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Applying the Reformational Doctrine of Christian Vocation to our Understanding of Engineering as a Sacred Calling

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Abstract

Students at Christ-centered universities often find themselves wrestling with whether or not God can use them as effectively in the field of engineering as He can in a field such as pastoral ministry or foreign missionary service. This question exposes an underlying dualism that has been fostered in the minds of 21st century believers causing them to view certain professions as "secular" and certain others as "sacred". This paper describes how the biblical doctrines rediscovered during the Protestant Reformation have liberated Christians to study and even excel in fields such as engineering and technology. I describe first how dualism was pervasive during the Middle Ages causing a strong distinction between sacred callings and secular pursuits. I then show how the teachings of the reformers and then later the Puritans concerning God's relationship with man and particularly the doctrine of the priesthood of all believers paved the way for a new understanding of the Christian doctrine of calling or vocation. Based on Reformation teachings, pursuing engineering *as engineering* glorifies God and is a sacred calling. Finally I investigate how this doctrine of Christian calling affects the pursuit of the engineering profession by Christians. I argue that Christians should be the best engineers in light of the fact that they are called by God to this profession for His glory. I suggest ways for instilling this biblical vocational mentality into the minds and hearts of engineering students at Christ-centered universities.

Introduction

Ask the typical engineering student why she is interested in pursuing engineering and the response will usually have something to do with the good money that can be made in technical careers or something to do with the expanding job market which is fueled by our information-driven society. The occasional student will admit that they pursue engineering because they are interested in understanding how things work and in modifying them to work even better or because they are good at science and mathematics and thoroughly enjoy those subjects. Few students will respond by saying that God has called them to be an engineer. These rare students are expressing an understanding of what theologians have called the doctrine of vocation.

A second problem frequently encountered by engineering advisors at Christ-centered universities is the question that many students face concerning whether or not they can as effectively serve God in a technology profession as they could if they entered the so-called "vocational ministry." Usually this term "vocational ministry" is a euphemism for such callings as foreign ministries, the pastorate, among others. This dilemma belies an underlying dualism that exists in the worldview of Christian engineering students concerning the vocations or "callings". More will be said about this kind of dualism later when I discuss vocational thought during the Middle Ages.

Vocational thinking is largely lost in our modern American, consumer society. Many people view their day to day job as simply a means to the end of pursuing the "American Dream". The "American Dream" drives people to earn as much money as possible in as short a time as possible so that they might retire as soon as possible to enjoy the fruits of their labor…the large house, the nice car, the speed boat on the lake among other extravagances. Not that there is anything inherently wrong with wealth in and of itself, but problems occur when these become the purpose for why we do what we do. Many Americans including many Christians view their jobs as a necessary evil which must be simply endured if the "greater good" of

reaching one's own materialistic goals is to be met. In other words, work becomes a self-centered enterprise in which the needs of the self and its wants are satisfied by hard work and ingenuity. In the short term, Monday through Friday are simply necessary drudgery if one is to enjoy Saturday and Sunday with their sporting and cultural events. This view of work is unbiblical, but this is the mentality that many students have as they enter college with the hopes of finding a job that will pay well upon graduation.

This paper is an attempt to take a look at the view of Christian vocation that came out of the Protestant Reformation and in particular, to apply this understanding of vocation to the profession of engineering. I will first describe the concept of vocation during the Middle Ages and show briefly that dualism ruled the day. I will next explore the doctrine of vocation that arose during the Reformation and in particular show what Martin Luther taught concerning vocation. Luther is considered by many to be one of the leading thinkers in history concerning the doctrine of Christian vocation. Finally, I will apply this kind of vocational thinking to several engineering examples and make suggestions for applying this Reformation teaching to the engineering curriculum at Christ-centered universities.

Vocation in the Middle Ages

The word vocation comes from the Latin *vocation* and carries with it the idea of a "call" or a "calling". It has historically been used to indicate the call of God in a person's life either in the calling of a lost sinner to Himself, or as it is intended for this paper, the call of God in a person's life relating to what will be one's chief employment in this world. Biblical references to this idea of vocation include I Corinthians 7 where the Apostle Paul exhorts new believers to stay in their calling following their conversion to Christ.

During the Middle Ages a fundamental dualism arose between "secular" employments and "sacred" callings. Thomas Aquinas explored this dualism in his *Summa Theologiae*. There he argues that the "contemplative life" is more excellent than the "active life". For Aquinas, the life of the cleric and the monk consisting of a life of prayer and asceticism far surpassed the life of the farmer or the cobbler who spend their days working with their hands. To justify this assessment, Aquinas appealed to the biblical story of Mary and Martha wherein Jesus commended Mary for listening to him while Martha busied about the kitchen.[1]

Thomas Aquinas is most well known for introducing the idea of this fundamental split between "Nature" and "Grace". Things belonging to nature include mundane tasks, sexual activity (even between husbands and wives), eating and drinking, and other this-worldly endeavors while the things belonging to grace include God, the spirit realm, man's mind, etc. Such a divide certainly had its origins in Plato as well as the Gnostics, but Aquinas formalized this dualism as a fundamental system in theology.

The result of this dualism in theology was the development of two classes consisting of the clergy and the laity during the Middle Ages. Monks and others in the church were considered called by God to their vocation while other labor intensive occupations were not really considered callings at all. Guzman says, "Those who were called to theological reflection and the spiritual disciplines could not afford to spend times in lower forms of work, such as manual labor."[2] It was against this backdrop that the Protestant Reformation brought a fundamental paradigm shift in the thinking concerning vocation. It is to the Reformation view that I now turn.

The Reformation View of Vocation

Most historians agree that the pivotal moment in the Protestant Reformation was Martin Luther's posting of his 95 Theses on the door of All Saints' Church in Wittenberg in 1517. Most historians and theologians would agree that the foundational teaching of the Reformation concerned the grace of God and its place in justifying sinful people. Arising from this foundation were important teachings concerning vocation.

Martin Luther is well known for his teaching on Christian vocation. Perhaps no one else in history was able to crystallize this doctrine better than Luther. In order to understand Luther's view, it is necessary to understand that Luther saw every man and woman, regardless of social class, as standing on a level playing field before God. That is, God is not a respecter of persons whether that person is a king or a peasant, priest or layman, servant or master, a pastor or an engineer. For Luther, everyone stands equally guilty before God and is justified by God through faith. Guzman puts it well when he describes Luther's teaching, "Negatively stated, all works are equally worthless as a ground for justification. Positively stated, all works are equally valuable on the ground of justification by faith alone."[2]

Says Luther,

> From all this it follows that there is really no difference between laymen and priests, princes and bishops, 'spirituals' and 'temporals,' as they call them, except that of office and work, but not of 'estate'; for they are all of the same estate-true priests, bishops, and popes-though they are not all engaged in the same work, just as all priests and monks have not the same work.[3]

In other words, it doesn't make any difference to God from a justification point of view what a man or woman does for their earthly employment as long as it is a lawful employment. Luther would say that each person stands before God not as a king or as a subject, but as a person of faith. Wingren says on this subject, "When anyone, be he emperor or craftsman, turns to God in faith, or, more concretely, in prayer, he is without the outer support which 'station' gives in relation to others."[4]

Luther raised the status of the so-called "temporal" callings to that of spiritual callings. For Luther, all callings are spiritual and bring glory to God as they are used for the benefit of other human beings. Listen to Luther again:

> A cobbler, a smith, a farmer, each has the work and office of his trade, and yet they are all alike consecrated priests and bishops, and everyone by means of his own work or office must benefit and serve every other, that in this way many kinds of work may be done for the bodily and spiritual welfare of the community, even as all the members of the body serve one another.[3]

Pay careful attention to Luther's emphasis on the welfare of the community. One of the keys to understanding Luther's thought on vocation is to see that God does His work through human vocations. In other words, God has in his providence provided for some people to be teachers, some to be garbage collectors, some to be supermarket checkout clerks, and some to be engineers among numerous other occupations so that his work in the world gets done and so that the needs of people, both *believers* and *unbelievers*, are cared for. Our problem today is that we often fail to see God's provision behind these occupations. We fail to see God's provision in the farmer, the grocery store clerk, and in the case of interest here, the engineer. The milkmaid no longer simply milked the cows, but as Wingren described Luther's view, "God himself will milk the cows through him (or her) whose vocation that is."[4] We as engineers could add to this that God himself provides a way to cross the turbulent sea through the engineer who designs the airplane. Or, God himself enables the doctor to see the tumor through the engineer who built the MRI machine. We know from the Reformation teachings on grace that God has no need for our work per se, but as Wingren says again, "God doesn't need our works, but our neighbor does."[4] As engineers, our neighbors need us in very real ways as we solve problems which benefit humanity at large.

Since men and women acting in their vocations are agents of God's providence, the worker now has a new motivation for performing his duties. He now sees himself as called to serve others out of love for them whether he knows them in a personal way or not. For Luther, the primary motivation to be involved in an occupation is not to earn vast quantities of money, but rather to serve the community. The worker is to look past her work to see those who she serves. She must learn as Veith says, "to see Christ in her neighbor."[5]

John Calvin also elevated the status of "secular" work when he said, "…the Lord bids each one of us in all life's actions to look to his calling. For he knows with what great restlessness human nature flames, with what fickleness it is borne hither and thither, how its ambition longs to embrace various things at once…Therefore each individual has his own post so that he may not heedlessly wander about throughout life."[6]

Clearly Calvin saw the dangers inherent for people who do not have a station in life to man or for those who neglect this station. Those who do not have a station in life to tend find great restlessness and little fulfillment.

The Puritans were also known for their elevation of the "secular" callings. Their great concern was that all people everywhere should be employed in their occupations in a manner that was pleasing unto God. Cotton Mather said, "A Christian should be able to give a good account, not only what is his occupation, but also what he is in his occupation. It is not enough that a Christian have an occupation; but he must mind his occupation as it becomes a Christian."[7] For Mather, it is not enough for the Christian to simply do one's work, but such work must be approached from a distinctly Christian perspective. Work done for God's glory is work that is never done in vain (I Cor. 15).

To summarize what I have said so far, the Reformation view would teach that all callings are equally sacred within the Kingdom of God. They are so not because they better a person's standing with God, but because they show love to our neighbor and fulfill the second great commandment. Secondly, the Reformation teaches us that God's providence is at work through the vocations that people have. The vocations are His means of providing for both believers and unbelievers alike. In other words, the many vocations we find in the world are God's way of dispensing His common grace. Such doctrine gives new meaning for Christian professionals such as engineers. Work is no longer seen as simply a way to earn a living, but instead it is seen as a vehicle for service to other people. Work is no longer about serving one's own ambitions, but is instead imbued with purpose outside the self. The engineer no longer does her work as unto men but as unto God Himself who sees all men and the work they do. Work done for the Lord is never done in vain. The questions the engineer must ask are, "How is God at work through my vocation?" and "Who is my neighbor?" The answers to these questions should give new motivation and meaning for the Christian engineer in particular as she seeks to do her work for God's glory.

God's Providence – Hidden Behind the Engineers

The Christian view of work and vocation must find its root in Scripture. Many Christian doctrines have their basis in the Book of Beginnings, Genesis, and the biblical doctrine of vocation is no exception. In Genesis 1:28, before the fall of man, we see God commanding the man and the woman to "Be fruitful and increase in number; fill the earth and *subdue* it." God later gave the man Adam the task of naming all of the animals in the Garden of Eden (Genesis 2:19-20). This command has come to be known as the Creation Mandate. It consists of two main directives, one of which is that mankind should engage in procreation to populate the world. The second part of the mandate calls on mankind to bring the world and its resources into subjection and to make use of them to the glory of God. Men are God's vice-regents in this world, being given the task of ruling it with and for Him.

Engineers fulfill a special place within God's Creation Mandate. There are few professions whose purpose is more directly involved in subduing creation for the benefit of mankind than engineering. The engineering profession is everywhere concerned with making the world a little better for mankind while extracting and making use of its resources to produce great benefits for people everywhere. In doing so, the engineer is uniquely equipped and positioned to love her neighbor through her profession. Consider for a moment several great examples of the ways in which the profession of engineering has benefited mankind as it shows forth God's common grace.

One of the engineering marvels of modern times is the mechanization of the agricultural enterprise. Such mechanization has led to great increases in crop productivity per acre and has involved the work of many skilled mechanical and electrical engineers. Modern harvesters are equipped with global positioning system (GPS) for accurately tabulating the crop yield as a function of location as well as the ability to control the application of herbicides and pesticides to minimize the waste of these expensive products. These high-tech advancements have allowed for the production of the vast amounts of food needed to feed the world's hungry populations. God in His common grace has given engineers to make significant contributions to feeding the hungry (neighbors) by use of these innovative techniques. A modern combine is shown if Figure 1 below.



Figure 1 - A modern combine harvesting corn.

The hard work of engineers has also given mankind the ability to take a look into the human body to identify diseases and other maladies previously hidden from our eyes. Computed tomography (CT), ultrasound, and nuclear magnetic resonance (NMR) all provide different views into the body and facilitate the diagnosis of serious diseases such as cancer, heart disease, and other ailments. An example of a Positron Emission Tomographic (PET) image of the human brain is shown in Figure 2 below. God's common grace through the engineering profession is clearly seen as lives are prolonged and the quality of life is improved for countless thousands of people (neighbors).

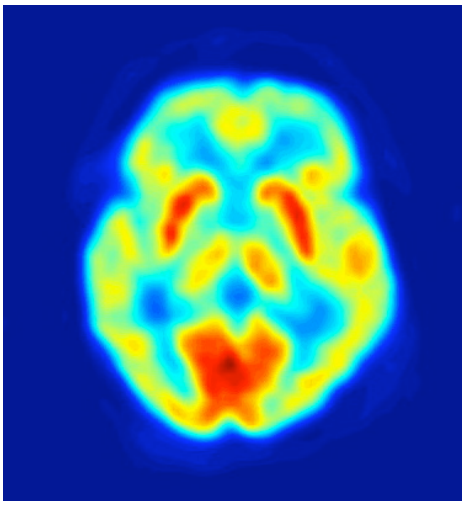


Figure 2 - A PET image of the human brain.

Finally, let us consider the development by engineers of Radio Detection and Ranging or radar. Radar made it's debut during World War II allowing Great Britain to defeat the onslaught of Nazi German bombers during the Battle of Britain.[8] While the military use of radar continues, the familiar domestic use of radar is for weather prediction and early warning. Modern Doppler radar systems can provide early warning of dangerous weather phenomena such as hurricanes and tornados allowing time for citizens to take the necessary precautions prior to the arrival of the storm. A radar signature called a "hook echo" can provide timely and automatic warning of developing tornadoes and is shown in Figure 3 below. God has provided engineers with the ability to design such systems for the protection of thousands of lives (neighbors) and engineers are currently seeking even better ways to use radar for storm analysis and prediction.

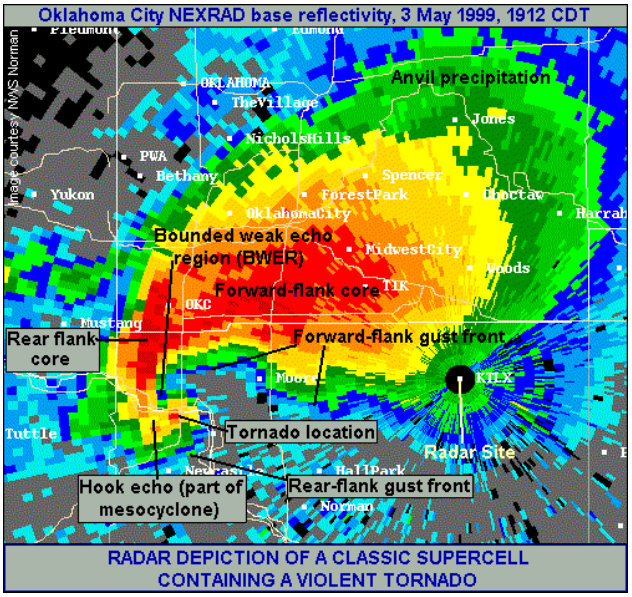


Figure 3 - Depiction of a hook echo signature of an approaching tornado.

We have seen several examples of how God has placed engineers in a unique position to unleash the power and secrets of God's creation for the benefit of men and women everywhere. In this way they perform services and create products that give comfort to people, provide them safety, and allow them to enjoy a better quality of life all parts of God's common grace. God in His common grace has provided humanity with the engineering profession and when men and women are called to be engineers, they are in their profession being obedient to God's command to love one's neighbors.

What This Means in the Engineering Classroom

This kind of vocational thinking is crucial to teach our up-and-coming engineers especially in the Christ-centered engineering classroom. In a world where a very tempting reason why most seek to become a technology professional is to make a comfortable living, it is important to teach our students to think about their profession in terms of serving people and finding Christ in their neighbor. The person who we are serving is no longer just some face in the crowd. They are a man or woman created in the image of God, about whom Jesus said, "If you have done it unto the least of these my brothers you have done it to me." The Christian engineering student must be challenged to think about who her neighbor is as an engineer. How can we do this? Let me suggest several ways.

First, the doctrine of Christian vocation as applied to engineering should be presented as a component of the introductory engineering course offered at most universities during the freshman year. At the Christ-centered university, the engineering profession should be presented as one whose primary purpose is found in serving the community at large. Designing bridges, writing software, fabricating circuits as well as the many other things that engineering professionals do should be presented as community-centered activities. At Cedarville University, freshmen engineering majors are introduced to vocational thinking by personnel from our career placement office during the course of the freshman introduction to engineering course. It is stressed that engineering is a high calling from God on equal footing with other degree programs within the university. In addition, students are given an assignment in which they are to interview believing engineers for the express purpose of learning from them how they integrate their engineering calling with their lives as Christians. In this way, students are exposed to living and breathing examples of Christian engineers.

A very practical suggestion for introductory engineering courses would be to assign students case studies involving actual engineering activities such as the ones above in which the students are to determine what neighbors are being served by the engineering professionals in the scenario. For example, the students might be challenged to think about an engineer involved in the design of medical imaging equipment. A designer of CT machines should be consciously aware of the patients whose diseases will be diagnosed earlier and whose lives will be made better due to the penetrating ability of such technology. This provides such an engineer with a reason to go to work in the morning that transcends the paycheck that she gets on a biweekly basis and forces her to reach outside herself to those in need. She becomes the hands of God in the lives of the many patients whose quality of life will be drastically improved. God is the Great Physician who often uses doctors and nurses and yes, engineers to bring healing to the afflicted and suffering.

It is important to reach freshman engineers with this message especially at the Christ-centered university because I have observed that there seems to be a lot of pressure to switch to "ministry-oriented" majors early in their college career. While we would desire for every college student to find the career that God has for them, it may be that many struggle with this decision because of a failure to present the engineering vocation as a calling from God Himself given to many. Students should be challenged to obey this calling even in the same way that we would challenge students whose call is to foreign missionary service.

Secondly, individual courses in the engineering curricula should be presented from a neighbor-centric perspective. For example in the communications course taught as part of most electrical engineering

curricula, it might be possible for us to challenge our students to think about the people (neighbors) who will use communications technology and to think about what is best for them. For example, questions should be asked such as, "What effect does the presence of ubiquitous communication technologies have on the fabric of society (all of my neighbors)?" A Christian engineer would approach this problem from a fundamentally different perspective than her Christian counterpart would. It is easy as an engineer to seek to solve any problem simply because it can be solved. It is easy to assume that "can" implies "ought". Christians should not take such a pragmatic approach to engineering. Because the principle of love for neighbor is implicit within the Christian teaching on vocation, the Christian engineer must consider the needs and concerns of her neighbor and this should be integrated into engineering classes as a matter of course.

Finally, the capstone design projects in engineering curricula should encourage an understanding of the neighbors that students are seeking to serve. In other words, they should be challenged to look beyond simply the development of a new product, but should be challenged to look at who the customer is and be challenged to see Christ in that customer. At Cedarville, many of our capstone projects have given students opportunities to do just that. In 2002 a team of Cedarville mechanical engineering students designed a prosthetic arm for a young girl who desired to play the violin. Other "neighbor-centric" designs have included a water filtration system for use in regions without suitable drinking water, a device for in-surgery determination of hip replacement among other recent designs, all of which have focused on our students becoming a conduit for God's common grace.

Conclusion

There is a need to instill vocational thinking in the hearts of engineering students at Christ-centered universities. We have seen that a fundamental dualism arose during the Middle Ages which gave the status of a divine calling to only those who entered into the monastic orders. We then saw how the Protestant Reformation broadened the idea of a Christian calling to include any legitimate occupation that a man or woman could enter. Finally, we looked at some ways in which such vocational thinking could be applied to engineering curricula in Christ-centered universities.

This paper has been a call for us as engineering faculty to think differently about engineering as a sacred calling. It has been a call for us to likewise challenge our students to do the same. It is time for our students to know and understand that engineering *as engineering* glorifies God as it demonstrates love toward our neighbors in improving life for many. I pray for a resurgence of engineers who understand and internalize these teachings from the Protestant Reformation.

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