

# All Ye Need to Know

*John D. Lamb*

*BYU Studies has a long history of publishing the annual lecture given by the recipient of the Karl G. Maeser Distinguished Faculty Lecturer Award, BYU's highest faculty honor. And so it is with great pleasure that BYU Studies Quarterly publishes this year's lecture by Dr. John D. Lamb, a professor of chemistry and biochemistry, this year's Maeser lecturer. His speech was delivered as a forum address on May 20, 2014, at Brigham Young University.*

Let me begin by inviting you to step back and consider your current GPS coordinates—no, don't pull out your smart phone, just use your smart cortex. Where are you? The answer is that you happen to be at one of the most privileged places, at one of the most privileged times, in all of human history—a twenty-first-century, fully functional university; and not just any university, but a great university. Now, I know you've already spent twelve or more years of your life in school, and more to come (maybe many more if you plan to be a doctor like 150 percent of the students in my chemistry classes). You're probably weary and may have asked yourself—is this all really worth it? Is this the best way to spend a quarter to a third of my life expectancy? I think that's a fair question and one that I'd like to spend a few minutes talking with you about today. Because my hope is to convince you, or perhaps to deepen your conviction if it is there already, that learning and knowledge have real intrinsic value, not just as the world sees it in the form of dollars and cents, but real eternal value. And so I've entitled my talk "All Ye Need to Know."

Graduates of the Keats 101 class will recognize this phrase as a snippet from his famous “Ode,” wherein he assures us that “Beauty is truth, truth beauty,—that is all Ye know on earth, and all ye need to know.” Like all good poetry, these lines are open to multiple interpretations; and the first interpretation goes something like this: “Well, that’s enough; don’t bother learning anything else.” This is the interpretation preferred by many Chem 105 students, and, indeed, I know many Chem 105 students who wish that John Keats rather than John Lamb were their chemistry instructor for this very reason. But that’s not the interpretation I wish to apply here today. Let’s put the accent on the word “all,” and you see that it comes out “ALL ye need to know,” which in my native Canadian means you really need to become a “know-it-all.”

Now I recognize that *know-it-all* is normally considered a pejorative term; but when you stop and think about it, would knowing it all in real fact be such a bad thing? To find an answer, let’s talk a little about God’s perspective on this important question. Of course, we typically query the mind of God through the pronouncements of his prophets. And the question at hand is: What is the value of knowledge, and is it really worth all the effort of getting it?

I don’t know about you, but when I’m faced with a difficult question, my first inclination is to see if Brother Joseph had something to say about it. It turns out there was plenty, much of it found in the scriptures, with which I am sure you are familiar—D&C 88, for example. But in addition, let’s turn to the sayings of Joseph Smith. Joseph states: “In knowledge there is power. God has more power than all other beings, because he has greater Knowledge, and hence he knows how to subject all other beings to him.”<sup>1</sup> Did Joseph say God was all-powerful because (a) he was in possession of more money, (b) was better looking, (c) had more influential friends, or (d) possessed the Elder Wand? No, rather, because he has great knowledge.

You might be thinking—okay, when I’m resurrected as a celestial being (hopefully), I’ll know everything, and then I’ll have all power too. But I’m afraid that’s not the way it works. Notice what else Brother Joseph had to say: “It is not wisdom that we should have all knowledge at once presented before us but that we should have a little then we can comprehend it.”<sup>2</sup> And elsewhere: “Whatever principle of intelligence we attain unto in this life, it will rise with us in the resurrection. And if a person gains more knowledge and intelligence in this life through his diligence and obedience than another, he will have so much the advantage in the world to come” (D&C 130:18, 19). And finally: “It is plain



**TOGETHER**, by John D. Lamb. Oil on gessoed board, 2013.

beyond comprehension and you thus learn that these are some of the first principles of the Gospel, about which so much has been said. When you climb a ladder, you must begin at the bottom rung. You have got to find the beginning of the history and go on until you have learned the last principle of the Gospel. It will be a great while after the grave before you learn to understand the last, for it is a great thing to learn salvation beyond the grave and it is not all comprehended in this world.”<sup>3</sup> This is clearly good doctrine and presents a pleasing outlook to the billions of years that lie before us—the excitement of discovery is in knowing that every discovery will open up new questions to be answered. Knowing all the answers would be like always being full and never being hungry, and I don’t think that sounds very fun at all.

Forgive me if I get a little personal at this point. I've been privileged to walk these halls nigh on forty-seven years now, as student and professor. I've been mentored and nurtured intellectually and spiritually by great men and women whom I've admired and attempted to emulate. Over the years, students have often asked me why I chose science and a career in teaching. So I've tried to come up with a logical answer aside from the fact that it just felt good. Actually, part of the answer lies in the very roots of the word *science* itself: the word derives from the Latin *scientia*, meaning knowledge, and so literally a scientist is a person who makes it his or her business to know stuff. Of course, in modern times the word has taken on a focus that perhaps fits better the more traditional title "natural philosopher," a label that I actually prefer for my profession. But to the point, being a scientist, getting to know stuff and to understand the world a little better is a rewarding endeavor for me, indeed an endeavor that yields a certain benefit well beyond the obvious professional ones enjoyed by those of us who carry the official title "scientist." Gaining knowledge is something everyone can do, and in this regard, in the broadest sense of the word, everyone can be a scientist. And if we really believe those words from Joseph Smith, everyone should strive to be a scientist, a knower of things, a seeker of light and knowledge like Abraham, our father. There is intrinsic and eternal value in gaining knowledge. It is one way of drawing closer to God; it is one way of becoming more like him.

Of course, one way of gaining knowledge is by study. On this point, I know I'm preaching to the choir, and I'm sure you students don't need to be reminded any more than you already are about that! Another way is by faith, and surely hearing the word of God with faith in him and his servants has edified the understanding of everyone here many times over. A third way that mankind as a whole enlarges in knowledge is by observation and reason, an endeavor that we commonly call "research" and that finds its most productive home in the university setting. That's an interesting word, isn't it—university—because it captures the scope of what we humans by nature seek to understand, the whole universe (and by the way, you cosmologists seeking proof of the multiverse, I appeal to you that one is just enough for now, thank you). So at a university like ours, we seek knowledge about everything, and specifically we seek to expand our knowledge and understanding about everything by observation and reason.

So much has been learned, so much progress achieved in the last few centuries. But let's not get big heads over that fact . . . you see, it

isn't entirely of our own doing. Where research is concerned, where the advancement of human knowledge is concerned, it turns out we have a powerful partner, one who seldom gets much, if any, credit. You never see his name on a peer-reviewed scientific publication; you never see his picture on the cover of *Nature*; he has never won the Nobel Prize in chemistry or physics or anything. He is Jesus Christ. And what, you may ask (as I'm sure our atheist friends would ask with some measure of indignation), is his contribution to the advancement of science, of knowledge of the universe at this and at every university or research laboratory? I invite an answer from Brigham Young: "Every discovery in science and art, that is really true and useful to mankind, has been given by direct revelation from God, though but few acknowledge it. It has been given with a view to prepare the way for the ultimate triumph of truth, and the redemption of the earth from the power of sin and Satan."<sup>4</sup>

Now, I know this is supposed to be a forum assembly, not a devotional; but you see, where knowledge is concerned, on the highest level at least, we don't make a distinction between sacred knowledge and secular knowledge. And why is that? Because God does not make this distinction himself. All truth ("all ye need to know," remember) is circumscribed into one whole—in other words, it fits together seamlessly—and the knowledge that has poured out upon the Latter-day Saints, and clearly on the whole world in the latter days, has just one source. Further, it has just one scope: to bring man closer to living in the kind of world God lives in, to live the kind of life God lives. It's interesting to me that LDS doctrine about the relationship between God and mankind, between the nature of God and mankind's capacity for knowledge, differs so markedly from that of traditional Christianity. You see, we don't believe in "mysteries" in the traditional philosophical sense of the word, that is, mysteries being not just things that we don't understand, but that we cannot ever understand because the answer is inherently incomprehensible to humans, locked away in the unknowable mind of God. On the contrary, we have faith (because Joseph had faith) that reasonable, comprehensible answers exist for every question, just waiting for God to reveal them, and waiting for our capacity to rise to the occasion. As Eliza Snow pointed out, and as we sing in "O My Father," "truth is reason."<sup>5</sup> The LDS perspective maintains that truth is reasonable, nature is reasonable, God is reasonable. We certainly don't have all the answers now, but we look forward to getting them one day, line upon line, precept upon precept. In a way, Joseph Smith has done for the sacred what Newton did for the secular: just as Newton showed that the laws that



**POWER FROM ON HIGH**, by John D. Lamb. Oil on gessoed board, 1992.

governed the earth and the heavens were not different (as had been thought up until that point), so Joseph brought the religious heaven and earth into a degree of harmony, in that physical bodies—ours, the earth, and others—once thought by many to be antithetical to heaven, are actually part of a long-term plan to build for the eternities; these are in fact to be maintained into the eternities, albeit in a more exalted form.

Thus, in Latter-day Saint philosophy, the temporal study of the material world is given a degree of sanctity and eternal value that it otherwise does not possess.

Of course, given the value of knowledge in bringing men and women closer to God, is it any wonder that over the ages Satan has done everything in his power to impede its progress? Short periods of enlightenment have come and gone, only to be replaced by droughts of darkness: the library at Alexandria burned; the schools of the Roman Empire were destroyed; the works of Beethoven and Goethe were replaced by Nazi barbarism. Furthermore, holding back knowledge has been a means of enslavement of men and women from time immemorial. Among many examples across many cultures, consider these:

- Ancient priests in Egypt subjugating peasants by their knowledge of heavenly motions and the Nile flood to engender awe and obedience
- Medieval priests making it a capital crime to read or translate the Bible in the vernacular
- Taliban goons shooting little girls for going to school

It is amazing to me that the last event could happen in this day and age, but I think it illustrates how desperate the forces of evil are to prevent knowledge from spreading over the earth as the Lord has intended. As Latter-day Saints, we need to stand as strong opponents of these evil forces and as standard-bearers of enlightened learning. Learning is an integral part of building Zion and a central feature of our mission. That is why one of the first things Joseph did in Kirtland was to establish a School of the Elders, and in Nauvoo a university. That is the main reason BYU exists and you and I are here. It is more than preparing for a profession. It is preparing for the millennial reign of Christ. It is preparing for eternity.

Anyone who watches the news knows that the forces of darkness and ignorance are alive and prospering in the world even today. But there is a flood of light and knowledge that is pushing back the darkness as knowledge becomes ever more readily available through the technologies brought about by advances in human understanding. These advances have greatly aided the development of our civilization. But the freedoms and prosperity we enjoy in the West are fragile flowers at a green oasis in the midst of a vast historical wasteland of human ignorance and suffering. That flower could easily wither if we don't cherish and nurture it in our own lives and the lives of our children and grandchildren. As spoken by the Ghost of Christmas Present in Dickens's

*A Christmas Carol*, ignorance spells the doom of civilization, and we must oppose it at every turn.<sup>6</sup> A broad education for every individual and the advancement of knowledge as admonished by the Lord in D&C 88 underpin the freedoms and the prosperity we enjoy.

Now let me pause here for a bit of clarification. Lest I be misunderstood, I want to explain that in speaking of the value of “knowledge” I mean more than familiarity with facts, but not exclusively. It is true that in the twenty-first century we are faced with an interesting, and to some degree unprecedented, challenge when it comes to deciding what to store in our heads. Today, facts are easily stored and retrieved from our exobrains, namely our computers, much more easily than was true using books in the predigital world. For example, I can remember spending many grueling hours in the library researching a topic for a term paper to find information that today I could find on the Internet in seconds. So, it could be claimed that in this day the other (and for the moment uniquely human) intellectual talent for understanding and wisdom is the most important, if not the only, aspect of knowledge that we need to nurture in ourselves. After all, didn’t the Lord admonish, “With all thy getting, get understanding” (Prov. 4:7)? Indeed, one might be tempted to go to the extreme of claiming that in the twenty-first century knowledge of facts has become altogether outdated. After all, you can always look it up in Wikipedia, right? But let’s ask ourselves, “Can understanding be achieved without learning some facts?”

Along these lines, Hugh Nibley makes an important point about the interesting interplay between facts and understanding. In his essay “Zeal without Knowledge,” he states, “If we try to evade the responsibility of directing our minds to the highest possible object, if we try to settle for a milder program at lower stakes and safer risks, we are immediately slapped and buffeted by a power that will not let us rest. . . . We must think—but about what? The substance of thought is knowledge. . . . If the mind is denied functioning to capacity, it will take terrible revenge . . . ; in particular, it will invent knowledge if it has to.”<sup>7</sup> What he’s saying, in essence, is that our minds demand knowledge—it is in our nature—and it is important that we fill the mind with true knowledge, or it will absorb the false or the imaginary. Beyond this, I have to say that it is mighty difficult to think intelligently about something of which you know nothing. I’ve tried that, and it doesn’t work. I’ve heard radio commentators try it, and to disastrous effect, inventing fallacious knowledge right and left leading to even more fallacious conclusions. If we are to direct our minds to the highest possible object, we do well to



**GLIMPSE OF THE LAKE**, by John D. Lamb. Oil on canvas, 2011.

fill our minds with true knowledge about that object and use the discernment that is uniquely human to come to “understand” the world in ways that computers just can’t achieve. Furthermore, without making the effort to check our facts, it will be easy for us to be caught up in a world that has lost the distinction between medicine and fruit juice, between music and noise, and between science and fraud.

We have a lot to do in a short time to build up Zion, and God has given us a very fertile field in which to cultivate our knowledge in support of that effort. Indeed, we live in a golden age of learning; and yet I worry that many of us are prone to squander this precious gift. My encouragement to you is this: don’t let opportunities to engage in deep and meaningful learning pass you by unnoticed. Open your eyes to light and minimize the things that distract you from what has real value.

There are so many inviting but hollow distractions around us these days. Pop culture is well named—it has all the nutritional value of soda pop or cotton candy—all empty calories and air. I like a little soda pop or cotton candy now and then; it’s fun. But a constant diet morning, noon, and night would ruin my health, and a constant diet of nothing but pop culture will ruin the health of the soul. One of the problems, of course, is that many of these distractions can be addictive. Let me invite you to be an iconoclast of pop-culture distractions—smash those game platforms (figuratively, I mean); apply the mute button unmercifully to MTV; tell those purveyors of the latest fashions to take a hike. Or at least, if you can’t put these things away altogether, put them in their place on a far back burner. Instead, why not use the precious little time you have on earth while your brain still functions to drink deeply from the Pierian spring<sup>8</sup> and apply that knowledge you’ve gained to good ends. Oh, and, by the way, just to help you understand what I mean when I say to do this “while your brain still functions,” let me make you aware of the kinds of dangers that lurk about you with a little story from my younger days. When I was about twenty-five, a fellow player threw a heavy wooden racquetball racquet with all his might into my head and knocked me unconscious (I don’t think on purpose!). I had to have thirteen stitches in my head, and I’m sure my IQ dropped ten points that day. So take a lesson from me, take every advantage of every opportunity to learn while you can. You never know what a friend might do.

We human beings have an inherent need, indeed craving, to learn—we inherited that from our Heavenly Parents. We are inveterate information gatherers; now, I don’t like that word *information* so much—it sounds rather sterile; but the word does have one redeeming value—it reminds us that we are informed by the information we invite into our heads. Will that be information junk food (I refer to most of pop culture), or will we ingest the best that the universe has to offer? I say let’s aim for the latter. Our destiny is to be better than what this world alone has to offer. Don’t let Lady Gaga or ESPN or Wall Street rob you of that. Your destiny is to build Zion; you were sent here to change the world. You are the last great hope of the world. There is a shining city on a hill that Joseph Smith pointed our minds to—we need to seek it out. It’s up to us to build it! Let’s make it the focus of our waking moments. Joseph knew that the only way for light to overcome darkness, for truth to overcome error, is for the children of light to grow in knowledge and apply that knowledge with diligence. That’s why he was so keen on education, and why we should be also. He had a vision that we could be better than the beasts and live not for today but

for eternity. Speaking of eternity, let me ask you: Can you imagine living forever? What are you going to do? Get up in the morning and watch the ten millionth superbowl on TV . . . eat your 457 billionth pepperoni pizza? *Really?* What are you going to do for all those billions of years? Whatever it is, it will be an extrapolation of what you spend your time doing now. Now is the time to lay the foundation for eternity. We've got to divest ourselves of the idea that eternity is something we face after we die. Eternity isn't tomorrow; it's now.

There are a great many things we should be doing to lay the foundation for a happy and productive eternity. Learning is just one of them, but certainly not the least. It just happens to be the one I'm focusing on here. So let me encourage you to be not only diligent but to be eclectic in your learning. There are wonderful things to learn in every discipline, and answers to many interesting questions are found there. Here are just a few:

- *Mathematics*: here we find the language of creation—Pythagoras was right, as we are now learning: reality really is based on numbers.
- *Economics*: here we learn why they are rich and we are poor.
- *Literature*: here we can live a thousand lives in a single lifetime—we can see the world through the eyes of Job, Falstaff, Horace Rumpole, and Jack Ryan.
- *Physics*: here we come to know that the world is weirder than we could possibly imagine.
- *Music*: here we can learn to resonate with the heartbeats of others.
- And *chemistry*: the ultimate in human intellectual achievement, which unveils the tiny world that underpins all we see around us.

As a scientist, I'd like to share with you a couple of examples of things I get excited about having learned in my lifetime. In the first place, what I have learned about chemistry has given me a totally new and unique perspective on the people in my life. For example, when I look at my wife, Betty, I see with my eyes only the light that reflects off her skin. But science has revealed that her skin is made up of trillions of tiny cells that I can't see; and inside each of those cells are organelles and a nucleus; and these in turn contain trillions of protein molecules all working in a wonderful harmony; and these are made of atoms so tiny that we cannot see them even with the most powerful light microscope, particles of matter that operate according to exotic, sometimes mind-boggling rules. Notice that Betty is much more than what I can see with my naked eye. Now, I can see her not only as a loving human being, a

wonderful wife and mother, but in addition I can envision her as one of the most complex molecular machines in the universe—a veritable miracle of biochemistry—a kind of Wonder Woman. Chemistry has given me a whole new way of seeing the world . . . and probably a whole new reason for sleeping on the couch tonight.

Here’s another example, this time from astronomy. What if I had eyes like the Hubble telescope and could see far into the distance and in many wavelengths of light? I could look over there and see the great storm on Jupiter in retinal clarity; or over there and see through the clouds of the Orion Nebula to witness a star being born; or over there and see a quasar as an enormous black hole devours nearby stars in a storm of super-hot debris. How could I even be aware that such awesome wonders exist, let alone envision them, if I hadn’t sought out and been blessed with knowledge?

One last point: Are we ever going to run out of things to learn? The longer I live, the more I doubt it. You see, at the beginning of the twentieth century, some in the scientific community claimed that all that was important to know had now been discovered, and that the only work left to do was to tie up a few loose ends. Of course, that was before Einstein and others upset the applecart in multiple ways, and look how our understanding has changed since then! Fast forward even further into the twenty-first century, and another heart-stopper. Here we thought we were making such great progress in understanding the natural world, only to discover that all this time we’ve been studying only about 5 percent of the matter and energy in the universe. The rest was invisible to us! Why? Because we are creatures of electromagnetism, and the rest of the matter and energy in the universe pretty much just ignores those rules. If we keep going on like this, we’ll soon find that the more we know, the closer we approach knowing relatively nothing at all. But is that discouraging? No, that’s not discouraging in the least. In fact, it opens up the wonderful prospect of an eternity of never running out of new things to learn about.

I hope that in some small way I have managed to strengthen your commitment to learning. As the hymn “The Spirit of God” expresses, here in the latter days “the knowledge and power of God are expanding,”<sup>9</sup> and surely, gaining knowledge and understanding is a godly endeavor. It can be hard work, but it can also be thrilling, it can be exciting, and it can be intoxicating. You’ve heard of a “runner’s high”? Well, sometimes I feel like I’m experiencing a “learner’s high.” I hope you have experienced this too. I hope you will continue experiencing it here at BYU, throughout your lives, and on into an endless eternity. God bless you all.

Until his retirement in July 2014, John D. Lamb was the Eliot A. Butler Professor of Chemistry and Associate Chair of the Department of Chemistry and Biochemistry. He was born in Ontario, Canada, and served an LDS mission in northern Italy. He received his PhD in Inorganic/Physical Chemistry in 1978. He worked as Program Manager at the U.S. Department of Energy, then joined the BYU Chemistry faculty with a joint appointment as executive director of research and creative activities. He served for twenty years as editor in chief of the *Journal of Inclusion Phenomena and Macrocyclic Chemistry* and for eight years as BYU associate dean of undergraduate education. He served as a visiting lecturer at three universities in Italy, one in Germany, and one in China. He is the recipient of the BYU Outstanding Achievement in Sponsored Research Award, the Maeser Excellence in Research and Creative Arts Award, the Alcuin Fellowship, and the Maeser Excellence in Teaching award; and he was Carnegie Professor of the Year in 2000. He has published over 170 peer-reviewed papers on macrocycle-based separations and received the International Ion Chromatography Award in Berlin, Germany, in 2012. He is author of the online multimedia tutorial *ChemTutor*. He has served as chair of the BYU Faculty Advisory Council and of the State of Utah Science Advisory Council. He was a member of the Mormon Tabernacle Choir and is a visual artist whose works in oil and egg tempera have been displayed in several juried art exhibits. He and his wife, Betty, have six sons and eight grandchildren.

1. Andrew F. Ehat and Lyndon W. Cook, *The Words of Joseph Smith: The Contemporary Accounts of the Nauvoo Discourses of the Prophet Joseph* (Orem, Utah: Grandin Book, 1991), 183. <sup>^</sup>
2. Ehat and Cook, *Words of Joseph Smith*, 200. <sup>^</sup>
3. Stan Larson, “The King Follett Discourse: A Newly Amalgamated Text,” *BYU Studies* 18, no. 2 (1978): 202. <sup>^</sup>
4. Brigham Young, in *Journal of Discourses*, 26 vols. (Liverpool: F. D. Richards, 1855–86), 9:369 (August 31, 1862). <sup>^</sup>
5. Eliza R. Snow, “O My Father,” in *Hymns of The Church of Jesus Christ of Latter-day Saints* (Salt Lake City: The Church of Jesus Christ of Latter-day Saints, 1985), no. 292. <sup>^</sup>
6. Charles Dickens, *A Christmas Carol and Other Christmas Stories* (New York: Penguin, 1984), 107–8. “From the foldings of its robe, [the ghost] brought two children; wretched, abject, frightful, hideous, miserable. . . . ‘This boy is Ignorance. This girl is Want. Beware them both, and all of their degree, but most of all beware this boy, for on his brow I see that written which is Doom, unless the writing be erased.’” <sup>^</sup>
7. Hugh W. Nibley, *Nibley on the Timely and the Timeless* (Provo, Utah: BYU Religious Studies Center, 1978), 265. <sup>^</sup>
8. Alexander Pope, “An Essay on Criticism,” published anonymously in 1711, line 216; text available at <http://andromeda.rutgers.edu/~jlynch/Texts/essay.html>. <sup>^</sup>
9. William W. Phelps, “The Spirit of God,” in *Hymns*, no. 2. <sup>^</sup>