the life, death, and resurrection of Jesus Christ when he says "… when the set time had fully come, God sent his Son, born of a woman, born under the law, to redeem those under the law, that we might receive adoption to sonship." (Galatians 4:4-5).

Therefore, it is apparent that God establishes and keeps schedules. The Christian engineer can be confident that identifying and keeping schedules is a godly practice. Of course, there are many other Christian principles that should be considered (beyond the scope of this paper) when establishing, maintaining, and adjusting schedules.

Physical Measurement Examples from the New Testament

There are many measurement terms in the New Testament, both physical and intangible. Two examples are provided here: the water jars used at the wedding in Cana and the feeding of the five thousand.

In John 2, at the wedding in Cana, John is careful to record the number and size of the jars, as well as their normal function – holding water for ceremonial washing. The NIV translates the volume of the jars as 20 to 30 *gallons* (and provides a footnote converting to metric). Knowing the density of water (and therefore wine), and estimating the weight of the stone jar, the engineer can do a mental calculation and quickly conclude that moving these jars was no small effort. The

jar itself could weigh perhaps on the order of fifty pounds and hold around 200 pounds of water. As alternative to handling the jars, it is possible they were kept in place and filled using smaller jars. Either way, it was no small effort to "do whatever he tells you," as they were instructed by Mary. The engineer can envision and explain this without having to resort to a commentary. And because they were servants, they did what they were told – in verse 7, Jesus tells them to fill the jars with water; they filled them to the brim. Whether they carried the jars to the water or the water to the jars, they did more than was required. They don't ask "why," or say "that's stupid," or tell him "these aren't your jars." They just respond in quick, unquestioning obedience, exceeding expectations. How do we respond when the Master tells us to do something? As an aside, an interesting study can ensue if one is reading the KJV, which says the jar holds two to three *firkins*. A firkin was a unit of measure for casks of ale or beer in the 17th century[6] (when the KJV was published). A quick look-up in a concordance shows that the Greek word (NIV – gallon, KJV – firkin) is metrētḗs, which means "a measurer, especially a certain standard measure of capacity for liquids."[7] This is the only occurrence of that word in the Bible. Further investigation reveals that the measurer is the name of a utensil known as an *amphora*, which is a species of measure used for liquids and containing somewhat less the nine English gallons or about 40 liters.[8]

Another interesting passage that speaks of measurements is in John 6 (and parallel synoptics) where Jesus feeds the crowd ("about five thousand men were there") with a boy's grocery basket. John records the following measurements:

- Philip's estimate of how much it will cost to "buy enough bread for each one to have a bite!" (or half a year's wages, literally 200 denarii). Philip has apparently done some mental math and quickly concluded the impossibility of the situation.
- The size of the crowd, first qualitatively – v4 "… a *great* crowd coming toward [Jesus]…", then John adds that "…the men sat down, in number about five thousand." (KJV) Matthew adds, "besides women and children." And Luke points out that Jesus told his disciples to "Have them sit down in groups of about fifty each." Therefore, it may be that John remembered how many groups there were and did the math; however, it is not clear how the math accounts for just the men, keeping the women and children separate (often preachers will at least double the size of the crowd, but it is never clear what the right cultural multiplication factor should be). And the story is still known as the feeding of the five thousand (even Jesus later refers to it as such – Matthew 16:9).
- The size and amount of the groceries: "five small barley loaves and two small fish…". Not only is it a small amount of produce (number of items), the items themselves are judged to be comparatively small. While it would be no less of a miracle if there were several times as many items, being instead relatively large, the point is well taken that it was the willingness of the boy to offer his groceries (faith of a child?) that is one of the significant points of the story. But it is even more dramatic given the small size and number.
- The amount of food remaining: "they…filled twelve baskets with the pieces of the five barley loaves leftover…". No specific information is available on the actual size of the basket so it is probably of a generally common size that the original audience would understand. Strong's says the Greek word is "of uncertain derivation; a

(small) basket." It is only used in this context and parallel passages. But it is important to the story teller that they measured the number of baskets. While it could be a coincidence that it is one per disciple, not much reported in the Bible is recorded by way of coincidence.

Once again the Bible relates details of measurements so that different perspectives on the understanding of the passage can be observed by those who may be interested. At the very least, one can conclude that it testifies to the accuracy and veracity of the account. The account in John 6 (and parallel passages) does not appear to be the product of an invented story; the numbers provided appear to be consistent with someone who recorded – or at least remembered – some data and reported on it later. It is obviously not scientific data, and is not designed to be treated as such. But the numbers and measurements lend credence to the story.

Spiritual Measurements

Perhaps the most interesting aspect of applying an understanding of measurements in the Bible is to make it personal. When one reads with measuring in mind – not just physically, in terms of amounts of things or passage of time as has been examined thus far, but spiritually – a new perspective can be gained. Two areas that will be examined here include references to faith and love specifically, followed by spiritual growth in general.

Faith

Most Christians are familiar with Jesus' remarks concerning various peoples' faith; references from Matthew are given as examples (emphasis added in italics):

- If that is how God clothes the grass of the field, which is here today and tomorrow is thrown into the fire, will he not much more clothe you—you of *little* faith? (6:30)
- When Jesus heard this, he was amazed and said to those following him, "Truly I tell you, I have not found anyone in Israel with such *great* faith…" (8:10)
- He replied, "You of *little* faith, why are you so afraid?" Then he got up and rebuked the winds and the waves, and it was completely calm. (8:26)
- Then he touched their eyes and said, "*According to* your faith let it be done to you" (9:29)
- And he did not do many miracles there because of their *lack of* faith. (13:58)
- Immediately Jesus reached out his hand and caught him. "You of *little* faith," he said, "why did you doubt?" (14:31)
- Then Jesus said to her, "Woman, you have *great* faith! Your request is granted." And her daughter was healed at that moment. (15:28)
- Aware of their discussion, Jesus asked, "You of *little* faith, why are you talking among yourselves about having no bread? (16:8)
- He replied, "Because you have so *little* faith. Truly I tell you, if you have faith as *small* as a mustard seed, you can say to this mountain, 'Move from here to there,' and it will move. Nothing will be impossible for you." (17:20)

In each of these passages, it seems that Jesus has used some spiritual tool or reference to measure the person's faith. In a sense, He is able to measure how much faith they have, and compare that to some sort of a faith standard that allows Him to determine if the amount is large or small.

Paul also refers to qualitative measurements of faith:

- Accept the one whose faith is *weak*, without quarreling over disputable matters. One person's faith allows them to eat anything, but another, whose faith is *weak*, eats only vegetables. (Romans 14:1-2).
- For though I am absent from you in body, I am present with you in spirit and delight to see how disciplined you are and how *firm* your faith in Christ is. (Colossians 2:5)
- So then, just as you received Christ Jesus as Lord, continue to live your lives in him, rooted and built up in him, *strengthened* in the faith as you were taught, and overflowing with thankfulness. (Colossians 2:6-7)
- We sent Timothy, who is our brother and co-worker in God's service in spreading the gospel of Christ, to *strengthen* and encourage you in your faith, (1 Thessalonians 3:2)
- Night and day we pray most earnestly that we may see you again and *supply what is lacking* in your faith. (1 Thessalonians 3:10)
- We ought always to thank God for you, brothers and sisters, and rightly so, because your faith is *growing* more and more, (2 Thessalonians 1:3)

In these passages, Paul speaks of faith in terms of strength and weakness. In engineering, this can be related to measuring a force; it would not be strange for a mechanical engineer to describe how much force a hydraulic cylinder can apply, or how much torque a motor shaft can supply, and characterize it as weak or strong for a certain application. A biomedical engineer may be concerned with replicating the muscle performance of the human body. Muscle strength can be characterized qualitatively as weak or strong, or quantitatively by the amount of weight it can lift. Certainly an athlete knows how to strengthen his muscles by lifting weights and exercising, and does so with a quantitative measurement of amount and repetitions.

Peter speaks of faith in reference to value:

- These [trials] have come so that the proven *genuineness* of your faith—of *greater worth* than gold, which perishes even though refined by fire—may result in praise, glory and honor when Jesus Christ is revealed. (1 Peter 1:7)
- Simon Peter, a servant and apostle of Jesus Christ, to those who through the righteousness of our God and Savior Jesus Christ have received a faith as *precious* as ours. (2 Peter 1:1)

Therefore, it appears that faith can be measured not just in terms of amount but also of value. Do you consider your faith as something that can be quantified? There is no such thing as a unit of faith, as there is for a unit of force or value, but perhaps there should be. Then the amount of faith units required for a certain trial could be determined, and one could assay whether they have enough or need more. While this is not how faith works, the analogy should be helpful. One is tempted to allow that this is all figurative language, and perhaps it is. But the measurement concept should compel each of us to think about our faith and the tool that Jesus is using to measure it. Is he putting you in the little or great category? Is your faith growing? Is it weak and in need of strengthening? Do you consider your faith as precious and valuable?

When Paul tries to give the Corinthians some perspective on their suffering and says "…our light and momentary troubles are achieving for us an eternal glory that far outweighs them all." (2 Corinthians 4:17, NIV; "…eternal weight of glory" KJV), he is not trying to say that glory has weight or is something that can be directly measured on a scale. He is using a figure of speech; but the engineer, who deals with weights and measures, may possibly have a more vivid picture of the comparison than a layman. Ultimately, we may have to rely on the athletic example more than the engineering example and admit that faith, like muscle strength, grows by exercise – lifting spiritual weights. It seems clear that God wants us to think in these terms, as well as to thank Him for the opportunities to increase our faith, which obviously come through trials and depending on Him. At the time, we may consider it "unfortunate." But through the lens of faith, and with an understanding that these "unfortunate" experiences are some of the tools God uses to grow our faith, they shouldn't seem so "unfortunate."

Love

Jesus also expressed some measure of love when he stated to his disciples, "Greater love has no one than this: to lay down one's life for one's friends." (John 15:13). Paul used the superlative when in the list of spiritual characteristics: "the greatest of these is love." (1 Corinthians 13:13). Paul goes on to apply measurement terms when he states his prayer for the Ephesians:

> I pray that out of his glorious riches he may strengthen you with power through his Spirit in your inner being, so that Christ may dwell in your hearts through faith. And I pray that you, being rooted and established in love, may have power, together with all the Lord's holy people, to grasp how *wide and long and high and deep is the love* of Christ, and to know this love that surpasses knowledge—that you may be filled to the *measure of all the fullness* of God. Now to him who is able to do *immeasurably more* than all we ask or imagine, according to his power that is at work within us, to him be glory in the church and in Christ Jesus throughout all generations, for ever and ever! Amen. (Ephesians 3:16-21)

Paul's reference to four dimensions of love would be a subject for another time. But the observation that, like faith, love is something that can be measured and should be growing, is something that should sink deeply into the heart of every believer. This is not your love, it is the love of Christ in you. And you can be full to the measure of the fullness of God! But it takes His power at work in you, not your own efforts.

Implications and Conclusions

The Christian engineer has a basis for performing and maintaining accurate measurements based on the Word of God. It is the Christian worldview that provides a basis for accurate measurements. The non-Christian and especially the atheist does not have a basis for developing a system of accurate standards. The secular engineer would state that it is obviously a good idea to have a system of standards that are uniform and accurate. But this begs the question of what the basis is for being a good idea. Another secular engineer could just as easily make the argument that it is actually personally beneficial to have different sets of standards and measurements (along the lines of what is prohibited by the Lord in the Old Testament). Without a reference to absolute truth, as from the God of the Bible, there is no basis for accurate

standards. The Christian engineer should be confident in the Biblical basis for his or her vocation, including making accurate measurements; it is not just a good idea, it is godly.

It was observed that an engineer relates marking time and the development of a calendar to a schedule. Engineers often grow up to be project managers and executives, many of whom tend to adhere to schedules religiously. But even the project engineer is cognizant of deadlines and deliverables. The Christian engineer also observes that God values and follows schedules. Much has been made of Nehemiah as a great builder and manager; many studies have been done and the details were not pursued here. It was observed that God's plan of salvation followed a schedule. Paul confirms that Jesus came "in the fullness of time…" (Galatians 4:4). But the Christian engineer may also observe that his own life is on a schedule, managed by God. The familiar verse that says "And as it is appointed unto men once to die, but after this the judgment…" (Hebrews 9:27, KJV) serves to highlight that the life of every person is on a schedule, with a deliverable at the end. One might observe that it is unfair not to know the date of that deliverable. It is said that hunting is the only sport where the other team doesn't know they are playing (and unfortunately for the deer, that sport also ends in death). But the fact of death for all humans is no mystery. Another might respond with an inquiry: how would you live differently if you knew the final date on the schedule? God knows the date for each person. In Psalm 90, Moses says that the average life is "seventy years, or eighty, if our strength endures," (v10). He goes on to request aid from the Lord to "Teach us to number our days, that we may gain a heart of wisdom" (v12).

As part of that schedule, God expects spiritual growth. The author of the book of Hebrews tells his readers that "In fact, though by this time you ought to be teachers, you need someone to teach you the elementary truths of God's word all over again." (5:12). God's expectation is for spiritual growth. This is something one should be interested in measuring. How much have you grown in the past year, three years, decade? Has your faith grown stronger? It was observed that Jesus commends great faith and condemns little faith. Paul offers us an example prayer that we should pray for others (and seek the answer to the prayer) to be filled *full* of Christ's love. Paul tells us that God is using the circumstances of our lives to make us into the image of His Son (Romans 8:28-29, 2 Corinthians 3:18). This is what exercises our faith and makes it grow. Christian engineers do well to consider the purpose of the project of life and that there is a divine schedule, even if they don't know the date of the final deliverable. The implications of how to live in preparation for the final deliverable, in all aspects of life, are not difficult to envision.

Here is an appropriate closing benediction: But *grow* in the grace and knowledge of our Lord and Savior Jesus Christ. To him be glory both now and forever! Amen. (2 Peter 3:18)

Appendix A – Inspiration for the Paper

The inspiration for this paper has two convergent sources, both based on experiences of mine. First, as a believer who tries to obtain input from the Word of God on a regular – if not daily – basis, such as a One Year Bible or other daily reading plan, I have sometimes taken an approach to select a theme for the year (or that course of through-the-Bible reading) for systematic focus. Some themes I have considered in the past include finances, pain and suffering, salvation,

science and technology, redemption; the list is virtually endless. By concentrating one's devotional attention on a certain theme, it allows the reader to dig deeply for treasures that can (and do) easily otherwise go unnoticed. For example, when reading about Namaan in 2 Kings 5, there are many lessons to be learned. One could easily pass over the remark in verse 2 about the Jewish servant girl who told Naaman about Elisha, who could heal him. But when focusing on the theme of pain and suffering, one stops to think that this poor child had been abducted from her family. Who loved her. And whom she no doubt misses greatly. And may never see again. But without pouting or self-pity or even an attempt to negotiate her freedom, she informs the man responsible for her predicament that she has a solution for *his* suffering. What a faithful perspective – she could be considered a poster child for loving one's enemy. Would that we all could respond to adversity in such a fashion. Without digressing any further from the topic of the paper, hopefully this brief tangent illustrates the depth of insight possible with such a devotional focus.

The second source of inspiration for the topic came when God abruptly changed my career. After thirty years in industry, the Lord made it clear to me that He had a new assignment for me – as a professor of engineering technology at a Christian polytechnic university. How this happened, while amazing and perhaps inspirational, is not germane to the paper. I eventually learned that an Engineering Measurement Lab was included among my course assignments. Knowing that the university provides an extra five minutes of class time for devotional instruction, it occurred to me that it could be interesting to focus on a theme of *measurements in the Bible*, using a systematic daily reading as the basis.

Appendix B – Expanded Table of Bible Measurements
From BibleHub.com[9]

Lengths

Finger	0.73 inches	1.85 centimeters	Jeremiah 52.21
Handbreadth (4 fing.)	2.92 inches	7.4 centimeters	Exodus 25:25
Span	9 inches	22.86 centimeters	Exodus 28:16
Cubit	18 inches	45.72 centimeters	Matthew 6:27
Long Cubit	20.4 inches	51.9 centimeters	Ezekiel 40:5
Fathom	6 feet	1.829 meters	Acts 27:28
Reed (6 cubits)	8.75 feet	2.73 meters	Ezekiel 40:5
Furlong	1/8 mi., 660 feet	201.2 meters	Revelation 14:20
Stadion	697 feet	185.4 meters	Luke 24:13
Sabbath day's journey	3/5 mile	0.9656 kilometers	Acts 1:12
Day's journey	20 miles	32.19 kilometers	1 Kings 19:4

Weights

Gerah	1/50 ounce	0.567 grams	Ezekiel 45:12
Bekah (10 gerahs)	1/5 ounce	5.67 grams	Genesis 24:22
Pim (2/3 shekel)	1/3 ounce	9.45 grams	1 Samuel 13.21

Shekel (2 bekahs)	2/5 ounce	11.34 grams	Exodus 30:23
Mina (50 shekels)	1.25 pounds	0.567 kg.	Ezra 2:69
Talent (60 minas)	75 pounds	34.02 kg.	Ezra 8:26

Liquid Measures

Log	0.65 pints	0.31 liters	Leviticus 14:10
Kab (4 logs)	2.6 pints	1.2 liters	2 Kings 6:25
Hin (12 logs)	0.98 gallon	3.7 liters	Numbers 15:4
Bath (6 hins)	5.9 gallons	22 liters	Isaiah 5:10
Homer (10 baths)	59 gallons	220 liters	Ezekiel 45:11
Kor (10 baths)	59 gallons	220 liters	Ezekiel 45:11
Metretes	10 gallons	37.85 liters	John 2:6

Dry Measures

Kab (1/18 ephah)	2.6 pints	1.2 liters	2 Kings 6:25
Omer (1/10 ephah)	2.3 quarts	2.2 liters	Exodus 16:36
Seah (1/3 ephah)	7.7 quarts	7.3 liters	2 Kings 7:1
Ephah (10 omers)	0.63 bushels (5.9 gal.)	22 liters	Ruth 2:17
Lethech (5 ephaths)	3.16 bushels (29 gal.)	110 liters	Hosea 3:2
Homer (10 ephaths)	6.33 bushels (59 gal.)	220 liters	Leviticus 27:16
Kor (10 ephaths)	6.33 bushels (59 gal.)	220 liters	Ezekiel 45:14

Money

Denarius	Day's wage		Matthew 20:2
Drachma	Est. 0.035 oz. silver	Est. 1 gram silver	Luke 15:8
Didrachma (2 Drach.)	Est. 0.07 oz. silver	Est. 2 grams silver	Matthew 17:24
Talent, silver	Approx. 100 lb	Approx. 45.4 kg	Ezra 8:26
Talent, silver (Alternate)	Approx. 50 lb	Approx. 22.7 kg	Ezra 8:26
Talent, gold	Approx. 120 lb	Approx. 54.4 kg	1 Kings 9:28
Talent, gold (Alternate)	Approx. 60 lb	Approx. 27.2 kg	1 Kings 9:28

Time

Sunrise	6 AM	06:00	Mark 16:2
First hour	7 AM	07:00	
Second hour	8 AM	08:00	
Third hour	9 AM	09:00	Matthew 20:3
Fourth hour	10 AM	10:00	
Fifth hour	11 AM	11:00	
Sixth hour	Noon	12:00	Matthew 27:45
Seventh hour	1 PM	13:00	John 4:52
Eighth hour	2 PM	14:00	
Ninth hour	3 PM	15:00	Acts 3:1
Tenth hour	4 PM	16:00	John 1:39

Eleventh hour	5 PM	17:00	Matthew 20:6-9
Sunset	6 PM	18:00	Luke 4:40
First watch of night	6 PM - 9 PM	18:00 - 21:00	
Second watch	9 PM - midnight	21:00 - 00:00	Luke 12:38
Third watch	Midnight - 3 AM	00:00 - 03:00	Luke 12:38
Fourth watch	3 AM - 6 AM	03:00 - 06:00	Matthew 14:25

Appendix C – Observations on the first appearance of various measurement terms in the book of Genesis

Chapter 1 (verse)
(1) – Time (beginning)
(2) – Contents (empty); 1:20 (teem); 1:28 (fill)
(3) – Light
(3) – Quality (good)
(5) – Counting (1st day; ordinal numbers)
(5) – Time (day)
(14) – Calendar (mark time – sacred time, days, years)
(16) – Counting (numbers – two lights)
(16) – Comparison (greater and lesser light)
(28) – Growth (increase)

Chapter 2
(8) – Direction (east)

Chapter 3
(8) – Temperature (cool of the day)
(16,17) – Pain

Chapter 4
(21) – Music
(22) – Metallurgy and manufacturing

Chapter 5 (verse)
(4) – Age

Chapter 6
(15) – length (cubit)

Chapter 7
(11) – Calendar (years and months)

Chapter 23
(15) – Weight and value (worth 400 shekels)

Chapter 29
(27) – week

End Notes

[1] All Bible references, unless otherwise noted, are taken from the New International Version (NIV). © 1984, 2011 by Biblica.
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