

JOURNAL of the UNION FACULTY FORUM

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A LETTER FROM THE FACULTY FORUM PRESIDENT

What a joy it is to serve at Union University. Noticeable benefits of life at Union include the shared commitment to Christ and the community fostered through this relationship. Within this unity we also see differences: differences in academic disciplines and the scholarship and creative works produced. We celebrate these differences. One venue of sharing these differences is the *Journal of the Union Faculty Forum (JUFF)*. I encourage you in the future to participate by contributing to the *JUFF*. In doing so, we can learn from each other and gain new perspectives. It is my hope that with this recent publication you'll find many reasons to enjoy the unique accomplishments of our colleagues as well as our unity in Christ.

For His Glory,

Michael H. Schiebout
Faculty Forum President
2020-2021

A WORD FROM THE EDITORS

After an unprecedented semester and a ridiculous amount of Zoom, we, the students of Professional Editing, Proofreading, and Publishing, are proud to present the 2020-2021 *JUFF*. This publication is the result of painstaking toil, frantic brainstorming, and lots of educated guesses about our colleagues' facial expressions under their masks. We hope these works of scholarship and creativity will help you think deeply about everything from Platonic solids to aging parents. We would like to extend our thanks to the authors who submitted to this year's *JUFF* for allowing us the audacity of editing their work and to Dr. Bailey for introducing us to the publishing world.

A WORD FROM THE EDITOR-IN-CHIEF

As your Editor-in-Chief, I am thrilled to present the 40th volume of the *Journal of the Union Faculty Forum*. Truly, the credit belongs to an impressive team that worked so diligently to bring you this year's *JUFF*. Both faculty and students collaborated on the publication from start to finish. My Professional Editing, Proofreading, and Publishing class had the privilege of collaborating with Associate Professor Melinda Posey's Typography class on the journal's design. Together, we are proud to present this quality publication that is both aesthetically pleasing and rich in content. Further, a special thank you goes to the faculty members who contributed to this issue.

Christine Bailey

Professor, Department of English
Director of Composition Support

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GENERAL SUBMISSION GUIDELINES

A new volume of the *Journal of the Union Faculty Forum* is published during each fall semester. The editors invite submissions of poetry, fiction, creative nonfiction, artwork, and scholarly articles in various academic disciplines. Submissions should be in a MS Word format with a 12-point font. The journal accepts MLA, APA, and Turabian documentation formats. Acceptance is determined by the quality of the work. You may submit your work for Vol. 41 (Fall 2021 issue) by emailing your contribution to cbailey@uu.edu.

A CHRISTIAN MATHEMATICIAN'S APOLOGY

Matt D. Lunsford

The idea of writing about my goal of living an integrated life as a Christian mathematician grew out of a desire to respond to G. H. Hardy's autobiographical essay "A Mathematician's Apology," originally published in 1940. While my experiences as a mathematician are similar in many ways to Hardy, I must acknowledge that I am not a research mathematician at one of the most prestigious institutions in the world. Even so, since being a mathematician has many universal similarities, I can relate well to most of Hardy's comments. However, one significant distinction is that Hardy was a self-declared atheist. While many may believe that this distinction makes little to no difference in the professional life of a mathematician, I disagree, and that is my main purpose for writing this essay. It is my hope that, by doing so, I might encourage fellow mathematicians, and possibly even academicians in other fields who hold to the Christian faith, to pursue the integrated life.

I have always had a natural ability to do mathematics. Throughout my school years, I was very good at arithmetic, algebra, and geometry. As an undergraduate, I did not select mathematics as a major until I took my first Calculus course. There was something about that course, with its epsilons and deltas, limits, derivatives, and integrals that I found fascinating. I recall being intrigued by the mathematical notion of the infinite. That was a new idea. However, most of my undergraduate mathematics career was simply thinking that mathematics was like a game of chess: just follow the rules and get the correct result. Near the end of that time, I was introduced to the idea of a mathematical proof. This was the next new idea, and it thrilled me. By this time, I was ready to try my luck at postgraduate education in mathematics.

Something dramatic happened in my first-year graduate courses in mathematics. My professors introduced me to abstract algebra, and in particular, to an area of algebra known as Galois theory. I already knew that I loved mathematics, but I fell head over heels in love with abstract algebra. Even today, I find the subject beautiful. I believe that passion, after ability, is probably the most important quality for becoming a mathematician. Passion was and continues to be the driving force for my becoming and remaining a mathematician.

Hardy and I agree that pursuing mathematics as a career is a noble goal, assuming that you are gifted and passionate about the subject matter. As for me, a career in mathematics was further confirmed by *vocatio*, a sense of calling. In my early years of college, I floundered. I was wrestling with a call to ministry, but I really did not know what that ministry would be. Now, after teaching for more than 25 years, I realize that my ministry is in undergraduate mathematics education, teaching students to love the discipline that I love. My vocation has been rewarding and fulfilling, but incorporating the integrated life into my career has remained a challenge.

Circa 1996, I embarked on a journey to discover and then to live out the integrated life. I realize that I have not arrived at the final destination. As with most journeys, a guide is invaluable. I found my mentor in a most unusual place – not among the living. English language scholar and Christian writer C. S. Lewis died before I was even born. Even though Lewis was not a mathematician, I have found him to be a marvelous guide and a kindred spirit. He was a first-rate academician who sought to live a life fully faithful to Jesus. Reading Lewis convinced me that I was on the road less traveled, but that I was not on this journey alone.

Let me begin unpacking my thoughts on the integrated life. Hardy asked two fundamental questions in his essay: First, is mathematics a worthwhile pursuit, and second, why would

someone become a mathematician? He dispenses with his answers to the second question rather quickly and then spends most of the rest of the essay discussing his first question. Taking my cue from Hardy, I want to ask two questions that will guide the remainder of this essay. What is mathematics? What makes a Christian mathematician different from a secular mathematician?

What is mathematics? That question has been pondered by humans for at least two millennia. First of all, the term mathematics is derived from the ancient Greek word *mathēmatos*, which literally means “that which is to be learned.” So, historically, mathematics has been associated with those areas of knowledge that were deemed worthy of study. For the Pythagorean sect, this specifically meant the natural numbers and their properties, geometry, astrology (including astronomy), and music. These four subject areas formed the original quadrivium of the liberal arts. I do not know of a universally accepted definition of mathematics, but here is my current working definition: mathematics is the discovery, creation, proof, and rigorous communication of logical theories, encapsulated within a prescribed and mutually agreed upon axiomatic system. The ultimate goal of this activity is both the acquirement of results, known as mathematical truth, and the rigorous dissemination of those same results. This mathematical enterprise, which has been operational for over two thousand years, exists, at least in part, to enhance humanity’s understanding of the created order (reality) in which we find ourselves. While my definition might sound exotic, rest assured that I am describing the same well known discipline – the one which explores the properties of right triangles and provides formulas for solving quadratic equations and so forth.

What makes a Christian mathematician different from a secular mathematician? For me, it is not the mathematics. What I call the “kernel” of the discipline is exactly the same. By “kernel,” I mean the core of the discipline as it is understood and practiced by contemporary mathematicians. The content of the papers I write for scholarly journals and the talks I give at

professional meetings is remarkably similar to that of a secular mathematician. However, as I am contemplating my discipline, I feel the freedom to explore whether ideas that emerge from my Christian faith commitment might enrich my understanding of mathematics, and alternately, whether the mathematical ideas I am pondering might enhance my understanding of the Christian faith. For example, Christian mathematicians might contemplate how the mathematical concept of infinity amplifies the meaning of eternal life. They might also investigate the relationship between mathematical truth and absolute truth. This freedom, I believe, is a substantive difference between the Christian and secular mathematician, but it is not the only one.

Another distinction is the source of our motivation. Why do we, as mathematicians, continue to learn, practice, and teach mathematics? Hardy asserts that the dominant motivations for the mathematician are intellectual curiosity, professional pride, and ambition. Christian educators like Parker Palmer have offered a partial retort to this mindset (6-9). Pursuing mathematics primarily for curiosity equates to seeking knowledge for the sake of knowledge itself. Pursuing mathematics primarily for recognition equates to seeking knowledge for vanity. Pursuing mathematics primarily for utility equates to seeking knowledge for its power to control. (Hardy, who argued that his contributions to number theory were both useless and harmless, never sought to exploit his mathematical abilities in this way). If, however, we pursue mathematics primarily for love, then we seek knowledge to heal a fallen world; that is, we seek knowledge to serve and edify others, to bring reconciliation and restoration to humanity, and also to glorify the Creator. Therefore I, and hopefully many other Christian mathematicians, strive to be motivated primarily by love.

While freedom of exploration and source of motivation are clear distinctives for the Christian mathematician, I do not believe that either is the core distinction. Christians are called to live their lives under the Lordship of Christ. This call is for an integrated life, where both piety and intellectual activity are accountable to Christ. For academicians, this means that

even our scholarly pursuits should be subject to the Lordship of Christ. In the preface of *On Stories*, Walter Hooper, the custodian of C. S. Lewis's works after his death, writes this about Lewis:

Whether the reader of Lewis's books is or is not a Christian, it ought to be said here that Lewis's conversion just *was* the chief watershed in his life. There was no nook or cranny of his being that it did not eventually reach and transform (xiv).

This provocative quote goads me to ask a question of myself. Have I allowed the Lordship of Christ to penetrate and transform all areas of life, especially that prideful area of expertise I achieved in mathematics? I find this to be the core of it all.

So the integrated life is a personal journey. It is not formulaic. One size does not fit all. The question of "how do I live an integrated life?" is not just another academic problem to be solved. It cannot be answered solely by reading the "right" books, or by asking the "right" questions, or even by hearing the "right" speakers. The answers to this question will be spiritually deeper than that. On the journey, seekers uncover who they are now and who they are becoming under the Lordship of Christ. The destination is clear: Jesus as Lord over all of my life, even over my area of expertise.

Now, let me address the elephant in the room. Practically, how does living an integrated life, being both a professional academician and a faithful follower of Christ, manifest itself in a Christian mathematician? In attempting to answer this question for myself, I will use two phrases that are often heard in Christian higher education: "redeeming the discipline" and "thinking Christianly." First of all, does "redeeming the discipline" entail changing or altering the content of the discipline? For the discipline of mathematics, I would argue no. Altering the discipline has not been part of my calling as a Christian mathematician. I conjecture that Christians in other disciplines may respond differently to this question. However, I want to argue that "redeeming the discipline" of mathematics could have at least two meanings for the Christian mathematician.

Firstly, “redeeming the discipline” of mathematics involves reinvigorating and prioritizing certain subareas within the discipline. These subareas (e.g. algebra, analysis, probability, geometry) are categorized by the contemporary mathematical society. Just as clothes can be either in or out of vogue, these subareas have received varying degrees of importance during different periods of time. My work involves the training of future Christian mathematicians, both teachers and researchers. Realizing that both of these groups lack a broad understanding of the human story of mathematics, I prioritize exposure to the history of mathematics for undergraduates. In a similar manner, regardless of current trends, another Christian mathematician might emphasize a different subarea of the discipline, accomplishing, at least in part, the mission of Christian higher education. Thus, we have one powerful method for “redeeming the discipline.” But there is another.

Secondly, I propose that “redeeming the discipline” of mathematics entails a return to the original source and purposes of this knowledge. Hardy equated intellectual curiosity with the desire to know the truth. I would argue that intellectual curiosity alone is insufficient and will lead to, at best, an incomplete version of the truth. The missing piece is context. First of all, the ability to do mathematics is a gift from God, and this should be acknowledged in our professional lives. We can debate until the end of time whether God is the author of none, some, or all of mathematics, but we as Christians cannot deny that God is our creator. So, regardless of one’s opinion on the origin of the discipline, God deserves the ultimate credit for the existence of mathematics. Then, responding to our God-given ability, we engage in the mathematical enterprise and become stewards and co-creators of knowledge in this world. This mathematical knowledge allows humans to comprehend aspects of the creation, to make predictions about the creation, and even to engage in thoughts we believe to be similar to, yet wholly different from, the Creator. Using the gifts of ratiocination and imagination, we can prove mathematical truths not only about this created order (reality), but also about abstract, idealized worlds that exist only in our minds, all to the glory of God.

What about the phrase “thinking Christianly”? As an educator and a scholar, I want to ensure that my Christian faith impacts both my pedagogy and my scholarship. Let me begin with scholarship. Ideally, my faith commitment would both influence and inform all of my scholarly pursuits. Many academicians would cry foul at this last statement, believing that in order to preserve complete objectivity, any hint of a religious conviction must be wholly excluded from the arena of scholarly activities. C. S. Lewis, in a short essay entitled “Meditation in a Toolshed,” addresses this critique. Lewis asserts that there is a bias in the academy that “looking at” something (a detached observer) is always superior to “looking along” that same thing (a partisan observer). Lewis uses the imagery of standing in a dark toolshed where a beam of light is streaming through a small hole in the toolshed door. Detached observers see something when they look at the light beam (e.g. dust particles floating in the beam) but partisan observers see something quite different when they move to look along the beam (e.g. the tree swaying in the wind outside the toolshed door). Lewis concludes, “We must, on pain of idiocy, deny from the very outset the idea that looking *at* is, by its own nature, intrinsically truer or better than looking *along*. One must look both *along* and *at* everything” (*God in the Dock* 215). Lewis’s conclusion is obvious: complete objectivity is unattainable.

In mathematics, “thinking Christianly” necessitates both looking at and looking along the discipline, hopefully in harmonious collaboration. I won’t elaborate further on “looking at” the discipline, since this is the current academic practice. However, what exactly might “looking along” the discipline mean? Here are a few questions that have prompted discussions with my colleagues and my students.

- Is mathematics eternal or a temporal human construct?
- Why does mathematics require both reasoning and imagination?
- Does mathematics, in any way, satisfy your longing for beauty?

- Is the effectiveness of mathematics to comprehend aspects of the creation something “miraculous”?
- In mathematics, is truth the same as provability?
- How does mathematics enrich your understanding of order and chaos?
- How does mathematics enrich your understanding of chance and determinism?

Academic papers addressing these and similar questions generally do not appear in scholarly mathematics journals. However, there are journals that publish scholarly papers addressing meta-mathematical ideas. So, in my own career, I have had academic seasons when I pursued and published primarily meta-mathematical papers and other academic seasons when I pursued and published only conventional mathematical papers.

Now, let me address pedagogy. What can “thinking Christianly” contribute to the teaching and learning enterprise? Consider the question: How does a person acquire knowledge? A biblical response would assert that knowing, at least in part, comes from abiding in a personal relationship with another being, either divine or human. In my context of higher education, that personal relationship is realized by the roles of teacher and student. Hence, I am compelled by my faith commitment to create within my classes a community of learning in which caring platonic relationships are prioritized. Most often, I will occupy the role of teacher. Yet, if it is truly a community of learning, there will be times when a student will assume the role of teacher, even though the content being shared at those times may not be from the kernel of the discipline. At all times, the members of the community should aspire to love and care for one another. The ultimate goal of this learning community is the formation of students who also will “think Christianly” about mathematics and whose primary motivation for learning mathematics will be love.

Hopefully the elephant in the room has been addressed: signed, sealed, and delivered. If not, I invite readers to join the

conversation by articulating their thoughts on how to live an integrated life as academicians and followers of Christ. Hardy believed that because mathematical truths (theorems) were permanent, a mathematician, much like a painter or poet, could achieve eternal prominence from his scholarly work. Of course, the Christian mathematician is also concerned about eternity, but not in the interest of renown. I know that my legacy will not be the theorems I have proven or even the meta-mathematical papers that I have written. The legacy I desire to leave will be in the relationships I have formed with both colleagues and students, who love God, love each other, and strangely enough, love that discipline which is called mathematics.

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MEL GIBSON'S *THE PATRIOT* AND THE DEATH OF EARNESTNESS

Ted Kluck

Naturally, as American life and probably humanity as we know it circles the drain, I decided to revisit Mel Gibson's *The Patriot* (2000) on Netflix. The film was nearly three-hours long—part of Mel's “I’ll never cut out a scene I’m in!” turn as a director (see also: *Braveheart*)—and was absolutely alarming (and almost grotesque) in its earnestness.

Being that it was made in 2000, just before social media, it may have been the last truly earnest film ever made and, as such, acts as kind of an earnestness time capsule. It’s hard to pinpoint exactly when earnestness died, but Gibson himself, being one of the first trophies of cancel culture, had to factor in.

But I’m getting ahead of myself. First of all, what is earnestness? Well, if life in 2020 is defined by a sort of sneering, cleverer-than-thou, well-actually, but-have-you-thought-of Debbie Downerism that is sure to ruin everything from your favorite sport (your team mascot is probably some combination of racist/sexist/homophobic!) to your favorite band (the lead singer is probably a horrible person!) to your favorite ice cream (corporations are evil and corporations make ice cream!)...earnestness can probably be loosely defined as the willingness to say you like something, without qualification or caveat.

In its seeming okayness with standing on the proverbial rooftop and shouting that it likes America, *The Patriot* may be the most earnest thing ever, given that we’re probably less than a year away from the word “Patriot” and, as

¹ This article was previously published in the *Jackson Sun*

such, the New England Patriots², being cancelled. Its complete and utter lack of nuance or “discussion” was oddly refreshing. It’s almost as if the movie was suggesting that if a character locks a whole bunch of innocent people into a church and then burns the church to the ground, that character is a bad guy.

Also, *The Patriot* spent \$110 million making a movie about liking America. That’s the sort of thing that can make a man’s masked head spin in 2020.

As movies go, we can’t decide if it was great or terrible, which probably makes it good. The main character’s storyline, which is roughly something like, “I hate war, but I’m good at war, and now the war is coming to my literal doorstep so what am I going to do?” really worked. Heath Ledger in a colonial ponytail really worked. The Mel Gibson character’s misty swamp kingdom, complete with eerie lighting and super heavy-handed symbolism worked. For that matter, *all* of the heavy-handed symbolism worked—from Gibson melting down his dead-kid’s toy soldiers to use as bullets, to the cheekbone Ledger hand-sewing an American flag, to the North Star necklace...it was all incredibly ham-fisted and very satisfying.

Even the violence was un-thoughtful, un-nuanced, and unrealistic. In that, it was also un-disturbing.

It’s almost as though people used to look to entertainment to be entertained. How silly and quaint. Don’t they know that it’s infinitely more satisfying to pick a film apart based entirely on your particular way of viewing the world (pick a philosophy here), looking for every opportunity to be outraged and

² Alt names: *The New England Agnostics*, *The New England Science*, *The New England Cultural Elites*

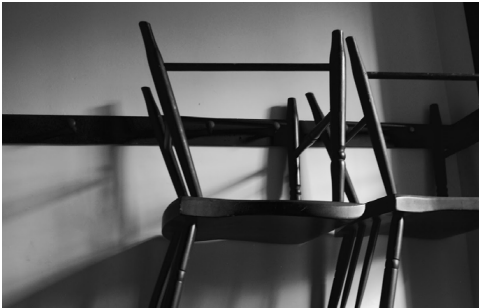
disappointed, and then *racing* to Twitter to share your disgust and outrage with the world? That is *way* more fun than just watching a movie to laugh, cry, escape, or just like it. What a bunch of thoughtless rubes we used to be!

I liked *The Patriot*. And even though it probably makes me a rube, I still like America. Will we ever see another pro-America movie? Probably not in my lifetime. That sounds like hyperbole, but it isn't. To wit, the last pro-America movie was made only twenty years ago and already feels like nostalgia.

A SHAKER PRIMER

Melinda E. Posey

Put your hands to work and your hearts to God." - Mother Ann. This photographic series is composed as a primer on the shaker mantras and ways of making formatted into a children's book. The series was shot over a course of several years at the Pleasant Hill Shaker Community in Harrodsburg, Kentucky.



C is for chairs, clocks & churns.



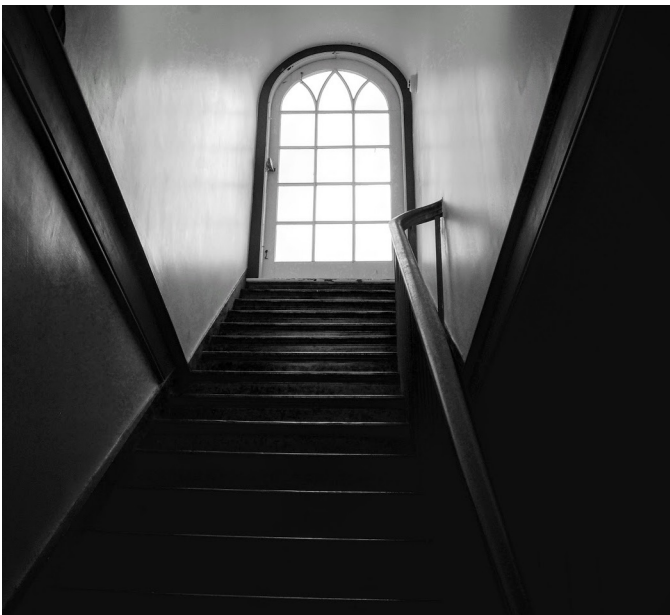
G is for gate.



I is for icehouse.



K is for kitchen.



S is for stairs.



U is for understanding utility.



X is eXiting.

MY MOTHER IS LOSING

David Howard Malone

My mother is losing her mind.

I feel ashamed of myself for saying it that way—it’s a little too flippant, even bratty, and it doesn’t even begin to capture all the things that have been happening to her over the past few years. But I’ve been trying to find a better way to say it for more than a year now, and I’m coming to the conclusion that this might be my least worst option. Every other way I’ve tried to say it sounds euphemistic or overly clinical or too fussy. “She’s losing her mind” suggests she might be thoroughly, ravingly out of touch with reality—she’s not, yet—or that her mind is sinking into braindeath or catatonia—it isn’t. She’s still her, for the most part. But something has been lost.

When I called her the other night, she asked me “What do you know that I don’t know?” and I told her I’d gone to the farmer’s market that morning. “I got eggplant and squash and zucchini,” I said. “I was looking for peppers, too, but I didn’t see any.”

“You have to be careful with pepper,” she said. “It can be too . . .,” she trailed off. “I can’t think of the word I’m looking for.”

“Too strong?” I said. “They give you heartburn or indigestion?”

“You got it right,” she said. “If you don’t get it exactly right, then you’ll regret it.”

“I like peppers,” I said, “but sometimes they don’t like me.”

“You have to hit a happy medium,” Mom said. “Dr. Jones used to say that that all the time, and I’d tell him, ‘Do you know how hard it is to find any kind of medium at all, much less one that’s happy?’”

She brings up the happy medium joke a couple of times a week; it’s not even a joke by now, at least for me; it’s more of an essential element in our personal liturgy. “It’s not like mediums are exactly thick on the ground,” I said. “And happy ones are as rare as hen’s teeth.”

“You can look and look,” Mom said. “It’s really hard to find the perfect one. A lot of times you have to be careful. If you get one that’s too strong, you’ll regret it.”

It was a glitch—she’d lost track of the happy medium part of the conversation and leapt back to peppers, like somebody bumping into the stereo while a vinyl record is playing and jarring the playback to an earlier song—but I caught up pretty quickly. “That’s right,” I said. “If you don’t cook green pepper just right, it can wreck your stomach.”

She returned to the happy medium joke two or three more times during the remainder of the conversation, mainly in regard to getting to bed on time—“You have to hit a happy medium”—but she didn’t rewind her conversation to an earlier point after that. If my goal in calling her is to let her know she’s valued and that someone wants to chat with her and laugh at her jokes, then I think the call was pretty successful. And she still sounds like herself the majority of the time. But something has been lost.

For most of the twenty-plus years I’ve lived in Tennessee, she’s been the one to call me, but a few weeks after Melvin, my stepfather, died in 2012, she mentioned, “I’m eighty-three years old, and this is the first time in my life I’ve ever lived by myself,” and so every night at around 10:30 I started to call her and chat a little about her day. I set an alarm on my phone to make sure I wouldn’t forget.

Before Melvin died, she'd been getting a nightly call from her younger brother, my Uncle Lowell, after Aunt Betty divorced him—he was living in Texas, with only the dog for company. Some days, Mom was the only human contact he had, and she spent a good chunk of every night listening to him talk about how his photography business was going downhill and praying with him and reminding him to cook some dinner for himself. She lost Uncle Lowell to pancreatic cancer a few months before Melvin died—in fact, when Melvin went to the family doctor to find out why he wasn't feeling well, Dr. Yasin told him that it was probably the lingering effects of grief over Lowell's death (it turned out to be some kind of syndrome where all your organs and all the systems in your body gradually shut down) (this is not the actual, clinical diagnosis). She wasn't even able to attend Lowell's funeral, since Melvin wasn't feeling up to traveling, and Mom didn't feel she'd be able to make the trip on her own. In a sense, then, I'm trying to fill in the hole that Lowell left behind.

One of the unexpected consequences of living into your eighties is that you start to outlive your community—my Aunt Wanda, who had lived with Mom for about ten years before Mom met my dad and who wasn't actually my aunt, passed away a few years before Lowell, and Mom felt her absence in both big and small ways, like someone who has lost a tooth and whose tongue keeps stumbling over this unexpected gap in her mouth. In the middle of telling a story about a second roommate who lived with them for a summer, she'd say, "I wish I could call Wanda—she'd remember her name," as if her past was a collection of knowledge that she and Wanda had curated together. She would have had more than enough grief if it had

only been Melvin who died, but his loss stacked itself on top of the losses of Lowell and Wanda.¹

I'm not sure I would have known she was feeling lonely if she hadn't told me. Her life has always seemed crowded with people to me—for years, women drove out to our house on a country road outside of Sycamore, Illinois, to sit at the kitchen table and talk with her about their troubles, mostly having to do with men. When that first started to happen, she'd told my dad how surprised she was that people were seeking her out, and Dad said, "I'm not surprised. You're a good listener." Even after Melvin died, her house seemed busy: women who had been in the Sunday School class she taught decades before would drop by to visit or take her to lunch, and women who were still in her Sunday School class all those years later—she'd stepped back from teaching it by then—would pick her up and take her to church for the weekly women's Bible study, and several women who would drop by house every week for a Bible or book study: one, a girl who had lived on a farm down the road from our old house had never read the Bible on her own before and didn't know why there was a column of letters and number running down the middle of every page in her Bible; another woman, who had lost her family business a few years before, approached every verse she read with suspicion: "Why does God want me to do that?" she'd say. "What does that even mean?"

Looking back, it should have been obvious when I started calling her that her memory was fading. She wouldn't be able to remember the names of people she'd known for years: I got used to her saying "our old neighbor who lived down the road" to refer Sandy Wright, who'd moved into a house on the

1 There were some other losses she'd had around that time, too: she'd fallen down the stairs and broken her wrist, which kept her from doing a lot of things for herself, including going down to the basement—between her bad knees and some weight gain, she got to the point that the only way she could get back up the stairs was to grab onto both stair railings and pull herself up to the next step; you can't do that when you have a broken wrist. And, even after her wrist had started to heal, she injured it again when Melvin was sick and fell down in the shower, and she'd tried to help him get up. She'd also failed a couple of driving tests and wasn't ever able to get her license renewed—it was O.K. when Melvin could drive her around, but once he got sick her options were a lot more limited.

country road my parents lived on after her husband left her and her teenage daughters; “the blind girl” was Eileen Brewer, a friend from church who’d lost her vision years ago due to, I think, gestational diabetes. But it never struck me as worrisome; whenever she’d fret about getting old and losing her memory, I’d tell her that I’d been struggling to remember names since I hit my thirties and started having to learn dozens of names of students every semester. You’re in your eighties, I’d say. Forgetting a few names is normal. Telling the same story twice in one phone conversation is normal. Struggling to get your flip phone open and speak into the right end isn’t that unusual.

I realized I’d been overly optimistic about all of this while we² were visiting Mom five or six summers ago. Laurie, my sister, had been at Mom’s house that morning to check in and help with breakfast, and I noticed she’d written some information on the back of an envelope that was propped up on the kitchen table next to Mom’s phone (“Friday, June 19. Plumber coming between 11:00 & 1:00. Laurie at the barn until this afternoon.”³ She’d also included her phone number). She hadn’t been doing that when we’d visited over Christmas break, but it didn’t register as anything meaningful at first.

I was sitting at the kitchen table with Mom as she was going over her Bible study—the devotional reading for the day from a Beth Moore book, along with a short reading from the Bible. Mom was a little anxious about having the plumber come to the house. He’d been over before—he was a young guy, she’d said, and when she told him she was eighty-six, he’d been surprised and said he would have guessed she couldn’t have been older than seventy-two—but she couldn’t remember what to tell him to fix.

2 One of my readers wondered who I meant when I said “we,” so here we go: Vicki, my wife; Elisabeth, my younger daughter; and Ian, my son.

3 The barn isn’t really an important part of the story, but I bring it up again later and so I thought I should explain. When my sister’s daughters were little, they took riding lessons at a stable in the next county, and Laurie was able to defray some of the cost of lessons and, eventually, of boarding the horse they bought by cleaning out the stables and grooming the horses a few times each week. About twenty years later, the kids have grown and the horse has died, but she still goes out to the barn a couple times a week: the stable owners don’t get around as well as they used to, and, at bottom, it’s probably always been that she likes to be around the horses.

Looking at her, I didn't think I would have mistaken her for seventy-two: her face looked tired and unfocused, and her hair, gray and frothy from her perm, looked like a flower gone to seed. "The shower in the basement is backing up," I told her. "When Vicki and I took our showers yesterday, the water started coming out of the drain by the furnace downstairs."

"O.K.," she said, sounding relieved. But around ten minutes later she was worried again: "What was I supposed to tell the plumber about?"

For as long as I can remember, I've been reading stories in which the main character has a moment of epiphany, this sudden flash of insight that comes toward the end of the narrative when the main character realizes she's made the absolutely wrong choice or that his understanding of who he is has been mistaken all along. I don't think I'd had an epiphany before, but what I felt when I heard her ask that question again so soon seemed like a version of it. It was obvious that her memory wasn't working right, and even though all the clues were there in front of me, pointing toward an obvious conclusion, I hadn't made the connections I should have, because it was easier for me to deny it.

"The drain in the basement isn't working right," I said. I didn't have the heart to tell her I'd already answered that question before. "The water from the shower downstairs is backing up in another drain."

"Good," she said. "That's what I'll tell him."

She asked again a few minutes later, and then again a few minutes after that. By the fifth time, my youngest daughter, Elisabeth, sat down beside her. "Grandma, let's write it down on this piece of paper," she said. She wrote it out— "Shower in the basement isn't draining right. Water is coming up from another drain"— and handed it to Mom.

"Thank you, honey," Mom said. "Now I've got it."

A few minutes later, she was feeling nervous again. "What was I supposed to say to the plumber?"

"There's a note on the table in front of you," I said, pointing.

"Oh," she said, and looked at the note. "Oh, good. Laurie must have left this for me."

"Elisabeth wrote it for you," I said.

"Did she?" Mom said. "Thank you, honey!"

The rest of the visit was filled with repeated confirmations that she was no longer herself. It seemed impossible for her to relax: every few minutes, she'd lean forward out of the love seat in the living room to ask us if there was anything she could do. Nothing we said would be able to set her mind at ease. Did we want something for lunch? What were our plans for lunch? Did we want her to make us something for lunch? She wasn't sure what she had in the fridge, but she could heat up some soup. If we wanted to go out to pick up something for lunch, she could give us some money. ("We just ate breakfast," I told her. "I'm not quite ready to think about lunch yet.") Where was her purse? Could somebody bring her her purse so she could see how much money she had? Where had her purse gotten to? Was forty dollars going to be enough to buy lunch for all of us? ("You know," I said, "if you don't have quite enough I can chip in a little money toward lunch. I'm working full-time; I can afford to buy lunch for you every once in a while.") Had anyone seen her purse? What time was Laurie going to be home from the barn? Shouldn't Laurie be home from the barn by now? Was that Laurie's car pulling into the driveway? (I got up and looked out the window. "Laurie isn't home yet," I said. "She said she'd try to be home by 5:00.") Well, then who was it that pulled into the driveway? I walked to the back door and looked outside. "It's just our car in the driveway," I said. "Maybe somebody just pulled in the driveway to turn around."

"I think I'm smart enough to tell when somebody is pulling into the driveway," she said. Her voice was sharp, and she folded

her arms and lowered her head as though I'd attacked her by pointing out Laurie's car wasn't in the driveway.

Even though she'd never done anything like that before, it still seemed familiar. When I was a freshman in high school, Grandma and Grandpa Gerber and Joyce (Mom's parents and her physically/mentally challenged sister) had moved in with our family, and Grandpa's inability to remember what people told him progressed in the same patterns as Mom's. "When are we going home?" he'd say, sitting on the couch in our living room.

"Oh, Dad," Grandma would say, exasperated, but never actually harsh, "I've told you before. We live here now, at Carolyn's."

"Oh," he'd say, rubbing his head with a curved, confused hand and looking around. His eyes were pale and watery. "When did that happen?"

In the middle of the night, he'd wake up and start putting on his clothes. We'd hear Grandma scolding him in their bedroom downstairs: "Come back to bed, Dad! It isn't time to wake up yet."

"I gotta get up and take the mail to Annawan," he'd say. He hadn't had that job for sixty years, but it was still living and vivid for him, enough to get him out of bed and start him getting dressed in the dark several times a month.

Sometimes, if Grandma wasn't able to calm him down, I'd stumble downstairs and lie to him: "Grandpa, I heard from your boss. He said you didn't have to take the mail today." There wasn't room in the cramped back bedroom for both of us to stand beside the bed. It felt like I was looming over him, our knees knocking against each other as I tried to convince him that what he remembered wasn't real.

"What do you know about it?" he'd say, but I'd crowd in a little closer, and he'd lose his balance and sit down.

"You don't have to go today," I'd say. "You can go back to bed."

Years later, I'd feel guilty for lying to him, but Mom told me she appreciated it. "It was very smart," she said. "You got him to go back to bed. That's the important thing." I could sympathize with her point of view, but it didn't make me feel like less of a bully.

The novelty of Mom's memory loss was that she didn't seem to be in the same constant fog as Grandpa. Throughout that visit, she remembered we were leaving on Saturday, and even though I started to assume everything we said to her would slip out of her mind in a couple of minutes, that wasn't always true. "Did you sleep all right last night?" she asked me a couple of days after we arrived. "You said you were tired after driving eight hours to get here."

"I slept O.K.," I said, looking at her. I wanted to say, "How did you remember that piece of information when almost everything else I say melts away?" but I couldn't bring myself to say anything.

While we were visiting, Laurie took Mom for an appointment with her doctor. I didn't imagine she'd be able to get a prescription that would magically clear up all her memory problems, but it would be helpful, I thought, to have a name to put on it, like Alzheimer's or dementia or stroke damage, and to have a sense of how that condition would progress. But when I talked with Laurie after the appointment, there wasn't any clarity. "He gave her some memory tests and she was able to pass them all," she said. "He thinks she might have some minor memory loss, but he doesn't think it's Alzheimer's."

It should have been encouraging, but it felt more like a practical joke. Would the doctor have said the same thing if he'd heard her ask where her purse was five times in half an hour? How could her memory function within a normal range for her age in the doctor's office and yet be so broken and threadbare at home? Was the doctor so distracted and inept that he couldn't see how broken she'd become, how far she'd fallen?

One afternoon during our visit, Mom starting talking about how nobody appreciated her anymore—Laurie’s kids were all working and couldn’t come by as much as they used to, and Laurie was always running around to the barn or to the store. “I guess you’ll all be happy when I’m gone,” she said. I looked at her from across the room. She was sitting back in the love seat, for once, staring off toward the kitchen and looking forlorn.

“How can you say that?” I said, feeling worried and a little offended. Was this how she really felt? “Don’t you know how much we all care about you?”

When I looked back over at her a few seconds later, her face was red and she looked smaller, like she was sinking down into herself. “What’s wrong?” I said.

“I don’t know how you can talk to me like that,” she said, her voice tight and shaking. “Why do you have to be so mean to me?”

“What are you talking about?” I said, still feeling righteous and indignant. “I’m trying to tell you that everybody loves you.”

“Why can’t people just be nice to me?” she said, starting to cry.

I stared at her across the small living room, feeling like a person who’s just broken a delicate, expensive vase when he was under the impression he was just sitting quietly in the next room.

Eventually, I gave up on talking. Everything I said to convince her I wasn’t angry just made things worse—all she was able to pick up on was my tone of voice, which was defensive and probably too loud, and what came across was that I was berating her. I got up off the couch and sat on the love seat beside her. “I’m sorry,” I said, putting my arm around her. “I don’t want to fight with you.”

We sat together quietly for a while. After about five minutes, she stopped crying, and ten minutes after that she seemed like the incident had vanished from her mind. “Can I get you something to drink?” I said.

She thought for a second. “Maybe half a glass of water,” she said. “And do we have any of that ice cream left or did somebody eat it all?” Her eyes were still a little damp, but otherwise she seemed fine.

Within a couple of days, I learned I would get the same reaction if I told her she had forgotten something. When she started fretting about plans for dinner and said, “Nobody tells me anything,” and I said, “Laurie’s going to pick up some pizza. She told you that this morning, and I told you that half an hour ago,” she’d be outraged: “You did not!”

“Why would I lie to you?” I’d say.

“Why do you have to treat me so badly?” she’d say, and, again, she’d be tearful and withdrawn until I walked over and sat beside her long enough to distract her from the memory of my betrayal.

When we got back home to Tennessee, everything seemed to settle back to the way it had been before, the way that, after an earthquake, the fractured rock masses compose themselves into a new equilibrium. During our phone calls, she sounded like her old, unchanged self. All her life, she’d been trained that there was a proper, formal way to behave on the phone, and so during phone calls she was able to rise to the occasion. Even when Laurie texted me that she’d been upset before my call, Mom would manage to seem lucid and pleasant for the length of our conversation. It was the same thing she did at the doctor’s office: for a few minutes, under the right circumstances, she was able to come across as almost exactly like her old self.

There was no way it could last. During a phone call with Eileen Brewer (the blind girl), Mom started fretting about all of the kids who were running in and out of her house. Eileen, understandably, was worried and called the police, who dropped by Mom’s place and, finding that there wasn’t a gang of kids ransacking the house, called Laurie at school and told her it was against the law to leave a person with dementia at home alone. She could fall down the basement stairs or burn down the house.

Laurie moved in to Mom's house and started sleeping on the couch in the living room, just steps away from Mom's bed. She arranged for people from church to come and sit with Mom during the day when Laurie had to be at school, and she started paying Anna, the daughter of a woman from church, to sit on the love seat next to Mom five days a week. For the past couple of years, they've spent the day together. Anna reads passages from the Bible to Mom, and she (Anna) has a collection of hymns on her phone by, I'm going to say, Alan Jackson that she can play when Mom starts to fret too much about when Laurie will be coming home or whether strangers are trying to get into her house. What Mom tells me is that there's a houseful of girls who come by for a Bible study with her—isn't it wonderful that so many young women are genuinely interested in studying Scripture?—and sometimes, while she's talking about all the different girls, Laurie texts, "Really, it's just Anna."

Mom told us, back when she was more herself, that she doesn't want to be a burden to the family, and even though she would be happy to stay in her house, she wouldn't object to moving into a nursing home if it got to be too much for us. "Why would I want to spend all my time driving out to a nursing home?" Laurie tells her. "It's easier to have you close by."

What makes this complicated, unfortunately, is that within the last year or so, she's lost the ability to recognize that she's at home. "Where are we?" she'll say, looking around from the love seat. "Shouldn't we start heading for home?"

"This is your house," someone will say. "You've lived here for more than twenty-five years."

"This is my house?" she'll say, her voice both amazed and scandalized. "How can this be my house?"

We point out specific features in the living room, touchstones that mark this as her house: "There's your butterfly painting on the wall by the closet door. There's a picture frame with photos of you and Melvin, and Uncle Milton and Aunt Ferne, and Uncle Lowell and Aunt Betty, and Uncle Lauren and Aunt

Mary hanging next to the front door. There's the painting over the fireplace that you asked the lady who spoke during the women's meeting at church to paint for you. Remember, she usually paints on milk cans?"

"Oh," she says, settling back just a little on the love seat. "I guess this is my house. With the garage out back I built when I married Melvin?"

"That's right," someone will say.

These days, when I call, she almost never thinks she's home. "I'm at somebody's apartment," she'll tell me. Or "We're sitting outside here." Or "We're at a place down by the ditch; we're going to go to Ferne and Milton's later." Or, "We're at Moody Bible Institute, but we need to get back to my apartment." Or "they've got me in a little cubbyhole for now." Even though she's lost access to her memory, she still can use her imagination; if she can't remember where she is, she can construct a completely fanciful explanation of what's going on. "I really should walk home tonight," she says, "but I'm too tired, and I don't have any money for a streetcar. I hope they have a bed for me here."

"I think they have a bed just for you," I tell her.

One of the reasons she can't tell where she is, maybe, is that the dementia is in her eyes. The optometrist told Laurie that Mom has double vision even when she has one eye covered, which indicates the problem isn't with her the mechanics of the eye but with the way the brain processes the data it receives from the eyes. Apparently it's another of the symptoms of dementia. It's been obvious for a while that Mom has trouble seeing: she kept telling people about all the parishioners lining up for church across the parking lot out her kitchen window—there's never been a church across the parking lot, and I've never seen people lining up—but she stopped saying anything once we took her knick-knacks off the window ledge. When she sits at the kitchen table doing her morning devotions, she underlines the main verse and writes it in a notebook, but she has to ask for help to find out where to start underlining, and the words of the verse

she writes are scattered across the page: she can't make out the lines in the notebook or where one word should follow the one she's just written down. If you look carefully at the tablecloth, you'll see there are certain areas that are filled with tiny lines and hooks from where her underlining has overshot the edge of the page, like fragments of some personal shorthand. You couldn't tell her she can't see well enough to read—she insists her eyes have never been better—but without someone there to read the verse to her and show her where to start underlining, she wouldn't be able to do her devotions at all.

Once, when she told me her dad liked to sing “It’s a Long Way to Tipperary” when she was a girl, I looked up the lyrics and read them to her: “Goodbye, Piccadilly/Farewell Leicester Square.” “Oh, I should have known,” she cried. “The words are right there on the TV.” And I’ve sat next to her, listening to a YouTube collection of old hymns like “The Old Rugged Cross” and “There’s Power in the Blood” and watched her trace her finger over the blanket on her lap, following the imaginary words that spiraled through the material.

It’s good to have hymns to play for her, because it distracts her from the confusion. Sometimes she asks us if we can drive her out to her folks’ house: “I haven’t been out to see them for a long time.”

Nobody wants to be the one to tell her, but eventually we have to say, always in a softened voice, “Well, Mom, they’re in Heaven.”

And no matter how often we’ve told her, it’s always freshly painful: “I was thinking that they were, but I wasn’t sure.” There are always tears in her voice, even though she doesn’t always cry. “They’re with Jesus now. We’ll be together in Heaven forever.”

So far, even though her memory is being stripped away from her, she still seems like herself. I’d like to believe that, no matter what she forgets, she’s not going to stop being herself, but it seems inevitable that the longer this disease has her, the more

of whatever it is that makes her her is going to be scraped away. These days, more often than not, she thinks I'm Uncle Lowell and asks me if I remember growing up on a farm in Northwestern Illinois in the days before rural electrification, carrying kerosene lanterns to bed and peeling potatoes for the harvesting crew in the fall and hurrying past the beehive in the tree by the outhouse. A few months ago, my brother Jonathan and my brother-in-law Tim volunteered to stay with her for a few hours while Laurie was away for the evening, and Mom was terrified the entire time because she thought they were burglars who had broken into the house. "Get out of here right now!" she told them. "I'm going to call the police!" At some point, I have to think she'll hear my voice on the phone and think I'm just a stranger, and there will be nothing I can say or do to comfort her.

At what point do we stop being ourselves? Who are we when we're cut off from most of the memories of our lives? Most of the time, I'm in agreement with the Christians who reject Gnosticism by saying, "You don't have a body—you are a body," but that stops working quite as well for me when I see the body of my mother deteriorating, including the bits and pieces that connect her to her memories and her identity. I'd prefer to believe that the real her, her spirit, is still intact—the clockwork of her body is gummed up and losing some gears, but the personality who's struggling to reach out through the disintegrating mechanism of her mind hasn't really changed. Or, to put it another way, the texting app is glitchy—"HHHHHHw hVb uou BVen//?// I kkkkkloVb uou!111"—but the texter is still the same. But even under that model, the flesh will eventually fail, entombing the spirit in a body that's no longer capable of accessing its memory or projecting its personality. If the hardware is broken, how will we be able to tell that the software is still working?

As her memories have been falling away, I've felt the need to hold on to the stories she's told me and try to make sure that, somehow, they don't just vanish. I want to tell you that her mother and father were each the first members of their

families to be born in the United States and that they grew up with English as their second language—when they were first married, they lived with Grandpa’s family and his mom and sisters would talk in German when Grandma was around because they didn’t want her to know what they were talking about . . . but Grandma could pick up on what they were saying because the German they were speaking was close enough to the Swedish she’d grown up with. I want to tell you that Mom was the valedictorian of her class at Annawan High School (“Really, there were only about twenty kids in the class,” she’d say every time I tried to congratulate her about this) and that she wouldn’t have known her parents were proud of her if she hadn’t overheard her dad saying it to her aunt when he thought Mom wasn’t listening. I want to tell you that she went from a life on a farm down a road that didn’t get electric lines until she was in high school to downtown Chicago, where she studied Christian Education at Moody Bible Institute and after about a year, was so familiar with the layout of the city that she started getting phone calls from female classmates: “I’m lost. Can you tell me how to get back to campus?” I want to tell you how she and a friend tried to witness to a woman on the streets of Chicago one night, and how the woman kept throwing the gospel tract they handed her under a parked car, saying that she needed to go to a hotel room to meet the Devil, and how Mom kept crawling under the car to retrieve the tract—“It was the only one we had left!”—while her friend tried to keep the woman from walking away. I want to tell you about the English class she took at Moody and the teacher who started class one day by asking Mom a question about one grammar point from the assigned chapter and ended up spending the entire hour asking Mom question after question, ignoring all the other students, because she couldn’t believe that Mom had committed every fact in that chapter to memory. I want to tell you she was single throughout her twenties, working for the general director of the Conservative Baptist Home Mission Society during the post-war evangelical boom; how she looked up from her typewriter to respond to a man who’d asked if her boss was in and realized it was Billy Graham; how she flew to board meetings in Oregon and Massachusetts, Haiti and Mexico, to take minutes during their annual meetings; how she shepherded missionaries through

the process of applications and reviews of their ministries across North and Central America. I want to tell you about the days after she married my dad and how she stayed at home alone, pregnant with me, while he spent the weekdays driving a moving van here and there across the country, only home on weekends, and the stories she told about the profusion of mice that invaded the house from the surrounding cornfields, even climbing up, once I was born, into my crib, and how, finally, she was able to find the holes they were crawling in through and plug them up with steel wool.

There's a lot more I'd like to say, but this essay is long enough already.⁴ I know she's probably never going to tell me these stories again, and I hate the thought of all of them being lost.

A little over a year ago, back when the thought of a pandemic seemed like an overused trope from a YA dystopian novel, Elisabeth⁵ spent a week in Paris with her high school French class, and my wife, Vicki, went with the group as a chaperone.

My son had left the month before for a summer-long internship in Spain, and my oldest daughter had moved to Nashville several years before. For the first time in more than a quarter century, I was home alone.

I don't want to give the wrong impression. I really wasn't alone for long. Emilie, my oldest daughter, came out to see me over the weekend, and I took her to Memphis to see a performance of *Anastasia*, the Broadway musical, at the Orpheum, plus an early dinner of pho and lemongrass tofu. I worked on a few projects around the house, uninterrupted and at my own speed, and there were updates via WhatsApp and Skype calls—when somebody snatched a wallet from Elisabeth's group in Paris and

⁴ Just one more, please. She liked to tell the story about how her mother was so convinced that communists were taking over the country that Mom brought it up every time something would go wrong: Grandma would say, "The milk's gone sour," and Mom would say, "It must have been the Communists!" I'd like to think my attraction to sarcasm comes from her.

⁵ My youngest daughter. It's been a while since I mentioned her, so I thought I'd throw in a reminder.

a group of the high schoolers chased him until he threw it in a bush. As I walked from one end of the house to another, I heard about it, it seemed, before the kids who chased after the pickpocket had a chance to catch their breath. I didn't have time to feel lonely.

Nevertheless, the house felt emptier than it ever had before, silence in the rooms seemed more profound than I could have imagined. There was nobody there who wanted to ask me a question, nobody quietly working in another room, no sounds of doors being opened and closed, no barely perceptible rhythm of inhaling and exhaling from the other side of the bed. It was like being in an inverted version of a haunted house, where the problem is not an eerie presence but an uncanny absence.

I couldn't help but think about Mom, in the quiet weeks following the busyness of Melvin's death, coming to terms with the idea that for the first time in her life she was living alone. Maybe that experience was what started the process of her memory loss, I thought: the desert expanse of that unfamiliar loneliness reaching inside her and beginning to break her down.

I thought, too, about the marriage vows I'd taken on a Saturday in May thirty years earlier. When I was younger, they seemed a little less personal: "For better, for worse; for richer, for poorer; in sickness and in health, forsaking all others, as long as you both shall live." Thirty years into the marriage, the handful of days I spent alone in the house seemed like a prophecy—unless Vicki and I somehow manage to die at the same time, it's inevitable that only one of us will be alive, feeling the emptiness of the house both surrounding him or her and penetrating inside. One of us will be left behind, trying to remember what it's like to move through the world on his or her own. Maybe one of our children will be as heroic as my sister and swoop in to heal and protect the parent who remains. I'm not sure that's a choice I'd want any of them to have to make.

My dad died twenty-eight years ago. When he was my age, he had only seven years left to live. Mom has lived a second life since

he passed away; a new home with a new husband, watching her grandchildren grow up. Dad's connection with the family ended before my oldest child was born. But living into your nineties carries its own sorrows: not everybody loses their mind, and their sense of where they are, and their eyesight, and the sense of security that comes from remembering a conversation they've had earlier in the day, and the ability to discern a person they love from a complete stranger. But there's still loss: Mom's lost her parents, her brothers and sisters, two husbands, her best friend, most of her friends from church, most⁶ of the people she worked with or went to school with. She lives in a world where there's nobody who knew her as a child or a young woman and fewer and fewer people who knew her when she was fully herself.

I hope her vision of the family all being together in heaven turns out to be true. The Bible doesn't really portray eternity as a family reunion—it's pretty vague on the details, actually, and what it does get specific on, like a city made of precious stones, and trees planted by water, and no crying, doesn't strike me as particularly homey or family friendly. It may be that at some point I'll enter into eternity and she'll be waiting there, the perfected version of herself, known by her creator and finally whole. I don't think about that too often, though: speculating about eternity when you're embedded in time is like making plans to live without water when you're a fish.

If I didn't live six hundred miles away, and if we weren't in the middle of a pandemic, I'd like to think I'd work to find time to sit by her and hold her hand and chat about anything on her mind, however fanciful and confused, and listen to hymns. Because of Covid-19, I haven't seen her for the better part of a year, and I may not have the chance to visit for at least another year. But for as long as I can, I hope I'll be a comforting voice on the phone. Maybe she'll remember who I am—probably she won't—but if she feels loved in the middle of everything she's losing, that will feel like a success.

⁶ *Probably all.*

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Addendum – Nov. 9, 2020

The day before the final draft of this essay was due to the editors of the *JUFF*, I got a series of texts from my sister:

Mom's doctor told us to bring her to the hospital. She hasn't been eating for the past few days, and she's feeling weak and out of it. We're waiting now.

Mom tested positive for Covid.

Can I call you?

On the phone, Laurie filled in the blanks. Covid wasn't even on her radar when she took Mom in, but the hospital automatically tests patients who are being admitted. The doctor ordered a full set of blood work, and, so far, the only problem they've found is that Mom is dehydrated. Anna, the Bible-studying, Alan Jackson hymn-playing girl who stays with her, had to be in quarantine for the past couple of weeks because her mom tested positive for Covid. I'd been under the impression enough time had passed that we didn't have to worry about Mom being infected, but that was incorrect.

Laurie's in quarantine for fourteen days. She called Mom this morning, and she's doing well physically, but she's angry with Laurie for not coming to take her home. She was hostile to the hospital staff when they were trying to treat her yesterday, pulling off her mask and refusing to let them draw her blood; they had to sedate her before they could continue. Based on how distraught and disoriented she was, the doctor has contacted a social worker to consult with Laurie about getting Mom into a care facility. It's probably for the best, although it won't be easy to get a Covid-positive patient into a facility, and all the memory care centers in the area have long waiting lists.

It's time to hand the essay in. I hate to stop in the middle of the story, but you could argue that we're always in the middle of the story in one way or another. I'm hoping she'll recover—Ninety-Year-Old Woman Beats Covid!—but in this case even the happiest ending is bound to lead to something sad. If I can, I'll call her hospital room again tonight, and tell her I love her, and laugh at her jokes, and try to make her feel like herself, even if it's only for a few minutes.

THE SCIENTIFIC QUEST FOR BEAUTY

Jimmy H. Davis

British physicist Brian Cox's opening narration for the PBS series *Forces of Nature* states:

The natural world is beautiful, but complex. The skies dance with color. Shapes form and disappear. But this seemingly infinite complexity is just a shadow of something deeper – the underlying laws of nature. We live in a beautiful world. It is even more beautiful when we understand how it works.¹

This essay will explore the long and storied relationship that the scientific enterprise has had with the concept of beauty.

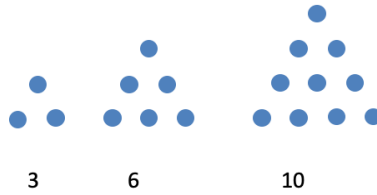
GREEK BEAUTY

Like many concepts in Western culture, the relationship between beauty and the exploration of nature begins with the ancient Greeks. When Pythagoras (c. 570 BC - c. 495 BC) and his followers studied numbers and their relationship to nature, they were guided by beauty. Furthermore, guided by the concept that “all is number,” they first attempted to link numbers with geometry. They discovered what they called triangular numbers and square numbers. As can be seen in Figure 1, combining the number one with the number two results into the triangular number of three. Furthermore, they found that one plus two plus three gave the triangular number six. A special arrangement for the Pythagoreans was one plus two plus three plus four, which gives the triangular number ten. This combination is called the tetraktys (arrangement of four)

¹ *Forces of Nature* premiered on PBS from September 14 – October 5, 2016.

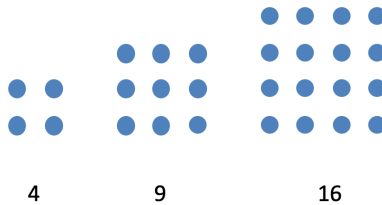
and was worshiped by the Pythagoreans since the number ten had beautiful and mystical significance in their philosophy.

FIGURE 1. Pythagorean Triangular Numbers



Another geometric arrangement, as seen in Figure 2, resulted in square numbers; for example, combining the number two with the number two resulted in the square number four. We still employ the square terminology when we state that the square of the number three is the number nine and that the square root of nine is three.

FIGURE 2. Pythagorean Square Numbers



Building upon their success of applying numbers to geometric shapes, the Pythagoreans next applied numbers to music. They studied the notes and scales used in Greek music, especially the lyre, a Greek stringed instrument. Comparing strings of the same material and thickness, they discovered numerical relationships between the length of the strings and its pitch

or frequency. They further discovered that certain ratios produce consonance (harmony), while other ratios produced dissonance (discord). Two strings of the same length produce the same pitch and are said to be in unison. Furthermore, comparing two strings in the ratio of 2 to 1 produces the same note but at a higher octave.² Other ratios are given in Figure 3.

FIGURE 3. Ratio between Strings Found by the Pythagoreans

String Ratios	1/1	9/8	81/64	4/3	3/2	27/16	243/128	2/1
Notes	C	D	E	F	G	A	B	C
	Do	Re	Mi	Fa	So	La	Ti	Do

The Pythagoreans next applied their findings in music to the structure of the universe. At that time, the structure of the universe was considered to be a series of rotating spheres centered upon the Earth in the following order: Moon, Mercury, Venus, Sun, Mars, Jupiter, Saturn, and stars. They believed that the distance between the sphere of the earth and the sphere of the fixed stars was a diapason (complete range of the musical tones). Between the sphere of the Earth and the Moon, there was one tone; from the sphere of the Moon to Mercury, there is one half-tone, and so forth. The sum of all these intervals would include all the notes of an octave. The Pythagoreans imagined that the rotation of the spheres produced a symphony called the Harmony of the Spheres.

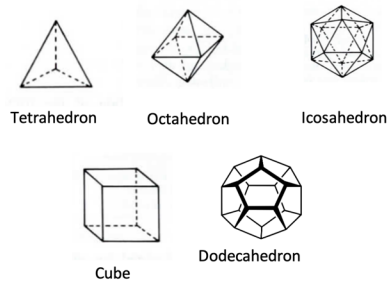
The Pythagoreans are thought to have discovered what are called the Platonic solids. A Platonic solid is a regular polyhedron with the same number of faces meeting at each vertex. Only five solids meet these criteria: tetrahedron, octahedron, icosahedron, cube, and dodecahedron. As seen in Figure 4, three triangles meet at a vertex in the tetrahedron, four triangles meet at a vertex in the octahedron, five triangles meet at vertex in the icosahedron, three squares meet at a vertex in the cube, and three pentagons meet at a vertex in the dodecahedron. The

² For a more detailed discussion of musical terms, please see Joseph Kerman, *Listen*, Third Brief Edition (New York: Worth Publishers, 1996).

solids have been attributed to Plato (424 BC – 348 BC) ever since he described the five shapes in his dialogue, *Timaeus* (360 BC).

In the dialogue, Plato discussed how the Pythagorean Timaeus had related each shape to the five Greek elements. As this paper will relate, aesthetics would continue to intrigue scientists until the present.

FIGURE 4. The Five Platonic Solids



APPLYING BEAUTY

The year of our Lord 2017 is the 500th anniversary of the beginning of the Protestant Reformation.³ Philip Melanchthon (1497-1560) was commissioned by Martin Luther (1483-1546) to design the new Lutheran education system to replace the Medieval Scholastic system. Melanchthon included mathematics and astronomy in the university curriculum; like the Pythagoreans, he believed that the study of these subjects leads to an appreciation of the order and beauty of the divine creation (*1*).

³ For an essay on how the Reformation ignited the Scientific Revolution, please see Jimmy H. Davis, "Impact of the Reformation on the Flowering of Modern Science" in Ray Van Neste and J. Michael Garrett, eds. *Reformation 500: How the Greatest Revival Since Pentecost Continues To Shape the World Today* (Nashville: B&H Academic, 2016), 217-231.

Austrian Johannes Kepler (1571-1630) was a Lutheran astronomer who bridged the gap between the Medieval natural philosophy that followed the philosophers of the past and the modern scientific era that followed experimental data. Kepler struggled for ten years to discover how God created the solar system. Kepler was guided by the following principles:

- From the ancient philosophers, Kepler began with the idea that the solar system would reflect Pythagorean concepts of beauty:
 1. The circle is a perfect shape; planets move in circular orbits.⁴
 2. The Platonic solids are beautiful.
- The Harmony of the Spheres (heavenly musical harmony) is wondrous.
- Like modern scientists, Kepler was committed to fitting his proposal to the experimental data; experimental data would supersede the philosophers. He believed that his proposal was more than a mathematical model but would be the actual structure of the solar system.

Because the Platonic solids were so beautiful, Kepler started with the assumption that God must have used these solids in constructing the solar system. In his book, *Mysterium Cosmographicum* (1596), Kepler employed the Platonic solids to explain why there were six known planets and why they were distanced the way that they were. Kepler discovered that he could fit a Platonic solid into the space between two adjacent spheres while also touching both spheres:

- the cube between Saturn and Jupiter
- the tetrahedron between Jupiter and Mars
- the dodecahedron between Mars and Earth

⁴ This idea came from the Greek philosopher and scientist Aristotle (384 BC – 322 BC) who stated that the heavens revolve in a circle in Book I of *On the Heavens* (350 BC).

- the icosahedron between Earth and Venus
- the octahedron between Venus and Mercury

Although the beauty of the Platonic solids had allowed Kepler to explain the number of known planets as well as their distances from the Sun, Kepler realized that the beauty of the circular orbit did not accurately reflect the paths traveled by the planets; the orbit of Mars especially deviated from that of the circle. Kepler battled the motion of Mars for five years. By the end of this time frame, Kepler realized that planets move in elliptical orbits rather than circular orbits; these findings were published as *Astronomia Nova* (1609). Kepler reflected on the challenge of the appeal to beauty when he stated, “My first mistake was in having assumed that the orbit on which planets move is a circle. This mistake showed itself to be all the more baneful in that it had been supported by the authority of all the philosophers, and especially as it was quite acceptable metaphysically” (2).

In his third book *Harmonice Mundi* (*The Harmony of the World*, 1619), Kepler employed the beauty of the musical harmonies to explain the eccentricities of the orbits.⁵ Kepler found that the ratios of the movements of a planet at aphelion (farthest from Sun) and perihelion (closest to Sun) are similar to the ratios that the Pythagoreans found for musical notes. Kepler believed that he had discovered the Harmony of the Spheres. To Kepler, man’s music was a mimicry of the heavenly harmony created by God (3).

Although today the number of the known planets is greater than the six of Kepler’s day, Kepler’s search for beauty resulted in an understanding of the structure of the solar system expressed as the Kepler Laws of Planetary Motion:

⁵ In astronomy, eccentricity refers to a dimensionless ratio parameter that reveals how much the planetary orbit deviates from a perfect circle. A value of zero is a circular orbit. A value between 0 and 1 is an elliptical orbit.

- A planet's orbit about the Sun is an ellipse.
- A planet is moving slowest at aphelion and fastest when it is at perihelion.
- The time period for a planet to orbit the Sun increases rapidly with the radius of its orbit.

LOSS OF BEAUTY

While Kepler was struggling to discover the structure of the solar system, English philosopher Francis Bacon (1561–1626) was proposing a new way to examine nature. The deductive method of the Greek philosopher Aristotle (383 BC–322 BC) had dominated the Medieval Scholastic universities. In contrast to Aristotle's *Organum*, Bacon proposed a *Novum Organum* (*New Method*, 1620) in which the exploration of nature would use induction and be objective, empirical, and rational. Since observations were to be the same for all observers, concepts like beauty were discouraged (4). Bacon's proposals are considered the foundation of the scientific method. English physicist Isaac Newton (1642–1726) validated Bacon's theory by explaining diverse motion data from the Earth and space using just four mathematical equations.

The period following Newton is called the Romantic Age of Science (1769–1831), when scientists and poets worked together to understand the marvelous beauty and wonder of nature (5). An example of this partnership is English chemist Humphrey Davy (1778–1829) and English poet Samuel Taylor Coleridge (1772–1834). Davy performed many experiments using nitrous oxide (laughing gas). Coleridge was there not only observing but also partaking of the gas with Davy to determine its effects. Davy's notebooks have poems scattered among his experimental observations, and Coleridge asked Davy to review the drafts of some of his poems (6). As the scientists pushed the boundaries of their investigations of the effect of gases on animals (denying mice of oxygen, for example), the

Romantic poets began to be repelled by the horror of science.⁶ They proclaimed that the rational observations of scientific discovery “misshapes the beauteous form of things:—we murder to dissect” (7) and “destroyed all the poetry of the rainbow, by reducing it to the prismatic colours” (8); science’s “philosophy will clip an Angel’s wings,” (9) and “gray are all [science’s] theories, and green alone Life’s golden tree” (10).

English biologist Charles Darwin (1809-1882) practiced in the period following the Romantic Age of Science. Darwin laments in his letters how he gradually lost his enjoyment of natural beauty, literature, and music. Over his career, he stated that he had become “a kind of machine for grinding general laws out of a large collection of facts” (11). No longer could he appreciate music; “my soul is too dried up to appreciate it as in the old day... I am a withered leaf for every subject except Science. It sometimes makes me hate Science” (12).

The Baconian desire for emotionless objectivity as one analyzes data was reflected in prosaic scientific journal writing. Poetic writing seemed to have been reserved for areas outside of science. When Harry L. Poe and I were researching for our books on design (13, 14), we found no listing of the words “awe,” “beauty,” “splendor,” or “wonder” in modern astronomy, biology, chemistry, or physics textbooks (15). Surprisingly, many texts dealing with the interaction of science and faith also lacked these topics (16).

HIDDEN BEAUTY

Beauty had not left science; beauty had moved from a public expression to a private motivator. English scientist Michael Faraday (1791-1867) was a protégé of Davy and discovered the principles underlying electricity and magnetism. Beauty motivated Faraday; he stated, “it is the great beauty of

⁶ English poet Anna Laetitia Barbauld (1743-1825) wrote the poem “The Mouse’s Petition to Dr. Priestley, Found in the Trap where he had been Confined all Night” (1773) from the mouse’s point of view.

our science...that opens the doors to further and more abundant knowledge” (17). Polish-French physicist and chemist Marie Curie (1867-1934) won two Nobel Prizes for her pioneering work with radioactivity. She stated:

I am among those who think that science has great beauty. A scientist in a laboratory is not only a technician: he is also a child placed before natural phenomenon which impress him like a fairy tale. We should not allow it to be believed that all scientific progress can be reduced to mechanisms, machines, gears, even though such machinery also has its beauty. (18)

RETURN OF BEAUTY

Radioactivity was one of many windows into the world of subatomic particles: protons, neutrons, and electrons. Quantum mechanics is the field of science that describes the behavior of subatomic particles. The mathematical nature of quantum mechanics makes it difficult to visualize the quantum world and to select the best theory to describe an aspect of the quantum world. As we saw previously with Kepler, validation of theories is an old problem. Kepler chose simplicity and agreement with experimental data over beauty. British quantum physicist Paul Dirac (1902-1984) addressed validating quantum theories in his 1939 James Scott Prize lecture “The Relationship between Mathematics and Physics.” Dirac proposed that a theory is valid if it has “great mathematical beauty” (19). Dirac admitted that beauty “is a quality which cannot be defined, any more than beauty in art can be defined, but which people who study mathematics usually have no difficulty in appreciating” (20). When comparing beauty with the traditional validation tools of simplicity and agreement with experimental data, which should take precedent? Dirac chose beauty over simplicity (21) and beauty over experimental data (22).

How seriously is this use of beauty taken by other scientists? American physicist Steven Weinberg (b.1933) stated that

it is “rather spooky...that something as personal and subjective as our sense of beauty helps us not only to invent physical theories but even to judge the validity of theories” (23). In 1967, Weinberg proposed a theory unifying the electromagnetic force with the nuclear weak force into a single force, the electroweak force. When proposed, his theory did not fit experimental data; however, his theory was so mathematically beautiful that scientists continued collecting data. His theory was validated in 1973, which resulted in Weinberg receiving the 1979 Nobel Prize in Physics.

Beauty had returned. Philosophers of science now list beauty along with simplicity and agreement with experimental data as criteria for validating theories (24). Furthermore, scientists began expressing the aesthetic as a motivator in their work. Having developed the synthetic techniques needed, chemists attempted the synthesis of the higher-order Platonic solids in the late twentieth century. American chemist Philip E. Eaton (b.1936) acknowledged the aesthetic appeal when he said, “For the chemist, the aesthetic appeal of the Platonic solids leads to the challenge of realizing their molecular equivalents” (25), yet when he published his synthesis of cubane, he returned to the “dry prose” of “We have completed the synthesis and fundamental characterization of the hydrocarbon cubane” (26). In contrast, American chemist Leo A. Paquette (b.1934) credited aesthetics when he published his synthesis of dodecahedrane: “The position of dodecahedrane as the structurally most complex, symmetric, and aesthetically appealing member of the C_XH_X convex polyhedra ($n = 20$) has caused its synthesis to be intensely pursued during the last decade” (27).

FINAL THOUGHTS

American physicist and Nobel laureate Richard Feynman (1918-1988) stated:

Poets say science takes away from the beauty of the stars—mere globs of gas atoms. Nothing is “mere.” I too can see the stars on a desert night, and feel them. But do I see less or more? The vastness of the heavens stretches my imagination—stuck on this carousel my little eye can catch one-million-year-old light. A vast pattern—of which I am a part... What is the pattern, or the mean-

ing, or the why? It does not do harm to the mystery to know a little about it. For far more marvelous is the truth than any artists of the past imagined! (28)

Feynman agreed with the quote opening this essay: it is a beautiful world, and understanding how it works does not take away any of that beauty. Feynman realized that this beauty can lead to awe and wonder that carries us beyond our daily existence. As Christians, we experience this on another level; we know that “the heavens declare the glory of God” (29). As John 1:1-3 tells us, the universe is not the result of impersonal forces but the result of a person beyond the universe, a person who longs to be known by us. That person is Jesus Christ. As the result of knowing Christ, we now know that the beauty and glory of the universe is Christ’s beauty and glory.

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SOUL SCIENCE: THREE BIBLICAL ILLUSTRATIONS FROM A SOIL SCIENTIST

Beth Madison

SOUL EROSION

As a farm girl growing up in the Southeastern U.S., I've seen lots of washed-out farm fields and gullies, be they empty reddish and tan gashes on the landscape or eyesores filled in with trash or overlain by kudzu. I've also seen blacktop roads fully or partially covered over by soil that has been washed off agricultural fields and construction sites, even from a singular overnight rainstorm. Yet it wasn't until I went to college and began studying soil science that I realized these images were far more important than simply being scars of history that interrupted a beautiful landscape. These were reminders of the impact of my own life choices.

A primary focus of many soil scientists is the prevention of soil erosion. Soil erosion causes loss of current and future productivity of a soil and potential detrimental impacts on other natural resources, including water sources. The United States Natural Resource Conservation Service defines soil erosion as “the breakdown, detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity”¹ (n.d., para. 1). Most soils naturally form aggregates which are defined as “a group of soil particles that bind to each other more strongly than to other surrounding particles” (NRCS, 1996, para. 1). Soil particles are attracted into forming aggregates because of their innate chemical charge, arising primarily from their inorganic clay fractions and organic material fraction. Yet aggregate destruction (and often subsequent particle transport) occurs when this innate attraction of the individual particles

¹ All of the soil principles discussed in this article can be further explored via www.usdanrcons.gov, www.soils.org, or any introductory soil science textbook; thus, each point of information will not be separately referenced as to better promote flow of ideas.

is overcome by external forces of wind, water, or gravity as discussed above. One of my soil science professors in college often said, “It’s far easier to prevent soil erosion than to fix it.” (To put numbers to this statement, on average, it takes 2,000 years for six inches of soil to form. And this same six inches of soil can be lost in less than 24 hours from soils in my part of the world if they are mismanaged.)

Not only was this professor spot-on in his statement, but I’d go further and say what I often tell my students, “Only God can make a soil aggregate and our best efforts will fall short on trying to duplicate that.” I clearly see this each and every day with my own backyard that refuses to grow a garden, despite my best efforts. My backyard is the sad result of what I call “subdivision scraping,” where the topsoil has been scraped off to level the ground for house building. And then, after the house is completed, the topsoil (if it’s returned at all) is merely spread over the yard without thought to the implications of the destruction of the natural soil aggregation, structure, and fertility in the process. The result is a backyard that can barely support a mix of grass and weeds, much less a garden.

Soil erosion is classified into four major types: splash, sheet, rill, and gully. Splash erosion occurs when the soil aggregate is broken into individual soil particles of sand, silt, and clay, but the particles remain in place on the surface. If the erosion cycle is unchecked, splash erosion becomes sheet erosion, where layers of soil particles are moved from their origin and deposited elsewhere. In the next stage, rill erosion, the soil forms furrows or paths of least resistance of movement by wind, water, and gravity where the soil particles move faster and faster from their origin. When the rills become deep enough channels of particle movement, gullies form for faster and more destructive soil erosion that often leaves unsightly and permanent scars on the landscape. I still remember learning the definition of gully erosion to be “erosion severe enough that you couldn’t fix it with a tractor or backhoe.”

In contrast, if a soil is covered (be it by a crop, residue remaining from a previous crop, compost or mulch, or such), it is protected from erosion because the forces of wind, water,

and gravity are diminished in their ability to break aggregates. Thus, they separate and transport soil particles via erosion. A simplistic analogy for this is wearing a coat outside in winter for the protection of my skin, and my body as a whole, from the potential destructive and deadly impacts of cold weather.

One day while thinking about the soil erosion cycle (a very everyday, normal kind of pondering for this soil scientist), I was struck by the similarities of this cycle to the progression of sin in King David's life in 2 Samuel 11, and, if you will, an erosion of his soul by sin. Simply defined, erosion is the "gradual destruction or diminution of something" from the Latin *erodere*, which means "to wear or gnaw away" (Erosion, n.d.). Simply put, in the soil erosion cycle, I see an illustration of the impact of sin on my life.

Sin does just that to a soul; it erodes and gnaws away at one's convictions and beliefs until that person is lost or carried away in the torrent of sin's floodwaters. One is left scarred and empty just like a freshly tilled field after a hard rainstorm. Yet if the field is protected by a cover crop or residue, it remains intact. Likewise, if my soul is protected by deciding to use guards in my life, it can remain intact. Hence, this is the importance of protection from erosion, for the field and for our souls, as seen in Proverbs 4:23 (AMP): "Keep your heart with all diligence, for from it flow the springs of life." Keeping this picture in mind, let's explore this idea in a simple comparison of the cycles of soil erosion and soul erosion (pun intended).

Starting in the first verse of 2 Samuel 11, King David was disobedient by being in the wrong place at the wrong time: "In the spring of the year, the time when kings go out to battle... David arose from his couch and was walking on the roof of the king's house, that he saw from the roof a woman bathing" (RSV). Thus, in so doing, he was unprotected, vulnerable to the breakdown of his convictions by exposure to temptation, which began the four-stage erosion of King David's soul.

1. This first point of his soul's erosion by sin could be analogous to splash erosion in the destruction of his beliefs from lust. Even though he hadn't acted on the initial temptation, the process of breaking down his convictions had begun in his soul. Thus, he was then even more vulnerable to further sin, just as a body of soil is more vulnerable to erosion after the initial step of breaking down soil aggregates into individual soil particles because of the removal of the force holding them together. For when splash erosion has broken down the soil aggregates into individual soil particles, there is nothing holding them together and preventing them from being washed or blown away. Similarly, when King David harbored lustful thoughts, his conscience began to be broken down, making him more and more vulnerable to being washed away by temptation into more and more sin.

2. Scripture continues with King David making the choice to ask about the woman he had seen and then having her brought to the palace for him (v. 3-4). The destruction of his soul's convictions by lust in verses 1-2 has now led to greater sin and thus, the deeper erosion of his soul and beliefs. This progression could be analogous to sheet erosion. By removing the topsoil layer of conviction, King David makes his soul even more vulnerable to sin, erosion, and long-lasting destruction.

3. Now the situation is ready and waiting for a far greater (and unfortunately natural) progression into the rill erosion of King David's soul where he makes the permanent choice to lie with Bathsheba. Not only has his sin further eroded his soul, leaving permanent marks of shame, guilt, and regret, but it also caused destructive furrows of sin over and out of his life into hers. These rills formed in his now eroded convictions and soul result in a longer-lasting, further-reaching devastation of his life, her life, and the lives of subsequent generations.

4. Finally, we encounter the gully erosion of King David's soul when he chooses to hide his sin with Bathsheba (and the resulting pregnancy) by having Uriah killed in battle (v. 6-25). His sins of denial, deception, and murder have now devastated Uriah's household and will bear long-lasting scars

on the landscape of the king's household, the nation of Israel, and on King David's soul itself. One act destroyed David's reputation and legacy. He could not recover what he had lost just as I can't go out and return eroded soil to the field from whence it came, even if the damage was caused by only one rainstorm.

Just as soil erosion's effects are not contained onsite where the soil was eroded, sin's effects are not contained in the life of the one who has sinned. There is always offsite damage, which is costly and often long-lasting and hard to fix. Just like ponds overgrown by scum from nutrient runoff transported in eroded soil sediments, our lives and the lives of those affected by our sin, be they willing participants or innocent bystanders, can be destroyed and become unsightly reminders of the impact of disobedience. Scars on our landscapes are reminders of sin's devastation, destruction, and dominion.

Yet grace is stronger than erosion, both for our physical and spiritual landscapes. Forgiveness can be found in 1 John 1:9 (ESV): "If we confess our sins, he is faithful and just to forgive us our sins and to cleanse us from all unrighteousness." Forgiveness can be seen in earth's eroded landscapes through the reseeded of these fields via birds and wind. This slow, steady regrowth of different plant species gives us a tiny glimpse of Eden.

This is why I choose to see old, oft-abandoned eroded fields overgrown with weeds as tangible reminders of the mighty act of forgiveness which Christ has accomplished for my own soul. Yes, these fields represent much loss of productivity to sin. The lost opportunity to use these fields to help feed and clothe many remind me of the opportunities in my life that were washed away by sin. Those opportunities which could have helped, encouraged, or blessed many are gone, just like the soil that was eroded from these fields. But the fields remain, and they bloom in biomass that participates in nutrient cycling and energy harvesting, not to mention the beauty of the flowers and their butterflies and birds—GRACE! And such is my life with

a soul bearing the scars of sin, regret, shame that will hopefully keep flourishing and bearing fruit in its old age as depicted in Psalm 92:12-15.

This same grace that covers over eroded fields with greenness and life is what prompts me to put cover crops, or guards, into my own life to prevent my soul from being open, exposed, and vulnerable to erosion by sin. These cover crops for my soul include saturation with Scripture (see Psalm 119) and protection via prayer (see Philippians 4:6 and 1 Peter 3:12). Other important cover crops I need to cultivate for my soul's protection are accuracy in accountability (see Proverbs 17:17 and Ecclesiastes 4:10) and finding solace in Christ apart from all others (see Psalm 15:1 and 1 Peter 4:15-16). All of these cover crops require my attention, time, and energy to remain healthy and be effective in covering my soul from temptation. And they are essential for protecting the good soil, which is slowly, steadily developing the rich roots of Christ's influence in every particle of my life.

SOUL FRAGRANCE

One of my favorite things to do with my husband is to ride on the back of his motorcycle on country roads in the early evening. My enjoyment of the experience involves all of my senses—the myriad of colors in the agricultural fields and surrounding woods, crisp clean air tingling my skin, the music of the wind in my ears, and the piquant smell of freshly tilled fields rich with manure and compost additions, which I'm tasting in its pungency.

That musty, old-barn, tangy smell unique to a healthy soil diverse in microbial populations and rich in organic matter additions always makes me smile and breathe even deeper as I savor it and respond in gratitude to God for it. This smell is only present when all is “right” in the soil environment, meaning that the soil pH, moisture content, and nutrient availability have all converged to make an ideal environment for bacterial and fungal populations to thrive in symbiosis with each other

and their soil ecosystem. This smell is an indicator that the microbes are happily growing and producing multiple specific gaseous compounds as byproducts of their activities, both in the soil and in the organic matter additions.

When I take my students into the woods on a field trip for soils studies, I often comment on how wonderful this smell is when we've just dug a soil sample for analysis. However, many of my students don't have the same appreciation for this aroma—they commonly say something like “ewww!” or “yuck!” or at least crinkle up their noses or sneeze and turn away. This same smell produces vastly different reactions—to a farmer “now that's the smell of money”; to a soil scientist “all is well”; or to another “that's this side of disgusting.” (Not to mention the strange looks I receive when talking about liking this fragrance—it's all about perspective, isn't it?)

The varying reactions of people to the distinctive smell of a healthy soil makes me think of 2 Corinthians 2:14-16 (ESV):

But thanks be to God, who in Christ Jesus, always leads us in triumphal procession, and through us spreads the fragrance of the knowledge of him everywhere. For we are the aroma of Christ among those who are being saved and among those who are perishing, to one a fragrance from death to death, to the other a fragrance from life to life. Who is sufficient for these things?

This same fragrance of Christ brings life to the “saved” and, conversely, is offensive (if not disgusting) to “those who are perishing.” The only difference is the perspective of the one receiving the fragrance—life or death, joy or rejection, humility or arrogance, grace or judgment, strength or failures, hope or despair. These opposing reactions depend on the condition of the soil in one's heart and life.

Just as the aroma of a healthy soil is sharpest when the soil is freshly tilled or dug, the fragrance of Christ is most distinctive in and from a devoted Christian's life when his or her life has been cut into (or plowed under) by suffering. The plowing reveals that which was growing beneath the surface—the quiet singular abiding in Christ which was hidden, waiting, ready to be revealed by the disturbance of suffering. This devotion cannot be replicated or reproduced. The proper heart conditions of humility, trust, and faith can only be cultivated by constantly taking up the cross of Christ in obedience (see Luke 9:23). And this devotion naturally produces life choices which are also unique and characteristic in their “differentness” contrary to what is accepted, expected, or explained by those not familiar with the beauty of a life lived unto Christ.

For if the life of Christ is actively thriving and growing in one's life, then trust, faith, and obedience will be sharply evident and piquant, even amid suffering. The conventional, logical perspective is to resist hard circumstances with every available resource. Acceptance, much less joyful acceptance, is an otherworldly perspective that is characteristic of trusting my God as the Sovereign One Who is stronger than any and all circumstances (see Jeremiah 32:17) and Who is my portion and strength when my heart and flesh fail (see Psalm 73:26). Nothing can hide the distinctive aroma of choosing joy in suffering as it floats out of the life of a Christ-follower from a heart of deep, rich soil committed to bearing much fruit for Jesus. As in Romans 8:18 (ESV), “For I consider that the sufferings of this present time are not worth comparing with the glory that is to be revealed to us,” it's all about perspective—if this suffering brings glory to my God and is for the good of His people by displaying more of the fragrance of Christ, then plow my life, my heart even deeper, Jesus, so that even more may know Your unmistakable grace! May my life be dug out, plowed under in sacrifice and offered as a pleasing aroma to You in worship (see Leviticus 2:2).

SOUL AMENDMENTS

When I was growing up, my father and I often went “treasure hunting,” or at least that’s how I remember our walks through the woods, farm, neighborhood, and even the backyard on occasion. We never came home without our pockets full of “treasure”—interesting rocks, leaves, sticks, flowers, bugs, and the stray nut, bolt, screw, toboggan, mitten, sock, or such. To this day, when we walk together or by ourselves, we still come home with something(s) jangling, clinking, or disintegrating in our pockets.

Yet our treasures would be considered as trash by many—castoffs, mismatched, rusty, broken, decaying pieces of what should’ve been left where we saw it. But we see beauty and usefulness in each piece—that splash of color, that unusual shape or texture, that piece to replace what I lost last month on another of my adventures or will need for next week’s project or repair.

“One man’s trash is another man’s treasure” captures the principle of the hidden beauty of agricultural land waste application as a valuable soil amendment for organic matter, nutrient, and water reclamation. That which is truly called waste—manure, compost, sewage, wastewater—is treasure in the eyes of a soil scientist because you are getting nutrients, water, organic matter and microorganisms in one perfect package. (Granted, I don’t want to put any of that in my pockets, but I would like a truckload or two for my yard and garden. These scraped subdivision soils need all the help they can get!)

“Black gold,” “free money,” and other such terms are lovingly used by farmers to describe the true worth of solid and liquid agricultural waste to current and future productivity. In fact, my father just today emailed me a picture of his spinach crop happily growing in a new application of incorporated manure. This manure is and will be providing a readily available source

of plant nutrients and water to his crops throughout the season. And then his soil will be bettered for future crops because of the increased total soil organic matter content, promotion of soil micro and macro organism populations, improved drainage, chemical activity, pH, and nearly everything else you want to happen to promote soil health.

Yet the public perception of using agricultural waste as a soil amendment is often that of fear and disgust because of a lack of knowledge. As a soil scientist, I've been frequently asked, "What is the best thing I can do for my yard, garden, flower bed?" and my response of "manure or compost" is often received with disbelief, disgust, and denial unless they have used (or known someone who used these before). And if they had, then the response is (usually), "Yes! I have never had such big and pretty grass, tomatoes, roses!"

An important soil science fact: for the waste itself to have reached the status of "now that's good stuff!" it has had to undergo a series of decay reactions to bring the nutrient percentages in the waste into proper ratios that promote crop growth, rather than hinder it. In other words, if the amount of carbon in the waste is much higher than the nitrogen amounts (called the C:N ratio), the waste isn't a good soil additive for an actively growing crop. This is because if the C:N ratio is higher than the soil, the microbes in the soil and in the waste can take away essential nitrogen from the crop, instead of being a source of nitrogen to the crop (which is generally the reason waste is added to the soil). Needless to say, these decay reactions to decrease the C:N ratios are required so that the waste addition will be helpful to the growing crop. In other words, if you don't give the waste enough time to decay, both in physical size and in nutrient ratios, the waste will truly be waste for the crop and its desired productivity at harvest.

So while thinking about all of this a few days ago, I made a connection to Romans 5:3-5 (ESV):

Not only that, but we rejoice in our sufferings,
knowing that suffering produces endurance, and

endurance produces character, and character produces hope, and hope does not put us to shame, because God's love has been poured into our hearts through the Holy Spirit who has been given to us.

The connection that I'm seeing as a Christian and a soil scientist is that many times what I perceive as unwanted additions (waste) to my life (trials, challenges, suffering, persecution) are the very things which bring about much-needed changes in my heart, both for now and the future. That which I wouldn't choose for myself (much less put in my pockets) because I consider them as trials, not treasures, are the very things which display the beauty of grace and love by nourishing the growth of the fruits of the Spirit (see Galatians 5:22-23) in my life in ways that nothing else can. These sufferings cause a decay of my pride which leads to growth of humility as they are changing me into one who endures and hopes because the very character of the soil of my heart and life has been amended as unto Christ by the workings of the Holy Spirit alive in me. For when my ratio of self to Christ has been properly decreased, then I am ready to be useful soil to promote the beauty of His love, grace, hope, and joy to a world dying around me without eternal life in Christ.

This series of decay reactions of my pride and self are essential for real growth to occur. This kind of growth in character is not measured in piled-up achievements, but in those thoughts, choices, emotions (patience, forgiveness, understanding) which I choose to cherish as honoring Christ. Stepping back instead of pushing forward, staying quiet instead of speaking up, and such indicate I have grown in obedience and trust, and thus, faith, as evidence of the growing health and vigor of the soil of my heart and life because I have found the true value in what I used to consider waste (see Matthew 26:6-13).

Just like those farmers used to reject conservation tillage farming methods because they were afraid they would be considered lazy, inept, and poor by having dirty fields covered with residue,

Christians who are undergoing suffering (and its effect of a life that often looks messy in pain, grief, loss) are often afraid of being considered to be lacking in faith. Others who haven't learned the true value of suffering as an amendment to one's life for bringing glory to God and good to his people (see John chapter 9) can judge those in suffering to be lazy, inept, and poor in faith. They might think this because they've been deceived that "if I believe hard enough, all will be good" or worse yet, the deception that "I can do all things by myself and for myself." In our culture of "I got this," suffering is often seen as inability to overcome that which is undesirable and thus, a life wasted. Yet I've found this inability to overcome is precious treasure ripe with freedom and hope because there is vibrant joy in surrender and obedience (see Psalm 119:32 and 45). That which I desperately tried to remove from my life as unwanted has turned out to be the very amendment which has brought true life in this season of my life and in whatever seasons God has for me to come. Those who don't recognize the value of suffering ask me, "How can you have joy in this?" They don't understand that what they think is waste is indeed treasure to me because it has brought me closer to Christ. (And the hope that I've found in Christ overflows even the deepest of pockets!) Honestly, this trial still makes getting through most days as hard as shoveling chicken manure, but I wouldn't trade it for anything because of what God has taught me in it—He truly is my treasure for today and forever (see Isaiah 33:6).

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Jimmy H. Davis is the Hammons Chair of Pre-Medical Studies and University Professor of Chemistry at Union University. He received his B.S. in chemistry from Union University and Ph.D. in physical inorganic chemistry from the University of Illinois at Urbana-Champaign. He serves as a Fellow of the American Scientific Affiliation. His scholarly interests include green chemistry of seven-coordinated transition metal complexes as well as questions at the intersection of science and faith. He is the co-author, with Hal Poe, of four science-faith books, with the most recent being *God and the Cosmos: Divine Activity in Space, Time and History* (IVP Academic, 2012).

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Ted Kluck is the author of over twenty books on topics ranging from professional indoor football to the evangelical church. He is a syndicated columnist for *The Jackson Sun* (Tennessee) and *USA Today*, and his journalism has appeared in *ESPN the Magazine* and *Christianity Today*. Ted has ghostwritten for a Pro Football Hall of Famer, a filmmaker, and a missionary. He is screenwriter and co-producer on the forthcoming feature film *Silverdome* and co-hosts The Happy Rant Podcast (www.happyrantpodcast.com). He coaches football at Lane College (in Tennessee) and lives in Humboldt with his wife, Kristin, and sons, Tristan and Maxim.

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