

Toward a Practical Theology of Peer Review

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Abstract

Despite the centrality of peer review to the development of a scholarly community, very little is known about the biblical basis and Christian conduct of peer review. We find that peer review is rooted in several Christian virtues, such as reflecting Christ, being honest, seeking wisdom, humbly submitting, showing Christian love, correcting error, and being accountable. Given these principles, we recommend that creationists use a double-blind peer review system, wherein the identities of the author and peer reviewers are confidential. Additionally, we recommend that creationist publishers develop a regular public audit of their peer-review process.

Critics of creationism and Intelligent Design (ID) often note that creationist or ID research does not appear in peer-reviewed literature (e.g., Crawford 1982; Scott and Branch 2003; Max 2004; Bottaro et al. 2006). Creationists complain that we are excluded from the peer-reviewed literature (Anderson 2002; Kulikovskiy 2008; see also Tipler 2004) and are therefore required to publish in our own peer reviewed-literature (Morris 2003). Critics view creationist peer review as not “real” peer review. For example, recent attempts to launch new creationist peer-reviewed journals have been met with scorn or dismissal (Sparks et al. 2007; Brumfiel 2008).

The irony of this conflict over peer review is that peer review is poorly understood and criticized even in conventional journals. Over the past 25 years, the process of peer review has come under increasing scrutiny, especially in the biomedical community (e.g., Lock 1986; Godlee and Jefferson 2003; Rennie 2002). The efficacy of peer review to improve the quality of manuscripts and to minimize bias has been questioned. Some studies show benefits, while others show no benefits or negative influences from peer review (e.g., Armstrong 1997; Jefferson et al. 2002a; Jefferson et al. 2002b; Overbeke and Wager 2003). For every one of these studies, however, there are enthusiastic editorials defending the value of peer review (e.g., Gannon 2001; Tobin 2002). What seems certain at this stage is that peer review is no guarantor of the accuracy or scientific quality of a published paper (Callaham et al. 1998; Altman 2002; Horton 2002).

These new perspectives on the process of peer review have led to strong calls for changes to the peer-review system. For example, Rennie (2003a) listed eight criticisms of peer review, including the

lack of standardization, the stifling of innovation, and the introduction of malice by reviewer anonymity. He calls for open peer review, in which the identity of the author and reviewers are known to each other (Rennie 1998). Others, fearing biased reviewers, advocate a double-blind system, wherein the identity of the author and reviewers are withheld from each other during the editorial process (Mainguy et al. 2005). In response to these criticisms, several journals are experimenting with new styles of peer review. The *British Medical Journal* now conducts open peer review and offers training workshops for peer reviewers (Schroter and Groves 2004), while *Biology Direct* publishes signed peer reviews with the articles (Koonin et al. 2006). Other journals, such as *Nature*, have resisted the calls to change (Anonymous 2008).

Some of these issues already exist in microcosm in creationist literature. In our experience, creationist journals generally conduct double-blind peer review, with few exceptions. For example, the *Proceedings of the First International Conference on Creationism* included published, signed peer reviews for each technical paper. In response to criticisms of the peer review process at BSG, Wood (2007) published an editorial endorsing the current peer review system based on his own anecdotal experiences.

Presently lacking within creationism is a justification and explanation of peer review from a Christian standpoint. What are the aims of peer review? Is peer review biblical? How should it be done given Christian morals, values, and ethics? Creationists value peer review (at least six English-language creationist publications claim to engage in peer review, Table 1), but we do so without a clear understanding of why.

Table 1. Creationist publications that claim to be peer reviewed¹

Title	Publisher	Date Begun
<i>Answers Research Journal</i>	Answers in Genesis	2008
<i>Creation Research Society Quarterly</i>	Creation Research Society	1964
<i>Journal of Creation</i>	Creation Ministries International	1984
<i>Occasional Papers of the BSG</i>	BSG: A Creation Biology Study Group	2002
<i>Origins</i>	Geoscience Research Institute	1974
<i>Proceedings of the International Conference on Creationism</i>	Creation Science Fellowship	1986

¹ We know by our personal experience that all practice some degree of peer review, but no creationist journal has ever published a full audit to confirm their peer-review activities.

This lack of perspective on peer review in Christian circles is not limited to creationists. Numerous noncreationist, Christian journals claim to be peer reviewed, including *Christian Scholar's Review*, *Philosophia Christi*, *Christian Higher Education*, and *Science and Christian Belief*. A search of the *Christian Periodical Index* and the American Theological Libraries Association database revealed only one full paper on peer review, an editorial by Barrett and Mustard (2002) in *Faith & Economics*. We also found a brief editorial note by Haas (1995) endorsing peer review in *Perspectives on Science and the Christian Faith*. Barrett and Mustard (2002) emphasized the sacrificial service of peer reviewers and discussed practical tips on writing a good review, but they took the value of the peer-review process for granted. Like the creationist journals, Christian journals at large clearly value peer review without any serious discussion of why.

Our objective in this paper is to open a Christian examination of peer reviewing by developing the beginnings of a biblical and Christian perspective on scholarly publication. We open the paper with a brief practical and theological discussion of why peer review is important. Next, we consider biblical passages and principles that relate to the justification and practice of peer review. We conclude with suggestions regarding the application of these biblical principles to the specific practices involved in Christian scholarly publishing. It is our prayer that this work will stimulate important discussions of the Christian practice of peer review and help us all to improve our scholarly publications for the glory of God.

The Need for Peer Review

Before we can determine whether we need peer review, it is necessary to define what we mean when we say "peer review." Peer review is a system whereby one's written work is evaluated by one's "peers," i.e., other scholars who are knowledgeable about the topic of the written work. Peer review may be informal, as when a person distributes a manuscript to a small group of trusted colleagues for feedback. Peer review

might also be formalized in the process of publication, wherein an editor distributes the manuscript to peers who might not even be known by the author. The purpose of this more formal peer review is twofold, namely to improve the written work (in content and written presentation) and to select works that merit publication.

The implicit principle in peer review is that no human being produces perfect written work. There are almost always errors present. Some errors are trivial and easily fixed, but others are more substantive and might render the work invalid. Peer review helps the author identify these errors before they become part of the public record. This would seem to provide benefits to a number of groups. The public and other scholars gain confidence that the published work has been scrutinized for errors. Authors avoid the embarrassment of having identifiable errors made part of the public record. Given these benefits, peer review would seem, at least in theory, to be a useful tool. Is it then an appropriate tool for the Christian?

Christians have two primary commands to follow in all activities: to love God and to love others. We believe that peer review helps to fulfill both of these commands. Peer review aids us in loving God by reflecting His character in this world. Likewise, peer review helps us love our neighbors by putting only the best published materials into their hands. Ultimately, we believe that these two divine commands can be fulfilled in the peer review process.

Like all Christian activities, we believe that a proper perspective on peer review must begin with God. God is love, knowledge, truth, and wisdom (e.g., 1 John 4:8; Romans 5:8; 1 Samuel 2:3; Isaiah 40:28; Deuteronomy 32:4; Psalm 146:6; Isaiah 11:2; Colossians 2:3). In fact, He possesses all these attributes in perfect excellence (e.g., Psalm 8:1, 18:30; Matthew 5:48; Isaiah 28:29). We are His image (Genesis 1:26–27, 9:6; 1 Corinthians 11:7) and are called upon to display His attributes (e.g., Matthew 5:48; 1 Peter 1:15–16). We must therefore strive for excellence in knowledge and truth with all wisdom and love in both our personal lives and

our public claims and statements. This must be true regardless of our particular calling, situation, or occupation. This imperative must include words both spoken and written and articles short and long, unpublished and published, private and public, lay and professional.

As humans we acknowledge that we know in part (e.g., Job 8:9; 1 Corinthians 13:9) and are limited in the attributes of wisdom, love, and truth which we should be displaying. We are limited both by our finiteness (Psalm 139:5; Job 8:9) and, further, by our fallenness (e.g., Romans 1:22; 2 Peter 3:5). However, our personal imperfection does not alleviate our responsibility to “be perfect even as He is perfect” (Matthew 5:48). Rather, realization of our imperfection should force us to be diligent and humble—diligent to strive for excellence in knowledge, truth, wisdom, and love, and humble enough to seek outside of ourselves for the perfection of those attributes, while trusting our failures to God and the blood of Christ. Peer review can be seen as seeking the counsel of others to assist in our own striving for God’s excellence.

By striving for excellence, we also love our neighbors. In our modern, western culture, many people view scientific pronouncements as authoritative. Christians who are also scientists therefore have an even higher duty to speak with excellence than the average Christian, simply because of the perceived authority that they possess. Errors made by Christians speaking in the name of science, no matter how well intentioned, can become “common wisdom” and thereby very difficult to correct. Even greater responsibility lies upon the scholar who professes ideas to the general public rather than just scholarly colleagues. In doing so, the scholar becomes a teacher, with all the attendant responsibilities (e.g., Matthew 5:19, 18:6; James 3:1). We therefore love our neighbors by striving to present the excellence of God in our written work and avoid the dangerous alternative of leading them into error.

Attaining accuracy in work begins with a healthy skepticism toward our own work, manifested by repeating experiments and observations, working to falsify personal hypotheses, and developing and testing alternative theories. Even this, however, is not enough since the subjectivity of working in isolation—or even in a small group—can blind researchers to alternative explanations or certain flaws in reasoning. This potential source of error can be remedied by seeking input from knowledgeable colleagues unconnected with the research, thus leading to at least the beginning of peer review.

Unfortunately, personal peer review is not infallible. There is always the danger that external opinions can introduce new sources of error. For example, when seeking advice, we tend to select advisors that we

suspect will at least sympathize with our ideas. We have a tendency to avoid harsh critics or individuals with high standards, but these demanding critics are those most likely to detect error and hence are the very advisors that we most need. Our natural proclivity to avoid them is therefore at odds with our need to exhibit the excellence of God and His creation.

We believe that this need to minimize error combined with the natural aversion to criticism necessitates a formal peer review process, as described above. By allowing an editor to select our reviewers for us, we minimize the biases introduced by our own selection of reviewers. The tendency to seek favorable review should be minimized since the editor is (or should be) unconnected to the research. We believe that this model of peer review is the best possible method to balance the need to publish scientific findings and theories with the need to be accurate in our work, and thereby reflect the excellence of God to the world.

Criticism

Despite this need to detect and correct error, formal peer review has serious shortcomings. For example, Callaham et al. (1998) described an experiment in which a manuscript with 23 deliberate flaws was sent to 124 reviewers. Ten of these flaws invalidated the entire study, and thirteen were less severe. The reviewers detected an average of 3.4 of the major flaws and 3.1 of the minor flaws. Altman (2002) describes many serious errors that appear in the published medical research literature. These results suggest that peer review fails to eliminate error.

Many critics of peer review note the inherent biases involved in the review process, many of which have now been demonstrated to some extent (Godlee and Dickersin 2003). For example, Ross et al. (2006) studied abstracts accepted at the annual meeting of the American Heart Association and found a bias toward authors who speak English, come from the United States, and work at prestigious academic institutions. Rennie (2003b) cited numerous anecdotes of innovative ideas rejected by peer review that later became important advances in their fields.

Given its shortcomings and demonstrated failure to eliminate error, why should we spend time and money on peer review at all? Before we answer this question, it is important to review the context of peer review in creationism. We believe that the form of peer review depends to some degree on the community served. Since creationism differs from the conventional research community in important respects, we believe these differences warrant a different response to peer review.

First, creationism includes a much wider range of expertise than the conventional scholarly community,

where most authors are well-versed in their disciplines. Creationism is a mixed community of trained scholars and informed amateurs. As a result, the range of quality in creationist manuscripts is likely much wider than in the conventional literature. In certain papers written by nonexperts, flaws are more apparent to the editor and therefore judgments can be more certain than in the medical literature, where debates over finer points of methodology might be more difficult for the editor to grasp.

Second, the active creationist community (those regularly publishing) is vastly smaller than the conventional community. This influences the identification and recruitment of qualified reviewers. For example, if all the creationists with formal training in one field coauthored a paper together, what qualified peer is left to review it? Such limitations might force creationist editors to rely on less qualified individuals or to seek peer review from noncreationists. It should be noted, though, that seeking peer review outside of creationism might often benefit creationist theories and ideas.

Third, because the creationist community is small, the journals tend to be more interdisciplinary than the typical conventional journal. Of the six English-language creationist publications that claim to be peer reviewed, only the *Occasional Papers of the BSG* restricts its focus to a single field, biology. The remainder publish papers in any field, from theology and philosophy to the “hard” sciences. As a result the average creationist editor is likely to be editing manuscripts from many fields of expertise. Reliance on peer reviewers therefore becomes more necessary to adequately evaluate submitted manuscripts.

Fourth, the size of the creationist community could produce a benefit, namely the opportunity to review papers carefully. Manuscripts submitted to all creationist journals in a given year probably do not outnumber the total manuscripts submitted to a single prominent conventional journal, such as *Science* or *Nature*. The paucity of manuscripts therefore allows us to scrutinize each one more carefully.

Fifth, there is no impetus to publish in the creationist literature (with the possible exception of individuals employed by creationist journal publishers). In the conventional community, success as a scholar is tied to output of peer-reviewed publications in prestigious journals. Publication in creationist journals does not usually render a direct benefit to the author and in some cases might even carry a professional stigma. As a result, the temptation to publish papers of lower quality should be diminished.

Given these differences, why should creationists engage in peer review if it is flawed and potentially ineffective? Critics seem to focus on peer review’s failure to eliminate error, but error *elimination* is

not the goal of peer review (Rennie 2003a). Rather, peer review seeks to *reduce* errors, which is a known outcome of peer review. For example, Callaham et al.’s (1998) findings indicated that many errors deliberately introduced in a manuscript went unnoticed by individual reviewers, but they did notice several of the errors. Likewise, Wager and Middleton (2002) found that technical editing improved the readability of manuscripts, as well as the accuracy of references and quality of abstracts.

Given the demonstrated biases of reviewers, is it possible to alleviate some of the inappropriate bias? Bias against authors might be alleviated by implementing a double-blind review, as described above (Mainguy et al. 2005). Studies of blind versus open peer review have found no difference on the quality of reviews (van Rooyen et al. 1998; Justice et al. 1998), suggesting at the very least that blinding does not adversely influence the reviewing system. Godlee et al. (1998) found that reviewers who knew the author’s identity were more likely to recommend acceptance of a manuscript, suggesting that a potential bias toward certain authors had been alleviated when the authors’ identities were kept confidential.

Within creationism, we are forced to rely on our personal experiences with creationist editing to affirm the improvements wrought by peer review. We can all attest to improvements to our own work as a result of peer review. Sometimes those improvements have been trivial, but in several cases, our written work has benefited tremendously from the feedback of peer reviewers. This paper, for example, has undergone four major revisions as a result of feedback from five informal reviewers and three anonymous peer reviewers.

Given all of these considerations, we believe that peer review is not merely an option to creationist publishers but a duty. We have a duty to reflect the excellence of God and to put before the world only the best we can offer. Peer review can assist us in correcting errors in our work, and its flaws can be identified and remedied. As creationists, the lighter publication load affords us an opportunity to evaluate manuscripts carefully. Therefore, neglecting, ignoring, or circumventing reasonable efforts to reduce error, such as peer review, would be wrong (James 4:17).

Biblical Concepts

Since peer review is justifiable as a Christian activity, what then is the best way to conduct peer review? We find that peer review and criticism embody important biblical principles related to reflecting Christ to the world, being truthful, attaining wisdom, submitting to others, displaying Christian love and mercy, being accountable, and correcting error. The first three principles reflect our relationship to God

and therefore our duty to love God, and the last four reflect our duty to love our neighbors. These principles should inform our practice of peer review.

Christ's ambassadors

The Church, i.e., believers in Christ, is the embodiment of Christ in the present time (between the Resurrection and the Second Coming) (1 Corinthians 12:12–13, 27; Ephesians 4:1–16, 5:30; Colossians 1:24). As such, He is in us, and we are to be a true reflection of Christ, functioning as part of the body of Christ, which carries out the work that pleases Him (John 17:20–26, 20:21; Acts 1:8; Romans 12:3–8; 1 Corinthians 6:1–6; 2 Corinthians 5:20; Ephesians 4:20–24; Colossians 3:12–14; 2 Timothy 4:2; Hebrews 10:24; James 3:13; 1 Peter 2:4–10). In the scholarly world, we reflect Christ when we seek to write and publish only work of excellent quality.

Honesty

Throughout the Bible, we find that God is truthful (e.g., Deuteronomy 32:4; Psalm 33:4; John 17:17) and Jesus is Himself truth (John 14:6). As a reflection of Christ in the world, we should strive for truthfulness (e.g., Joshua 24:14; 1 Samuel 12:24; John 4:24, 16:13; 1 Corinthians 13:6; Ephesians 4:15, 25; Titus 2:7–8; James 3). Indeed, Jesus commands us to speak truthfully (Matthew 5:37), as does the ninth commandment (Exodus 20:16). Exodus 20:16, Proverbs 12:22, and Proverbs 14:25 illustrate the value God places on truthfulness in people. The call to scholarly honesty requires us to admit our errors and correct them.

Wisdom

God provides wisdom directly to those who fear Him—those who earnestly strive for it in Scripture and prayer (Proverbs 2:1–9). Wisdom can be received from others when we seek godly counsel. Fearing God and seeking godly counsel are often tightly linked in Scripture (Psalm 1; Proverbs 1:1–7, 20–33; 3:5–8, 11–17; 9:10; 12:15; 13:10, etc.). Sometimes godly counsel comes in the form of rebuke, criticism, or discipline (e.g., Proverbs 25:12). Godly peers with similar interests, but different viewpoints, should be sought to mutually sharpen our thoughts (Proverbs 25:11, 27:17). If multiple godly advisors concur, an action is more likely to reflect God's will and succeed (Proverbs 11:14, 12:1, 15:22, 32–33). Scholars, authors, and reviewers alike ought to seek wisdom together.

Humility and submissive servant leadership

The principle that God can use only those persons who are humble in spirit likewise is pervasive (e.g., Proverbs 3:34; 15:33; 16:5, 19; 21:4; James 3:13, 4:6; and 1 Peter 5:5–6). Christ demonstrated servant-

leadership in His last meeting with His disciples before His crucifixion (John 13:1–17). In the body of Christ, humility and mutual submission are required (Romans 12:3–4; Ephesians 5:21), as is submitting to the direction of God-ordained leaders, who in turn submit to the needs of those in their care (Ephesians 5:21, 6:1–9; James 4; 1 Peter 2:13–3:7, ch. 5, especially 5:3). Finally, God reacts favorably to those who submit in humility and resists activity that is motivated by pride (1 Peter 5:5–6). Humility is necessary for all parties involved in peer review.

Possessing Christian love

Truthfulness and humility are closely tied to Christian love (Ephesians 4:15–16) and mercy (Psalm 85:10, 86:15; Proverbs 3:3, 16:6, 20:28). We are even to love our enemies and to pray for those who spitefully use us (Luke 6:27–28, 35). Jesus also commands us to do to others that which we would have done to us (Luke 6:31). One of God's goals is to draw all people to Himself by the manner of life of Christians (1 Timothy 2:1–7) and by the love Christians display to one another (John 13:34–35). In our efforts to bring down strongholds and stamp out error, we must remember our Lord's command to love the people involved—those who are deceived by the error, those who are believing lies, and even those promoting nontruths. Christian love should manifest itself especially when reviews and editors strive to improve a poor-quality submission.

Accountability

The principle of accountability is strongly ingrained in biblical teaching and examples. God directly confronted individuals with their sin (e.g., Adam, Cain, Sampson, David, and Jonah). God also made entire people groups accountable for their sins (e.g., the judgment of the Flood, the Israelites' 40-year sojourn in the wilderness, and the Babylonian captivity). We are all accountable to God and should be accountable to one another (Acts 15:1–35; Romans 14:12; Galatians 6:2; Colossians 3:12–14; James 5:16; Hebrews 10:24). Scholars should be held accountable for their actions as reviewers, editors, and authors.

Correction of error

We are to correct error when it is found in the body of Christ (Galatians 2:11–21; James 5:19–20). Although these references apply to moral error (sin), we believe that they give us guidance for correction of any error. Love for the person in error and for those whom the error might harm should motivate us to correct that person (Galatians 6:1–4; Ephesians 5:15–16, 25; 1 Peter 5:5). A relevant corollary is the biblical mandate to begin our correction one-on-one, and only if that fails should we expand our confrontation

to more witnesses/counselors in a private setting. Errors should be made public only if the one in error is recalcitrant (Deuteronomy 19:15; Proverbs 12:23; Matthew 18:15–17; 1 Corinthians 6:1–6; Colossians 4:5–6; 1 Timothy 5:19–20). Confidentiality to protect the parties involved is also important (Proverbs 3:32, 11:12–13, 20:19, 25:9–10). Furthermore, Scripture draws a clear distinction between evaluating the words and actions of a person for the purpose of restoration and judging unseen motives for the purpose of harm or punishment—the latter being a usurpation of God’s authority (Acts 10:42; Romans 14:10–13; 2 Timothy 4:1–5; James 4:11–12). Again, the “honest” mistakes in scholarship are not the same as willful sin, but the principles of moral correction give valuable guidance to both situations.

Practical Advice

Since a good peer-review process can accomplish correction of error in the spirit of humble, biblical correction, all scholarly Christians should support and engage in rigorous peer review. The peer-review process shares the responsibility for accuracy among the author, editor, and publisher. Each individual involved in the process has specific responsibilities to ensure that the process is conducted in accordance with biblical principles.

General considerations

Based on the biblical principle of correction, we see that the Bible values correction done in private. We suggest that implementing this in peer review requires confidentiality to protect the author, reviewers, and the review process itself. Because we are accountable to God and to each other, we should avoid the potential for bias by removing ourselves from situations of conflict of interest. Potential conflict of interest by any party should be openly stated from the outset, and reassignment of editors or reviewers should be made as needed. Responsibility for choice of good reviewers and filtering unduly harsh remarks falls on the editor. Upon receiving the editor’s and reviewer’s comments, the author is to carefully consider the advice and either redress the deficiencies or provide a well-supported rebuttal as to why the paper should not be changed. Appeal should be possible but within a clearly articulated protocol that protects editors and reviewers from false accusations.

Publishers

Publishers set the standards and attitudes reflected in their publications. They are responsible for establishing a competent and humble editorial board. They articulate the editorial and appeal policies that embody the biblical principles above and guide the actions of the editors. The progress that

the creationist community makes toward advancing sound science ultimately depends on the resolve of publishers to uphold high standards, reflecting God’s character.

Authors

The first responsibility for publishing accurate papers lies with the author. Scholars should exercise skepticism and Christian humility toward their own work. By doing so, the researchers will also begin to separate ideas from emotion. It is very easy to become emotionally attached to our own ideas, but this is inappropriate, especially if an idea is incorrect. In cases where an emotional attachment has already developed prior to peer review, authors must at least remember that the biblical prohibition against judging (Luke 6:37) does not apply to correction (i.e., peer review) as noted above. The purpose of peer review is to benefit rather than harm, and all Christian authors must adopt an attitude of humility toward their own work.

Authors should seek private reviews prior to submitting the work for publication. Accepting criticism is much easier when it comes from a friend than from a person unknown to you, and identifying errors privately is less embarrassing than having a reviewer or editor point them out. Reviews should be sought from trusted and reliable sources. Authors should also account for the strengths and weaknesses of their private reviewers. For example, it could be unwarranted to accept scientific advice from a theologian or vice versa. By seeking good, private reviews, authors can submit “one to another in the fear of God” (Ephesians 5:21).

Authors should choose an appropriate scholarly publication. Many publications have specific requirements and preferences that may be unrelated to quality issues. A publication may focus on a single discipline (such as biology) or type of contribution (such as evidential apologetics). Obviously, an author should respect these preferences, since they do not relate to moral issues. Authors concerned with achieving the highest accuracy for their work (which should be the case for all Christian authors) should seek out publications with the highest editorial standards. By selecting a publication with a proven track record in publishing high-quality work, authors have a greater chance of minimizing errors.

Authors should avoid thinking that an affirming review (or even publication) means that the paper is without error. It is very common to appeal an editor’s decision by claiming that someone else gave an affirmative review. This need not be a relevant consideration, either to the editor or the author. The editor need not consider the opinion of people outside of the reviewers, unless there is compelling evidence

that the outside reviewer saw something that other reviewers missed. The author also must realize that the personal reviews may also be erroneous.

Editors

The responsibility of the editor is to select submissions to publish, but the editor should not act merely as a gatekeeper. Rather, the editor's first duty is to improve each paper submitted, consistent with the duty of leaders and teachers to serve the church (see above). Finding a perfect paper is unlikely; there will almost always be room for improvement. The goal of the editor, then, is to identify which improvements are necessary for publication. If the editor and author do their jobs well, another goal of the editor should be minimization of rejections.

The initial evaluation of the article depends on the editor's own assessment. Errors detected by the editor might be simple and correctable errors, or they may be more serious flaws that might actually invalidate the entire work. In the former case, it seems most prudent to send the paper for review immediately. If the errors are insignificant and easily remedied, it is likely that competent reviewers will also identify them in their reviews, rendering comment by the editor unnecessary.

In cases of seriously flawed papers, the editor may select from several options. If the editor believes that the flaws could warrant rejection of the work, the editor might seek additional opinion from one or more peer reviewers to validate the initial assessment. Alternatively, the editor could reject the paper based on personal judgment alone. On the other hand, if the editor believes that the work could be salvaged with significant revisions, the editor could request those revisions without consulting reviewers. This seems best, since it limits knowledge of the error to the editor and author and thereby follows the Bible's encouragement to keep such knowledge as private as possible (see above).

Selection of reviewers must be done with great care, with the assumption that wise advisors are more likely to provide good advice. Reviewers should not be personally biased for or against the work and should be qualified to assess the work. Because of the potential for personal bias, the editor should not follow all reviewer recommendations submitted by authors. One reviewer from the author's recommendations might be appropriate, but the editor should also choose other reviewers to ensure that any personal bias on the part of the reviewer is minimized, since author-chosen reviewers were found to recommend publication sooner than editor-chosen reviewers (Schroter et al. 2006; Wager et al. 2006).

The editor should select reviewers who are most qualified to assess the work. For example,

paleontologists should review paleontology papers, philosophers should review philosophy papers, and so on. If reviewers with specific qualifications cannot be identified, the editor should instead use reviewers with the best qualifications and consider their shortcomings when evaluating their reviews.

In evaluating reviews, the editor should not merely passively collect opinions. Reviewers should be held to the same standards as the authors (Armstrong 1997). Reviewers should justify their evaluations with logic or references where appropriate, whether positive or negative. Unusually succinct reviews, e.g., "This paper is fine," should be challenged. Why is the paper "fine"? What about it is relevant? If there are errors, how does the reviewer know? Since the ultimate fate of the article is the responsibility of the editor, editors should demand reviews of good quality.

In general, no single opinion should be considered conclusive, but what constitutes a single opinion should be left to the discretion of the editor. Minimally, no paper should be evaluated on the testimony of a single reviewer, whether or not the reviewer affirms it. This would be consistent with Moses' admonition to establish legal fact only by two or more witnesses (Deuteronomy 19:15). We recommend that at least two and preferably three opinions on any given work should be sought. In cases where the reviewers unanimously agree on the paper's quality, no further assessment would be necessary. In cases where reviewers disagree, the editor should give the benefit of the doubt to the critics rather than those who praise the work, since the goal of the peer review should be error minimization, and it is possible that reviewers might miss errors. Alternatively, if the editor believes the negative reviews to be unwarranted, they can be disregarded.

Somesubmissionsmightwarrantseekingmorethan three reviews. In general, it seems appropriate that a particularly provocative, controversial, or sensational paper should be scrutinized more carefully than an average paper. The controversial status of a paper might be evident immediately to the editor or might come to light in the strong reactions of the reviewers. In such cases, more than three reviewers would seem to be necessary. These additional reviewers will protect both the author and the editor, either in the case of publication or by preventing publication.

In rendering an editorial decision, the editor should give the author every possible opportunity to revise and thereby improve the work. Only in cases of irreparable flaws or uncooperative authors should the editor resort to rejecting a manuscript. In the spirit of humble servanthood, the editor should handle negative reviews delicately. Reviewers should *never* be discouraged from giving a negative review, but in relaying that review to the author, the editor should

offer some words of encouragement and a reminder that a negative review is not a personal attack. If the review is especially offensive, the editor may wish to challenge the reviewer to rewrite the review or simply select the most relevant portions to report to the author.

Reviewers

Scholars called upon to review articles should first evaluate their own qualifications and suitability for the article in question. Potential reviewers should decline to review papers for which they are not qualified and should identify any conflicts of interest to the editor immediately. A major source of conflict of interest is competition. Potential reviewers who are working on similar projects or alternative models should identify this bias to the editor prior to conducting the review. The editor will then decide whether the conflict of interest is sufficient to warrant replacement of the reviewer. Not all disagreements among authors and reviewers would be conflicts of interest. It may be that the editor wants an opinion from a scholar who disagrees with the approach or philosophy of the authors.

The primary duty of the reviewer is to be honest. If the work contains errors, it will do the author no good if the reviewer fails to point out those errors for fear of offending the author. Remember that it is the editor's responsibility to evaluate the work based on the reviewer's comments. Concealing problems on the pretense of "kindness" or "Christian unity" only inhibits the editorial process. Furthermore, allowing a Christian author to persist in mistakes and errors is unloving. As noted above, the editor should do what is necessary to "cushion the blow" when communicating the reviews to the author.

The secondary duty of the reviewer is to treat others with respect and to speak the truth in love. Abusive or sarcastic reviews are disrespectful to the author and the editor. Reviewers should treat the author as the reviewer would like to be treated. Again, this should not be considered a reason to overlook error or excessively compliment poor-quality work. Encouraging a fellow Christian to conduct or publish work of poor quality is unloving. Reviewers should encourage excellence whenever possible.

Finally, for the sake of the editor, reviewers must write a thorough review. Barrett and Mustard (2002) described a three-part approach to writing a review. In the first part, the reviewer briefly summarizes the work, highlighting the basic argument and the importance of the subject. Next, the reviewer suggests areas of improvement, focusing on the major weaknesses in the paper. The review concludes with specific comments aimed at improving the writing or the clarity of figures or tables. In the case of

creationism, following these suggestions may be challenging, especially when dealing with an amateur author who is unfamiliar with the basic conventions of the reviewer's field of expertise. Nevertheless, making the effort to follow these suggestions will help to craft a loving and kind review, even if the reviewer recommends against publication.

Confidentiality

As noted above, the Bible encourages privacy when correcting error, and a good peer-review process should be conducted confidentially and sensitively. The editor should not share the contents of unpublished work outside the conduct of editorial procedures. The editor should consult only fellow editors or reviewers for opinions on the work. In the interest of fairness, the editor should not conduct a private review process that is not communicated to the author. All peer reviews should be passed along to the author.

Reviewers should also respect the confidentiality of unpublished material. Only the person asked to review the work should review it (Barrett and Mustard 2002). If the reviewer knows of someone who is more qualified to review it, the reviewer should communicate that person's identity to the editor. The reviewer should not pass along a paper to anyone without the consent of the editor.

The editor should also try to make the identity of the author and reviewers unknown to each other. This is difficult in the case of the author, especially when previous work by the author is cited. Minimally, the author identification on the title page should be removed from the paper prior to sending it for review. Papers or reviews in electronic format (e.g., Microsoft Word or Corel WordPerfect) should have their digital signatures removed or altered.

Accountability

To ensure that the editorial process does not itself fail (which is always a danger when fallen humans are involved), a peer-reviewed publication should build in multiple levels of accountability. This accountability could include mechanisms to avoid conflicts of interest, a process to appeal editorial decisions, and regular, formal assessments of editorial quality. These mechanisms will increase the likelihood that the editorial process remains fair and just.

Minimally, every Christian scholarly publication should make the editorial procedure as transparent as possible by publicly disclosing their editorial process in an editorial manual. The guidelines and recommendations of this paper can be applied in different ways, depending on the circumstances. For example, a publication may not accept unsolicited manuscripts or may choose to edit stand-alone abstracts differently than full papers. Disclosing

specific editorial procedure allows the public to evaluate the publication itself and gauge the likely quality of any published item, thereby protecting the reputation of the publication, editor, and author. A clearly articulated editorial manual also protects the publication in the event that a dispute arises between authors and editor. In creationism, the most detailed editorial manuals are published by the *International Conference on Creationism* and *Answers Research Journal*. Least detailed are the guidelines of the *Occasional Papers of the BSG* and *Origins* (GRI).

Most important in the editorial manual is a policy on conflict of interest. Conflict of interest occurs when an editor, reviewer, or author has some relationship that might cause inappropriate bias. Within creationism, conflict of interest is prevalent because of the small size of the community. For example, all six creationist publications that claim to be peer reviewed regularly publish articles written by members of their editorial staff, and none of them has a public policy regarding conflict of interest. The biggest offender is the *Occasional Papers of the BSG*, wherein five of the ten published articles were written or cowritten by the assistant editor. Similarly problematic is the peer-review status of special publications, such as the RATE books, which were funded, written, and edited by the same organization. Without a clear policy regarding conflict of interest, the public does not know when or if a paper has been adequately reviewed.

To avoid conflict of interest, no editor should edit his or her own paper or the paper of a coworker. This might require that an editorial team have a variety of individuals who are not coworkers who could edit papers of other editors. Alternatively, the editor (and the editor's coworkers) should avoid publishing in his own journal (which seems unusually harsh since there are so few creationist journals), or a temporary editor must be recruited each time there is a conflict of interest (which seems burdensome). In the case of a journal with multiple editors or a special temporary editor, the publisher should disclose the editor of each article so that any appearance of conflict of interest can be avoided.

Even without a conflict of interest, it is likely that an editor will eventually make an error and reject work of significant merit. To protect authors who might find their work rejected unjustly, the publication should include a process to appeal an editor's decision. Given the essential trust that should exist between editor and publisher, all appeals must favor the editor. Formal appeal should commence only when the author has exhausted reasonable efforts to persuade the editor. We recommend that an appeal committee be composed of other editors of the same publication. In this way, editors still have final say on the content of the publication rather than a temporary

committee of outsiders or an unqualified committee of publishing administrators. Procedures for the appeal committee and minimum standards of proof should be publicly issued prior to the initiation of a formal appeal. We recommend that an upheld appeal should result in the paper being reassigned to a different editor, rather than the automatic acceptance of the paper. In order to avoid the appearance of special treatment or conflict of interest, *ad hoc* or irregular appeals outside of the stated appeal process should never be conducted.

What if an editor makes the opposite mistake? Instead of rejecting work that warrants publication, what if the editor accepts work that is erroneous? As long as the editor acted in good faith within the stated guidelines, editorial decisions should not be overturned (Graf et al. 2007). Errors detected after publication can be addressed by errata or corrigenda. On the other hand, a pattern of accepting erroneous papers will reflect poorly on the publication and the publisher. In such cases, the publisher should seek a new editor or editorial team. Detecting poor editorial performance would best be accomplished by a regular editorial assessment, rather than an arbitrary or irregular intervention.

Editorial Assessments

In order to assure the public that peer review is being conducted appropriately, publications should regularly audit their own performance. Statistics on the handling of papers should be collected and published. Such statistics could include the average time taken to process a manuscript, the average number of reviews received, the average number of reviews received from reviewers not on the editorial board, and overall rejection and acceptance rates. These statistics might also bring problem areas to the attention of the editors and publisher. Currently, we know of no creationist publication that publishes such statistics. The *CRS Quarterly* published acceptance and rejection statistics in the past but not recently (Kaufmann 1989, 1990, 1991, 1993a, 1993b, 1994, 1996, 1998, 1999).

Further assessment might include an author's survey, a reviewer's survey, or some kind of formal review by the publisher. Such surveys might evaluate the quality of the peer reviews, the editorial communications, or other specific aspects involved in the peer-review process. When conducting any survey of authors, the publisher should keep in mind that Weber et al. (2002) found a significant association between the rejection of a manuscript and the author's negative opinion of the peer-review process.

Conclusion

Christians will probably never satisfy critics

of creationist peer review, but we believe that creationists have a duty to practice stringent peer review. Presenting only the best information to the public is a responsibility of all Christian scholars, regardless of their opinion about the creation/evolution issue. Peer review is an important tool for doing that. Resting upon the biblical principles outlined in this paper, we believe that peer review is godly counsel that will improve our work, including our research proposals and choice of research methods, as well as the published presentation of our results in abstracts, journal articles, and monographs. We reject any suggestion that peer review is a form of personal judging that disrupts unity of the body of Christ. Rather, if carried out correctly, peer review acts to unify the body in purpose, function, and integrity.

The status of peer review in the creationist community is largely unknown. Other than personal experiences, there is very little data about the practice or effectiveness of creationist peer review. Applying the recommendations in this paper, all creationist publications can better serve the public and better reflect the excellence of God. We hope that this is the goal of every Christian scholar.

References

- Altman, D.G. 2002. Poor-quality medical research: What can journals do? *Journal of the American Medical Association* 287:2765–2767.
- Anderson, K. 2002. Intentional editorial censorship. *Creation Matters* 7 (3):7–8.
- Anonymous. 2008. Working double-blind. *Nature* 452: 605–606.
- Armstrong, J.S. 1997. Peer review for journals: Evidence on quality control, fairness, and innovation. *Science and Engineering Ethics* 3:63–84.
- Barrett, C. and D.B. Mustard. 2002. The ministry of referees and discussants. *Faith & Economics* 40:26–32.
- Bottaro, A., M.A. Inlay, and N.J. Matzke. 2006. Immunology in the spotlight at the Dover “intelligent design” trial. *Nature Immunology* 7:433–435.
- Brumfiel, G. 2008. Creationists launch “science” journal. *Nature* 451:382–383.
- Callahan, M.L., W.G. Baxt, J.F. Waeckerle, and R.L. Wears. 1998. Reliability of editors’ subjective quality ratings of peer reviews of manuscripts. *Journal of the American Medical Association* 280:229–231.
- Crawford, G.E. 1982. Science as an apologetic tool for biblical literalists. *Science, Technology, & Human Values* 7 (40): 88–93.
- Gannon, F. 2001. The essential role of peer review. *EMBO Reports* 2:743.
- Godlee, F. and K. Dickersin. 2003. Bias, subjectivity, chance, and conflict of interest in editorial decisions. In *Peer Review in Health Sciences*, ed. F. Godlee and T. Jefferson, pp.91–117. BMJ Books, London.
- Godlee, F., C.R. Gale, and C.N. Martyn. 1998. Effect on the quality of peer review of blinding reviewers and asking them to sign their reports. *Journal of the American Medical Association* 280:237–240.
- Godlee, F. and T. Jefferson, eds. 2003. *Peer Review in Health Sciences*. London: BMJ Books.
- Graf, C., E. Wager, A. Bowman, S. Fiack, D. Scott-Lichter, and A. Robinson. 2007. Best practice guidelines on publication ethics: a publisher’s perspective. *International Journal of Clinical Practice* 61, Suppl. 152:1–26.
- Haas, J.W. 1995. Peer review. *Perspectives on Science and the Christian Faith* 47 (4):1.
- Horton, R. 2002. The hidden research paper. *Journal of the American Medical Association* 287 (21):2775–2778.
- Jefferson, T., P. Alderson, E. Wager, and F. Davidoff. 2002a. Effects of editorial peer review: A systematic review. *Journal of the American Medical Association* 287: 2784–2786.
- Jefferson, T., E. Wager, and F. Davidoff. 2002b. Measuring the quality of peer review. *Journal of the American Medical Association* 287:2786–2790.
- Justice, A.C., M.K. Cho, M.A. Winker, J.A. Berlin, D. Rennie, and the PEER Investigators. 1998. Does masking author identity improve peer review quality? *Journal of the American Medical Association* 280:240–242.
- Kaufmann, D.A. 1989. Minutes of the 1989 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 26:101–102.
- Kaufmann, D.A. 1990. Minutes of the 1990 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 27:96–97.
- Kaufmann, D.A. 1991. Minutes of the 1991 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 28:116–117.
- Kaufmann, D.A. 1993a. Minutes of the 1992 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 30:23–24.
- Kaufmann, D.A. 1993b. Minutes of the 1993 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 30:168–169.
- Kaufmann, D.A. 1994. Minutes of the 1994 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 31:170–171.
- Kaufmann, D.A. 1996. Minutes of the 1996 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 33:102–103.
- Kaufmann, D.A. 1998. Minutes of the 1998 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 35:170–171.
- Kaufmann, D.A. 1999. Minutes of the 1999 Creation Research Society Board of Directors meeting. *Creation Research Society Quarterly* 36:38.
- Koonin, E.V., L.F. Landweber, and D.J. Lipman. 2006. A community experiment with fully open and published peer review. *Biology Direct* 1:1.
- Kulikovsky, A. 2008. Creationism, science and peer review. *Journal of Creation* 22(1):44–49.
- Lock, S. 1986. *A Difficult Balance: Editorial Peer Review in Medicine*. Philadelphia: ISI Press.
- Mainguy, G., M.R. Motamedi, and D. Mietchen. 2005. Peer review—the newcomers’ perspective. *PLoS Biology* 3 (9): e326.
- Max, E.E. 2004. Challenging creationist debaters. *Reports of the National Center for Science Education* 24 (6):39–40.
- Morris, H.M. 2003. Willingly ignorant. *Back to Genesis* 180:

- a–c.
- Overbeke, J. and E. Wager. 2003. The state of the evidence: What we know and what we don't know about journal peer review. In *Peer Review in Health Sciences*, ed. F. Godlee and T. Jefferson, pp. 45–61. London: BMJ Books.
- Rennie, D. 1998. Freedom and responsibility in medical publication. *Journal of the American Medical Association* 280:300–302.
- Rennie, D. 2002. Fourth International Congress on Peer Review in Biomedical Publications. *Journal of the American Medical Association* 287:2759–2760.
- Rennie, D. 2003a. Editorial peer review: Its development and rationale. In *Peer Review in Health Sciences*, ed. F. Godlee and T. Jefferson, pp. 1–13. London: BMJ Books.
- Rennie, D. 2003b. Innovation and peer review. *Peer Review in Health Sciences*, F. Godlee and T. Jefferson, pp. 76–90. London: BMJ Books.
- Ross, J.S., C.P. Gross, M.M. Desai, Y. Hong, A.O. Grant, S.R. Daniels, V.C. Hachinski, R.J. Gibbons, T.J. Gardner, and H.M. Krumholz. 2006. Effect of blinded peer review on abstract acceptance. *Journal of the American Medical Association* 295:1675–1680.
- Schroter, S. and T. Groves. 2004. *BMJ* training for peer reviewers. *British Medical Journal* 328:658.
- Schroter, S., L. Tite, A. Hutchings, and N. Black. 2006. Differences in review quality and recommendations for publication between peer reviewers suggested by authors or by editors. *Journal of the American Medical Association* 295:314–317.
- Scott, E.C. and G. Branch. 2003. Evolution: What's wrong with 'teaching the controversy.' *Trends in Ecology and Evolution* 18:499–502.
- Sparks, J.L., J.J. Roper, C.L. Bridgman, K. Decker, D.L. Tufford, R.M. da Rocha, M.J. Cramer, M. Luterra, H.G. Hanlin, D.W. Inouye, W.W. Aney, M.E. Ricci, R. Genter, T.E. Ahern, A.R. Dyer, and C.E. Stronach. 2007. A response to the Institute of Creation Research. *Bulletin of the Ecological Society of America* 88:381–383.
- Tipler, F.J. 2004. Refereed journals: Do they insure quality or enforce orthodoxy? In *Uncommon Dissent*, ed. W.A. Dembski, pp. 115–130. Wilmington, DE: ISI Books.
- Tobin, M.J. 2002. Rigor of peer review and the standing of a journal. *American Journal of Respiratory and Critical Care Medicine* 166:1013–1018.
- Van Rooyen, S., F. Godlee, S. Evans, R. Smith, and N. Black. 1998. Effect of blinding and unmasking on the quality of peer review. *Journal of the American Medical Association* 280:234–237.
- Wager, E. and P. Middleton. 2002. Effects of technical editing in biomedical journals: A systematic review. *Journal of the American Medical Association* 287:2821–2824.
- Wager, E., E.C. Parkin, and P.S. Tamber. 2006. Are reviewers suggested by authors as good as those chosen by editors? Results of a rater-blinded, retrospective study. *BMC Medicine* 4:13.
- Weber, E.J., P.P. Katz, J.F. Waeckerle, and M.L. Callahan. 2002. Author perception of peer review: Impact of review quality and acceptance on satisfaction. *Journal of the American Medical Association* 287:2790–2793.
- Woloshin, S. and L.M. Schwartz. 2002. Press releases: Translating research into news. *Journal of the American Medical Association* 287:2856–2858.
- Woloshin, S. and L.M. Schwartz. 2006. Media reporting on research presented at scientific meetings: More caution needed. *Medical Journal of Australia* 184:576–580.
- Wood, T.C. 2007. An inside look at the BSG editorial process. *Occasional Papers of the BSG* 10:25–27.

