Scientific Law and the Attributes of God

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Does the “book of nature” bear the signature of God? Such a question is readily deconstructed. What do we mean by nature and by God? What is assumed by the expression “book of nature”? The latter certainly implies that nature is intelligible to personal agents who can ‘read’ appropriately. Historically, there is the deliberate contrast to the book of “Holy (Judeo-Christian) Scripture” with its meta-narrative and special revelation of the plan and purposes of the Biblical God. Were we situated in Athens in the 4th Century BC this second Book would be largely unavailable to us. Today, however, we inherit not only the cumulative insights of modern science but the sweep of historical and philosophical theology and also nuanced studies of their subtle interrelationships. Whereas classically, natural theology might have been construed as a separate prolegomena to, or apologetic foundation for Christian theology, the situation is now greatly changed. For centuries the broad outlines of Christian belief have been codified and propagated into the public domain. Hence we can minimally specify the present effort as pertaining to the biblical God of Christian Trinitarian Theism. Nevertheless, the discussion aims to proceed without any direct appeal to Scripture as authority, but rather to mainstream interpretation of its overall theme concerning the nature and attributes of the divine Being. Rather greater emphasis is placed upon a critical realist reading of the scientific enterprise.

By judicious combination of contemporary insights, classical natural theology may be reformulated to yield a theology of nature. This must inevitably embody a purposive or teleological appraisal of human and cosmic existence, and thus a place for the intuition of ‘design’ and underpinning ‘intelligence’ at some level or other. Moreover, a stratified understanding of physico-chemical, biological and social realities, over against an ontological reductionism, would allow both for optimised scientific exploration, evaluation of complexity and recognition that ‘design’ or fitness-for-purpose may be wholly or partly mediated by the
overarching ‘boundary conditions’ or mathematical-physical ‘fine tuning’ of created existence, rather than specially inserted into numerous particulars.

There are many potential uses for such a “theology of nature”, especially since we earthlings are doxological creatures, and our worship can degenerate into idolatry. Moreover, ‘Science and Religion’ has become an academic discipline and thus to some extent an end in itself! However, these inter-disciplinary issues and arguments feature prominently in current apologetic polemics, both for and against Theistic belief. Much pro-Theistic apologetic today emphasises perceived empirical ‘oddities’ – at the limits of scientific explanation. We have already noted that ‘Intelligent-Design’ (ID), may be very broadly construed in terms of ontological ‘fine-tuning’. However, in the predominantly US-based ID-movement, a special type of ID argument has become focused upon apparent lacunae in the secondary causal framework of the natural order, engendering considerable debate. These ‘gaps’, notably in biology, are taken as indicative of specific, localised design engineering due to exclusion of explanation by either chance or necessity. The sub-text is an invitation to infer special divine action at these junctures, rather than a ‘functional integrity’ of the natural order.

But even if such ‘gaps’ did not shrink or disappear, they would still be an inadequate one-sided basis for mature theistic conviction, which orbits that Supreme Being, the author and sustainer of all created existence - in all its particulars and relationships, including those increasing facets where there is a valid scientific understanding. This brings us to the subject of scientific law.

Are there scientific laws?

Whereas natural sciences, such as particle physics, elucidate firstly what everything is, the question of what everything does is equally central, and such regularities are properly mapped as scientific laws. Richard Feynman articulated the working convictions of especially physical scientists:

“There is a rhythm and a pattern between the phenomena of nature which is not apparent to the eye, but only to the eye of analysis: and it is these rhythms and patterns that we call Physical Laws.”
However, catalysed by the 1962 work of Thomas Kuhn \(^9\) and the changing post-modern mood of the 1960s, the paradigms of scientific law underwent reappraisal by philosophers and especially sociologists of science. In 1983, Nancy Cartwright published: *How the laws of physics lie* \(^10\) followed in 1999 by: *The Dappled World: A study of the boundaries of science.* \(^11\) These profound books advocate *inter alia* that, in practice, we cannot easily apply physical laws to all situations, as the world is too patchy or ‘dappled’. But this particular point would be conceded by all but the most extreme theoretical physicists. Recently, the views of Cartwright and other prominent philosophers of science, such as Ronald N Giere \(^12\), have returned to mediating positions, emphasising that the theoretical side of science is a series of model-building exercises \(^13\). Meanwhile, most working scientists, including those of the highest calibre, continue to believe: (a) in the reality of discovering the rhythms, patterns and regularities of the natural world and that (b) higher-level behaviour supervenes on the operation of more basic physical laws. Thus, for instance, gravitation has a pervasive influence, and it is also appropriate to refer to “molecular driving forces” \(^14\). The key question that transcends the theoretical and empirical reach of scientific practice is: What is the ultimate reason for the existence of such stable, reliable, reproducible laws or regularities? As Stephen Hawking expressed it:

“Why does the universe go to the bother of existing? …Even if there is only one possible unified theory, it is just a set of rules and equations… What is it that breathes fire into the equations and makes a universe for them to describe?” \(^15\)

**Classical attributes of the Christian God**

The Biblical presentation of God in relationship to the Universe is mediated through a pre-scientific cosmology that is open to trans-cultural comprehension and sometimes modern mis-reading through wooden literalism. In Scripture, as emphasized by John Calvin, the divine Being *accommodates* the level of discussion and self-revelation to human creaturely limitations \(^16,17\). Cumulatively, in the Biblical text, divine attributes are revealed for acknowledgement and worship. These have been extensively evaluated in historical, systematic and philosophical theology. For centuries, it has been standard practice to consider such divine characteristics as either similar to or in contrast with ideas of the supreme from philosophy or science. This is exemplified in *A Companion to the Philosophy of Religion*, edited by Quinn and Taliaferro \(^18\). Here the Being, Omnipotence, Omniscience, Goodness, Simplicity, Eternity, Necessity, Incorporeality, Beauty, Omnipresence, Foreknowledge, Action, Immortality and Impassibility
of God are considered in successive chapters.

Article 1, of the Church of England 39 Articles, specifies the attributes of God:

“There is but one living and true God, everlasting, without body, parts, or passions; of infinite power, wisdom, and goodness; the Maker and Preserver of all things both visible and invisible. And in unity of this Godhead there be three Persons, of one substance, power, and eternity…”

With greater detail, the Westminster Confession of Faith states:

“There is but one only living and true God, who is infinite in being and perfection, a most pure spirit, invisible, without body, parts, or passions, immutable, immense, eternal, incomprehensible, almighty, most wise, most holy, most free, most absolute, working all things according to the counsel of his own immutable and most righteous will …”

Quite apart from such standard theological treatments, scientists writing for a broader audience have made connections between the laws of nature and the attributes of the Christian God.

Thus, Paul Davies identifies the following characteristics of such laws; they are:

- **universal** - valid at every place and time.
- **absolute** – do not depend upon the nature of the observer.
- **eternal** – grounded in the mathematical structures used to represent the world.
- **omnipotent** – nothing can be outside their scope.

He comments “These attributes share remarkable affinities with those ascribed to the Christian God”. 19

**Divine Attributes of Scientific Law**

Further considerations may be discussed in the sequence tabulated below.

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1. **Earthly and celestial regularities**

In Biblical thought, both terrestrial and celestial regularities are directly attributable to God’s covenant commitments and faithfulness. The regularity of the movements of the stars and seasons witness to the power and reliability of the Creator, according to texts such as *Job* 38: 31-35; *Jeremiah* 33:20-21, 25-26; *Genesis* 8: 22. Whereas Aristotelian thought postulated a radical divergence between celestial and terrestrial laws, where sub-lunar matter and the heavenly spheres obeyed different ‘physics’, their essential harmony was implicit in the biblical witness. As Bertrand Russell acknowledged, the scientific method is obliged to assume *uniformity of nature* in order to proceed, yet cannot itself substantiate this implicit assumption: “The principle itself cannot, without circularity, be inferred from observed uniformities, since it is required to justify any such inference”. 20

However, the key idea that *the law is divine* is not only older than the rise of modern science, but older than the rise of Christianity! Thus Marcus Tullius Cicero (106 - 43 BC), testifies from pre-Christian antiquity:

> “But can there be any person … who can consider the regular movements of the heavenly bodies, the prescribed courses of the stars, and see how all is linked and bound into a single system, and then deny that there is any conscious purpose in this and say that it is the work of chance?” 21

2. **Universal Applicability of Scientific Law**

What we have to deal with in scientific laws are regularities that are true *at all times* and *in all places*: *Quod semper, quod ubique.*22 Spatial and temporal ubiquity of scientific law is a reality underpinned by the omnipresence, eternity and immutability of God. Far from being mere truisms, the *translation-invariance* of fundamental laws are instances of symmetry principles that, since the researches of Emmy Noether (1882-1935), have been recognised to exhibit profound connections with conservation laws, in both classical and quantum physics. Temporal invariance: from now to then, implies *conservation of energy*. Spatial invariance: from here to there, implies *conservation of momentum*. Indeed, any conservation law has a symmetry principle underpinning it: rotational-invariance underlies conservation of angular momentum. Gauge-symmetry invariance underlies conservation of charge.
3. **Known only through effects.**

Scientific laws are generalisations from particular instances, where their effects are manifested. As Feynman stated, they are known “only to the eye of analysis” \(^\text{8}\), and through inference to the best explanation \(^\text{23}\). This parallels the Biblical presentation of the activity of the Spirit of God in creation and re-creation, as being like the wind: perceived only indirectly; [Genesis 1:2; Psalm 104:30; John 3:8].

4. **All powerful.**

The universe conforms to laws already there; laws that are discovered rather than invented. No event escapes their “hold” or dominion, *within a specified domain*. In classical language, the law is omnipotent. However, the domain does require to be specified. Thus, Newton’s laws are limited to low velocity and macroscopic-size approximations. Again, laws can be extended, as in the Navier-Stokes and Langevin equation extensions of Newton’s laws for applications in fluid mechanics and mesoscopic physics, respectively. And Newton’s laws are limiting cases for both relativistic and quantum mechanics. As formulated by scientists, laws are *descriptive*. But no laws could be formulated if there was not an underlying lawfulness that is *prescriptive*. So, behind the increasing approximations to reality involved in the human formulation of scientific laws, Theistic belief perceives the real or ultimate law-word of God.

This divine law-word may also bring forth miracles. Miracles may be unusual and striking, but they do not violate God’s law. They only violate some human expectations and guesses. And that is our problem, not God’s! However, behind this is the issue of the personal-relational being of God. Law itself, by human analogy, implies a *law-giver*. Someone – a personal agent - must formulate the law and enforce it, for it to be effective. This claim, controversial in a post-modern context, is strongly supported by the philosopher, Nancy Cartwright, who titles one of her papers: *No God, No laws*: “Without God, there cannot be laws of nature …” \(^\text{24}\)

5. **Rational and thus Personal.**

Scientists believe passionately in the rationality of scientific law. But rationality belongs to persons, not inorganic minerals or vegetation. And scientific research findings must be translatable into many human languages. So the lawful regularities of nature must be
expressible in linguistic and symbolic communication. But language, like rationality, belongs essentially to persons. Hence scientific law must flow from a personal source.

6. **Contain unfathomed depths.**

Increase of scientific understanding only leads to ever deeper questions, and often scientific advances or ‘research programmes’ are valued to the extent that they can generate fresh questions and perspectives. The world seems to be structured with an inexhaustible ‘fractal-like’ structural complexity. This parallels the theological concept of God’s incomprehensibility, meaning - not that God cannot be known; but that he can be known truly though not exhaustively. There is therefore parallel profundity and mystery in scientific discoveries that may only produce awe.

7. **Truthful: “Subtle but not malicious”.**

Numerous scientific biographies testify to the motivation of truth-seeking amongst practicing scientists. The painstaking nature of research demands that the quest is not fruitless. And the Biblical vision of God is that of ultimate truth and reliability. Moreover, scientists expect “nature” to be sometimes subtle, but never perverse, malicious or capricious – unlike the classical deities of Greece and Rome. The standard biography of Albert Einstein by Abraham Pais, is titled: *Subtle is the Lord*, expressing his life-long conviction. John Polkinghorne has strongly emphasized the truth-seeking kinship of science and theology in many books, notably on *Quantum Physics and Theology*.

8. **Beautiful: “fitting” / symmetrical.**

Christian theology shows us a God who is profoundly beautiful. And scientific laws, especially “deep” laws - showing profound inter-connections and subsuming previous laws as limiting cases - are also beautiful. Scientists have long sifted through possible hypotheses and models partly *via* criteria of beauty and simplicity.

Quite apart from the highly-publicised profundities of quantum mechanics, relativity and cosmology, astonishing insights have been found in the mesoscopic and nano-scale world. In particular there are unexpected consequences of classical mechanics in chaotic-dynamic regimes. Here, on the one hand, unexpected non-deterministic behaviour is apparent, whereas
on the other, hidden patterns of fractal-lawfulness are discovered in apparently chaotic systems \(^{33,34}\). New forms of matter (materials) have been discovered recently, with amazing properties. For example, the material \textit{graphene} was discovered at the University of Manchester by Andre Geim and Konstantin Novoselov. This has an optical transparency defined by the fine-structure constant (\textit{alpha}), the parameter that describes coupling between light and relativistic electrons \(^{35,36}\). This is traditionally associated with quantum electrodynamics rather than condensed matter physics.

\begin{center}
\textbf{History of Unification}
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\begin{itemize}
    \item Isaac Newton
    \item James Clerk Maxwell
    \item electric
    \item magnetic
    \item atoms
    \item electromagnetism
    \item Quantum mechanics
    \item Special relativity
    \item Quantum Electrodynamics
    \item \textit{Weak force}
    \item \textit{Strong force}
    \item \textit{Electroweak theory}
    \item \textit{Grand Unification?}
\end{itemize}

9. \textit{Suggest an underpinning Logos.}

As we have noted, the perception of an underlying mathematical structure or \textit{logos} to the universe is a theme running from the Stoics, Cicero\(^{21}\) and Philo up to scientists of the 21\textsuperscript{st} century. Reflective scientists perceive the mathematical expression and progressive unification of these laws and are driven to postulate their necessary existence antecedent to the genesis of space and time, matter and radiation \(^{27,29}\). Theism is a short but significant step further, grounding the scientific enterprise in the personal integrity of God.

In the first Christian century, the Fourth Evangelist responded to the speculations of his time with a striking revelation: that the Word (\textit{logos}) that created and sustains the universe is not
only a divine Person “with God,” but the very One who became incarnate: “the Word became flesh” [John 1:14].

10. Three-fold: plan, activity and power.

The Trinitarian being of God is a revealed truth, beyond the attainment of scientific research. However, the unity-in-diversity of the Holy Trinity coheres with the unity-in-diversity of the cosmos. Moving from a specifically Christian understanding of God to articulate a theology of nature, allows for second-order reflection upon the Trinitarian planning, acting and empowering God working above and within the created world. Especially as human-kind is viewed as image-bearers of God, an imitative pattern is apparent. Law involves a rationality that implies the coherence of a plan. Then the law comes to expression in particular instances and further there is a coherence and integration to the world that we express by the term: a universe.

Conclusion

In the scientific enterprise we are confronted by the reality of God himself, impinging upon our consciousness; a reality that we may respond to or suppress. The “book of nature” does indeed bear the signature of God. This is a conclusion anticipated two millennia ago [Romans 1: 20f], but which calls for contemporary analysis and response. We must heed the admonition of Dietrich Bonhoeffer:

"...how wrong it is to use God as a stop-gap for the incompleteness of our knowledge. If in fact the frontiers of knowledge are being pushed further and further back (and that is bound to be the case), then God is being pushed back with them, and is therefore continually in retreat. We are to find God in what we know, not in what we don't know. 37

References

   [personal.lse.ac.uk/cartwright/Papers/NoGodNoLaws.pdf]