

The Power of Revelation

Lessons in Management from the LASER

Charles Townes was born in 1915 in Greenville, South Carolina. His father was an attorney and a farmer. Growing up in rural Georgia, young Charles enjoyed the outdoors where he explored nature. He attended Furman University, a nearby Baptist institution, where he received a bachelor's degree in 1935. He received a master's degree from Duke in 1937 and a Ph.D. in physics from Caltech in 1939.

After graduation, Dr. Townes looked for an opportunity to conduct fundamental physics research. He believed the best venue would be as a faculty member of a major research-oriented university. In the late 1930s, however, times were difficult in the United States. The economy languished in a seemingly interminable depression for nearly a decade. The depression continued despite aggressive government programs and deficient federal spending. As the decade of the 1940s approached, the winds of world war began to blow. Though the United States officially adopted a political doctrine of isolationism, the War Department, sensing the inevitable, was sponsoring research into new weaponry, detection systems, and communications.

Dr. Townes' efforts to acquire a university position proved fruitless. The only job offer that he received was a position as an applied physicist doing war related research and development at one of America's premier industrial companies. This would have been a dream offer for many scientists, but not for Dr. Townes. His interest in fundamental physics led him to initially reject the offer. Because of the absence of other job offers and with the urging of one of his professors, he reluctantly reconsidered and eventually accepted the position as a member of the technical staff of Bell Labs.

Dr. Townes worked on radar systems and bomb sights. He was never excited about this work, but he faithfully applied himself. Much of his work dealt with finding wavelengths suitable for the new detection technology known as radar. The War Department was searching for radiation wavelengths that would not be absorbed by water vapor in high humidity conditions, such as were prevalent in the Pacific Theatre of World War II. Dr. Townes' wartime research was somewhat frustrating and not as efficacious as he wished. His physics career began rather inauspiciously.

During the postwar years, the War Department (later known as the Department of Defense) continued as the source of funding for research. The War Department was concerned about the emerging threat from the Soviet Union and saw the military value of technology during World War II. The War Department wanted to explore all technologies that had possible military application. Electromagnetic radiation was one of the key areas of interest.

On January 1, 1948, Dr. Townes joined the physics department at Columbia University in New York. As a molecular spectroscopist with wartime experience, he was able to procure research funding to explore electromagnetic radiation for the War Department. His task was to investigate the millimeter wavelength spectrum of electromagnetic radiation seeking technologies with potential military value. Dr. Townes was granted some latitude in his research, which he exploited. He mused over a number of different projects, including the possibility of amplifying a beam of radiation through interaction with a beam of molecules.

The War Department urged Dr. Townes to form a committee—known as the millimeter committee—of top scientists to serve as a think-tank. Prominent scientists from several universities were invited and agreed to serve on the committee. The War Department wanted to minimize the risk that the

researchers would miss something of military significance and felt that the millimeter committee would play an important role in satisfying that goal.

In 1951, after several years of inconclusive research, Dr. Townes traveled to Washington to meet with the millimeter committee and representatives from the War Department. He and his team had not discovered anything of real value to the War Department. Clearly, Dr. Townes and his colleagues were frustrated with the lack of progress; both professional pride and research funding were on the line.

The meeting was scheduled for the spring of 1951. The morning of the meeting, Dr. Townes rose early and walked from his hotel to nearby Franklin Park. He sat on a park bench enjoying the cool morning, smelling the flowers, and pondering the wonders of God's creation. His thoughts turned to his work. As he reflected on his research, he asked himself what was wrong with his thinking. What was blocking his team and him? He knew that there must be something in the millimeter spectrum of radiation that would be useful to the War Department, but what? And what was keeping him from seeing it?

For some time, he had considered the possibility of a beam of molecules transferring energy to an intersecting beam of radiation. The net effect would be to amplify the beam of radiation. It appeared that this would be in violation of the laws of physics, specifically, the second law of thermodynamics.

The second law of thermodynamics states that everything tends to move from an orderly state to a disorderly state. An orderly state is a state of instability and a disorderly state is a state of stability or equilibrium. A simple example of this law is the interaction of frozen water (ice) with liquid water. An ice cube floating in a glass of liquid water represents a state of order due to the differential in temperature between the ice and the liquid water. Since the liquid water temperature is above the freezing point of 32 degrees Fahrenheit, the ice cube begins to melt in the glass of water. The result is an increasing state of disorder as the ice cube melts, causing the water temperature to decrease. This means that the temperature differential between the ice and water is decreasing, which means there is less order. If the second law was not true, then the ice cube could transfer energy to the water causing the temperature differential to increase. An increasing temperature differential means that the system is getting more orderly. But as far as we can tell, this latter scenario is not reality.

Could a beam of radiation grow through the transfer of energy from a beam of molecules? How would a beam of molecules in a state of equilibrium be able to transfer energy to an intersecting beam of radiation? Logically, it made no sense. Furthermore, like the ice cube example above, Dr. Townes believed that the second law of thermodynamics prohibited such a scenario. Reinforcing his belief was the fact that other well respected scientists had also dismissed the possibility.

On that park bench in Washington, D.C., in the spring of 1951, Dr. Townes pondered, more profoundly than ever, how God made the universe. As a Christian, he was unusual among his peers. Most scientists in his day were naturalists, which meant that they viewed the universe as a closed system. A closed system assumes that the totality of reality is the tangible physical world, which *a priori* excludes any reference to God as an explanation for physical phenomena. However, Dr. Townes believed that the universe is an open system, which allowed for God to interact with the physical universe. Furthermore, since Dr. Townes believed that God created the universe, he knew that God was the source of all the principles that govern the universe. And he knew that the key to discovering these principles was revelation from God.

As Dr. Townes pondered the universe that morning, he experienced revelation from God. A new thought came to him. He realized an error in his thinking. The second law of thermodynamics applied to a system in equilibrium, that is, in the lowest energy state. Being in the lowest energy

state meant that there was no lower energy state and therefore no energy available to transfer from the molecules to the beam of radiation. But if the beam of molecules was not in equilibrium but in an excited state, the second law of thermodynamics would not prohibit energy transfer from the beam of molecules to the beam of radiation. This implied that an electromagnetic signal could possibly be amplified by extracting energy from an intersecting beam of molecules that was in an energized state. In this scenario, the energized molecules would drop into a lower energy state and the beam of radiation would be amplified by the energy released by the molecules. This revelation, which Dr. Townes believed was divinely inspired, led him to develop the MASER, the forerunner to the LASER. MASER is an acronym for ***M**icrowave **A**mplification by **S**timulated **E**mission of **R**adiation*.

Dr. Townes' experience illustrates the power of divine revelation and the power of presuppositions. No one knows anything about God's universe unless God chooses to reveal it to him or to her (1 Corinthians 4:7). Furthermore, we all base our lives on presuppositions, that is, beliefs about God and His universe. Dr. Townes' failure to recognize that the second law of thermodynamics only applied to systems in a state of equilibrium proved to be a major block in his thinking.

All of us shape our lives based on presuppositions. The seminal presupposition that everyone makes is his or her view of God. Your view of God will shape everything in your life. For example, if you believe that man is created by God with intent and purpose, then you value human life. If you value human life, you would not abort a baby simply because of an unwanted pregnancy. You would see the hand of God in the pregnancy even if the conception was the byproduct of sin.

An erroneous presupposition will lead to erroneous thinking and action. For example, if you believe that man and the universe were not created by God, then there is no particular dignity to human life. Hence, a fetus of an unwanted pregnancy has no divine connection or purpose. Therefore, exterminating the fetus is an option, usually based on the mother's wishes. This illustrates that bad presuppositions lead to bad decisions. Keep in mind that the only presuppositions that work are those that are consistent with the character and nature of the Creator.

If you believe that the universe was created by God and therefore reflects His character and nature, then all aspects of God's creation contain revelation about Him. Every field of study, therefore, is ultimately a study of God and how He created His universe to work. Hence, the foundational field of study for all knowledge and wisdom is theology. Beginning with theology, one can learn about science, mathematics, social behavior, law, construction, finance, history, linguistics, manufacturing, management, and so forth.

God's unchangeable nature is one of His characteristics (Malachi 3:6). A corollary of this attribute is the timeless universal nature of God's principles. For example, one of the principles of God's universe is sowing and reaping (Galatians 6:7), also known as cause and effect. This principle is regarded as a universal timeless law in all areas of endeavor.

Given that all knowledge is ultimately a study of God's attributes and that God is unchangeable, it follows that the proper study of any discipline should yield truth about God that is congruent with truth gleaned from all other disciplines. As a result, we can learn truth about God in one discipline that can be used to help understand other disciplines.

So what can we learn about the management of organizations (i.e., organizational behavior) from science? Science is the study of physical phenomena found in God's universe. Organizational behavior is the study of how groups of people accomplish various missions in God's universe. The common link is God and His universe.

To illustrate this, consider what we can learn about God's universe from the LASER, an acronym for ***L**ight **A**mplification by **S**timulated **E**mission of **R**adiation*. LASERS work on the principle of influence.

The starting point for a gas LASER is a cylindrical chamber of atoms or molecules with mirrors on each end; one of which is semi-transparent. The gas is subjected to an energy source that energizes the atoms or molecules. When radiation of a very specific wavelength traverses the gas, it stimulates the energized atoms or molecules to emit radiation, known as photons. The radiation travels to the end of the chamber and is reflected by the mirror and then travels to the other end where it is reflected back by the other mirror. As the radiation travels back and forth, more and more atoms or molecules are stimulated to release energy. The result is amplification—a beam of radiation increasing in intensity.

The power of the LASER comes from the phenomenon known as “coherence and amplification.” Coherence enables radiation emitted by the atoms or molecules to be released monochromatically and in-phase so that the waves reinforce rather than cancel each other. If the waves of radiation were not coherent, they would tend to cancel each other. Instead, the radiation intensity amplifies.

The power is released when the beam of radiation becomes intense enough to overcome the reflectivity of the semi-transparent mirror located on one end of the LASER. The released LASER beam is then available for whatever purpose desired. The LASER can be used for many purposes. Low-powered LASERs are used in applications such as electronics and medical equipment. Moderately powered LASERs are used in applications such as communications and distance measuring. High-powered LASERs can burn a hole in steel.

The LASER is a device that efficiently focuses the collective work of a group of atoms or molecules to accomplish tasks. What can our knowledge of the properties of LASERs teach us about how to efficiently focus a group of people to accomplish tasks? Or stated another way, what can we learn about management and organizational behavior by studying the operating principles of LASERs?

Consider the following characteristics of LASER phenomena and their parallels in management and organizational behavior.

Property	LASER	Management and Organizational Behavior
Stimulation	External Energy Source	God
Common ground and perspective	Same type of atoms or molecules	Biblical Worldview
Team work	Stimulated Emission	Equally Yoked Leadership Team
Boundary	Wave Guide	Strategic Plan
Efficiency	Coherence	Executorial Excellence (interdependence and discipleship)
Growth	Amplification	
Success	Useful work	Customer Validation

The following is a brief comparison of the principles of LASERs and the principles of management or organizational behavior.

- **Stimulation:** to initiate the LASER phenomenon requires an external energy source to energize the atoms or molecules. A LASER cannot spontaneously start by itself.

In organizations, the initiating condition is a vision and energy from God given to a person or a group of persons.

- **Common ground and perspective:** the atoms or molecules in the LASER must be the same type. This is required to facilitate interdependent action.

Organizational leaders must share a common worldview. A worldview is a way of viewing reality and is expressed in philosophy, values, and principles that shape the culture and practices of organizations. The only worldview that works in God's universe is His worldview; hence, a biblical worldview is uniquely required to enjoy lasting success.

- **Team work:** as the external energy source energizes the atoms or molecules in the LASER, some of the atoms or molecules release energy in the form of photons—waves of monochromatic radiation (i.e., the same wavelength). As the photons move through the LASER, the radiation stimulates other energized atoms or molecules to emit monochromatic photons.

Organizations must be led by equally yoked leaders, that is, leaders who are committed to walk in unity and in submission to a biblical worldview, which results in a very stimulating environment.

- **Boundary:** as the atoms or molecules in the LASER emit photons, the radiation needs to be directed or guided to maximize the useful energy. For a LASER, this is done by a physical wave guide.

In organizations, the contributions of the various members of the organization must be guided by a well conceived strategic plan and accountability to that plan.

- **Efficiency:** one of the marvels of LASERS is that the emitted photons are not only monochromatic but also coherent. This means that the photons are emitted in-phase with each other.

For organizations, coherence occurs when the members of an organization work interdependently. This happens when the members are equally yoked and filled with passion to fulfill the mission of the organization with excellence.

- **Growth:** radiation in a LASER grows as the monochromatic coherent photons oscillate back and forth between the mirrors on each end of the wave guide. This process enables the radiation intensity to be amplified until its intensity overcomes the reflectivity of the semi-transparent mirror on one end of the LASER. The released LASER beam is then available to accomplish whatever purpose is desired.

Like the mirrors in a LASER, disciples who are called to be part of an organization will grow individually and help others in the organization to grow. Also, disciples attract other disciples, and those who want to be disciples, to the organization. The culture will be infectious, in a good sense, as the individual efforts of the disciples work interdependently to fulfill the strategic plan of the organization with excellence.

- **Success:** the effectiveness of the LASER is validated by the results it produces, that is, its ability to perform useful tasks.

Likewise, organizations are validated by the results they produce. These results are a measure of the clarity and execution of the organization's value proposition as experienced by customers.

God's handprint is seen in all aspects of His creation. God's nature and character are seen both in the principles of physics and the principles of management. His character and nature are consistent

and congruent because His principles are the same throughout His universe. These principles are timeless and universal; hence, they transcend space and time as well as all aspects of the universe.

You may have noticed in the chart and discussion above that these seven characteristics of the LASER and their parallels in the science of management and organizational behavior can be correlated to the Beyond Babel Model, presented in my book *Beyond Babel*. This suggests that the Beyond Babel Model captures timeless universal principles about God's universe, which can help people effectively manage any organization—families, schools, businesses, churches, non-profits, government agencies, and so forth.

Charles Townes won the Nobel Prize in 1964 for his contributions to the physics of MASERS and LASERS.

Dr. Townes received the Templeton Prize in 2005. The purpose of this award is to honor scientists who make outstanding contributions to both the physical and spiritual dimensions of life.

Dr. Townes is an outstanding man who walked out the reality of his faith. He discovered that the key to his accomplishments was revelation from God. This is the key for everyone. To do whatever God created you to do requires divine revelation.

In developing the Beyond Babel Model, which is the seminal teaching in my book, *Beyond Babel*, I had a similar experience to Charles Townes—I had a moment of revelation. For more than a decade, I studied the Bible, seeking to understand the biblical principles of management and organizational behavior. I also read a variety of books and journals, attended conferences, talked with others, and prayed. One day while I was sitting in my home office pondering this matter, the elements of the Beyond Babel Model suddenly became clear to me. Like Dr. Townes, I viewed this insight as revelation from God, given to me by the sovereign God of Creation. And this revelation was a key to guiding me into the work that God ordained for me to do.

Neither Dr. Townes' experience nor my experience should be surprising since the God of the universe has chosen to impart wisdom and knowledge by revelation. Revelation is uniquely given to each of us to guide us into our life purpose.

Furthermore, since God created everything in the universe, His fingerprints can be found in all aspects of creation. Therefore, we should expect that the principles of the various disciplines of the universe will be congruent. As a result, we can learn about God from every discipline. And all disciplines can be expected to produce a consistent coherent picture of God's nature. This makes our work of discovering God's universe interesting and exciting. Let's enjoy it!

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September 2008
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