Living with Simplicity and Complexity: From Social Comment and Scientific Epistemology to Christian Understanding

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ABSTRACT

This paper draws a distinction between simple and complex causality models and briefly examines their role in the social, natural, and spiritual dimensions of life. Complexity itself is multidimensional and may take the form of feedback complexity, statistical complexity, or quantum-mechanical complexity amongst others. Simple modelling has a very important role in initially establishing a pattern for understanding which can later be refined to accommodate additional data. When Jesus identified himself as the fulfilment of Old Testament prophecy, he was encouraging believers to move beyond the simple models that were important for their initial development and adopt models which allowed for deeper spiritual growth.

Keywords: feedback; critical point; simple and complex modelling; intricacy

INTRODUCTION

As I write this article Australian politicians are in election campaign mode promoting their vision for Australia and their capacity to manage the economy. Until a few months ago budget estimates determined by treasury predicted a small surplus in the Federal account. However, a subsequent blowout in the budget has left Australia with a debt of billions of dollars. How did treasury get the estimate so wrong? The fact is that predicting economic trends is somewhat like predicting the weather. There are not just one or two factors that determine the outcome but a multiplicity of factors. Because many of these factors are dependent or related factors, a change in any one factor can have a devastating effect on the outcome.

S.J. Goerner (1999) suggests that part of the problem facing the business of economic forecasting is the almost universal dependence by economists on a clockwork model of economics. By this she means that all attempts to associate economics with the kind of mathematical rigour that led Sir Isaac Newton to a deterministic vision of the universe are futile. This kind of rigour enabled one to predict the future and reconstruct the past, as one might do with a clock. Alvin Tofler, in his forward to a famous work by Prigogine and Stengers (1984, p.xiii) describes Newtonianism this way:

"Take that body of ideas that came together in the seventeenth and eighteenth centuries under the heading of 'classical science' or 'Newtonianism'. They pictured a world in which every event was determined by initial conditions that were, at least in principle, determinable with precision. It was a world in which chance played no part, in which all the pieces came together like cogs in a cosmic machine". While Newtonian physics required a stroke of genius, and we must never forget that, it nonetheless is a much simpler model than that required to describe the complexity of economics. Goerner (1999, p.95) compares simple and complex models as shown in Figure 1.

Goerner (1999) claims that economists are trying to understand a highly-entwined system like those shown in Figure 1(b) by using the clockwork tools and assumptions represented by the simple model shown in Figure 1(a).

However, the situation is not that simple: "Economics is where all the threads of human complexity come together with a vengeance. Belief systems, social patterns, and whether we can feed our families, are all rolled into one" (Goerner 1999, p.327). Mainzer (1997, p.1) uses the term "linear thinking" or "linear dynamics" to describe the model in Figure 1(a) and also characterises it as "the belief that the whole is the sum of its parts". Models like those in Figure 1(b) are characterised as "nonlinear complex systems" where the whole is not equal to the sum of its parts.

There are two fundamental features that characterise Figure 1(b): feedback and intricacy. These are sometimes described as the *web* of complex behaviour. These web-like features can give an economist insight not achievable with a simple model like that shown in Figure 1(a). Clearly, it is the play and counterplay of elements in the *web* which makes economic

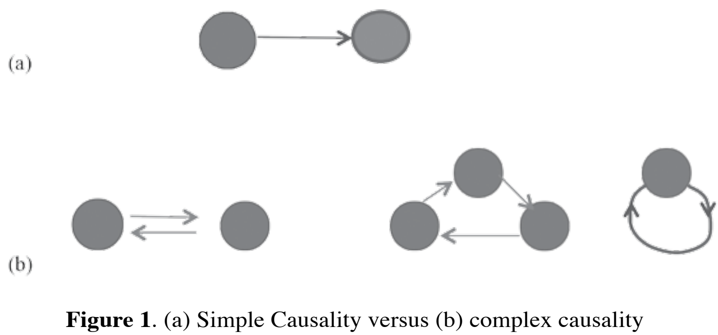

Figure 1. (a) Simple Causality versus (b) complex causality

forecasting so difficult. However, the complex *web* can reach a point, called by Buchanan (2000, pp.78-79) the *critical point*, where the system fluctuates between stability and instability. A slight variation in one of the elements in the *web* could swing the system over into instability, which is what happened in the 2008 Global Financial crisis. Of course, the system could swing the other way into stability. It all depends on the nature of the variation imposed on the system from without or from within.

In this paper I wish to firstly explore the nature of simple and complex behaviour a little more by addressing two health related phenomena; that of the relationship between diet and health and the problem of how to interpret diagnostics when it comes to the possible presence of cancer in the body. Secondly, I would like to deal with some of the splendid work on simple and complex behaviour that has been done in the fields of science and mathematics. This work will help to clarify concepts like *feedback*, *critical point* and introduce new concepts such as *chaos*. Finally, I wish to attempt an application of the ideas of simplicity and complexity to the origin of the Christian message as exemplified in the life and teachings of Jesus.

All complex systems of the kind focussed upon in this paper, whether they are social phenomena such as economic forecasting or natural phenomena like weather forecasting and the body's role in health and disease, depend upon the principles of *feedback* and *intricacy*. The more feedback pathways present, the more intricate the network of relationships and the more complex and unpredictable the behaviour. It should be borne in mind that the term, *complexity*, has now become fashionable in the scientific and popular literature and is understood to refer to the kind of complex behaviour about which we have been talking. However, there are complex systems of a different character which can only be described using statistics because of the very large number of components involved. For example, one can only access the *average* speed of gas molecules at a certain temperature and pressure and not the actual speed of each gas molecule partly because of the large number of gas molecules involved (typically of the order of 10^{23}). We will see how historically important simplified modelling has been in approaching an understanding of complex behaviour, whether we are dealing with the feedback kind, the statistical kind, or any other kind.

TWO HEALTH RELATED PHENOMENA

Relationship between diet and weight

Goerner sets the scene for this discussion as follows:

> To ordinary observers eating is related to weight gain. We all know this. It has been explained

> by a well-known scientific story. The body breaks food down to get energy. It uses the energy to think, run, breathe and otherwise keep going. Unfortunately unused energy is stored as fat and, since fat no longer symbolizes wealth, modern people want to get rid of it (Goerner 1999, p.91).

The energy content of food can be quantified in terms of calories or kilojoules by calorimetric studies. If one knew how many calories were consumed at a meal and how many calories were used by the body, then presumably one could calculate how much fat would be produced by the unused calories. The simple idea that more calories equals more fat and less calories equals less fat was very popular fifty years ago and is still thought to be somewhat important even today. This was typical of the model illustrated in Figure 1(a), that is, more calories leads to weight gain in a straight forward fashion.

However, the body cannot be treated like a simple machine. Goerner stipulates this as follows:

> What science has learned…is that the body is massively intertwined and the intertwining counts. One thing affects another which affects a third which turns around and affects the first. Understanding how threads blend and feed each other is central to understanding how the system works. Virtually nothing in this system has a simple constant effect-like more calories equals more fat. Indeed outcomes are often counterintuitive (Goerner 1999, p.94).

For example, if one consumes only protein it has been found that it is possible to consume huge numbers of calories and still lose weight at an alarming rate. Protein needs components from other kinds of foods in order to be digested and if these are missing the protein passes right through the body. It has also been found that grapefruit can speed up metabolism so that less food energy is stored as fat, meaning that one can eat more and still lose weight. Thus the simple adage that more calories equals more fat which in turn equals weight gain only applies under specially controlled conditions. The best advice in weight control for people who do not have a severe medical condition seems to be rather to eat a balanced, healthy diet and to exercise. This general advice seems most compatible with the complex system we know our body to be.

Diagnostics and Cancer

Malcolm Gladwell (2009) discusses simplicity and complexity from a slightly different point of view: that of the nature of problem solving. Suppose a male patient presents with a suspected prostate problem, having experienced difficulties associated with urination. In the past, under such a circumstance, "the doctor would do a rectal exam and feel for a lumpy tumour on the surface of the patient's prostate" (Gladwell 2009, p.169). If a lumpy tumour was found a clear diagnosis of prostate cancer could be given. However, diagnosing prostate cancer has undergone significant changes in the last twenty years or so. Gladwell describes the new procedure as follows:

> These days, though, we don't wait for patients to develop the symptoms of prostate cancer. Doctors now regularly test middle-aged men for elevated levels of PSA, a substance associated with prostate changes, and, if the results look problematic, they use ultrasound imaging to take a picture of the prostate. Then they perform a biopsy, removing tiny slices of the gland and examining the extracted tissue under a microscope. Much of that flood of information, however, is inconclusive: elevated levels of PSA don't always mean that you have cancer, and normal levels of PSA don't always mean that you don't – and, in any case, there's debate about what constitutes a normal PSA level. Nor is the biopsy definitive: because what a pathologist is looking for is early evidence of cancer – and in many cases merely something that might one day turn into cancer – two equally skilled pathologists can easily look at the same sample and disagree about whether there is any cancer present. Even if they do agree, they may disagree about the benefits of treatment, given that most prostate cancers grow so slowly that they never cause problems. The urologist is now charged with the task of making sense of a maze of unreliable and conflicting claims. He is no longer confirming the presence of a malignancy. He's predicting it, and the certainties of his predecessors have been replaced with outcomes that can only be said to be "highly probable" or "tentatively estimated" (Gladwell 2009, pp.169-170).

Gladwell (2009) suggests that the first situation described above relates to a *puzzle* whereas the prostate cancer diagnosis relates to a *mystery*. A problem that is a *puzzle* does not have enough information initially whereas a *mystery* develops because there is too much information. The solution to a *puzzle* often requires energy and persistence with a relatively simple outcome while the solution to a *mystery* requires experience and insight with a relatively complex outcome. Complexity is also endemic to science and mathematics.

SCIENCE AND MATHEMATICS

Mathematics can often provide insights into complex behaviour which are difficult to access by other means. In the discussion on economics in the introduction one of the key principles of complex behaviour was *feedback*. Feedback can be illustrated in a mathematical sense using an equation like:

$$x_{n+1} = Ax_n (1-x_n)^2 \qquad (1)$$

The idea is that once a value of x_{n+1} is calculated by substituting a value of x for a given value of A, the result is fed back into the right hand side of the equation to generate another value of x. This process is repeated a large number of times until no change in the values of x occurs. The process is known as *iteration*.

Scott (1991, pp. 20-25) discusses the interesting mathematics here using equation (1) above as an example. As the value of A is increased gradually from 3 to about 5.3 the stationary values of x obtained by iteration are single and unique until A = 4. For example, when A = 3 and say a value of x equal to 0.5 is substituted into equation (1) and a process of iteration commenced, eventually a stable value of x = 0.4226497..... is obtained. If the same process is investigated when A = 4.5 then the iteration ultimately leads to two stable values being obtained, 0.33333.... and 0.66666..... This is known as a period-2 oscillation because a number is repeated every second iteration. When A = 5 the iteration ultimately leads to four stable values. The four stable values when A = 5.121122... are 0.758685..., 0.226254...., 0.693671.., and 0.33333.... and these are known as period-4 values since they are repeated after every fourth iteration. The transition from period-1 to period-2 to period-4 is known as period doubling.

This period doubling continues until a position is reached where no stable values are obtained and the values obtained from the iteration procedure become unpredictable, that is, a region of *chaos* is reached. There is an oc-

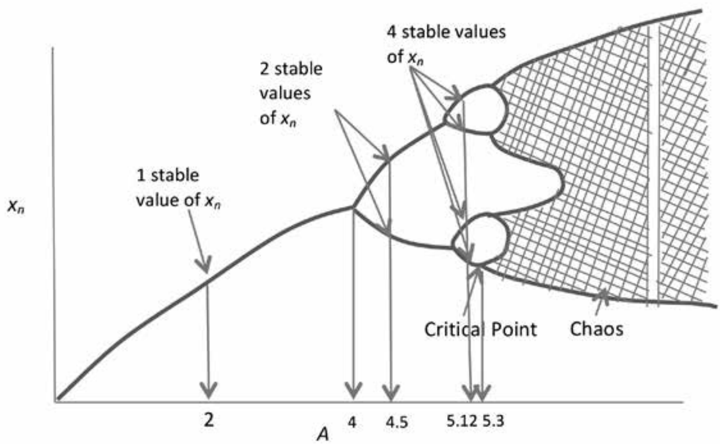

Figure 2. A plot of x_n against A showing successive period doublings and the onset of chaos for equation (1).

casional return to stable values but then a descent into chaos again. This is illustrated in Figure 2 where x_n is plotted against A for equation (1).

Note that the critical point in Figure 2 is the point of balance between unstable values (or *chaos*) and stable values. It turns out that equation (1) has also been found to represent a chemical feedback process known as cubic autocatalysis. It is cubic because the highest power of x_n in equation (1) is 3 and it is autocatalytic because more of one reactant species is produced than is used. Some autocatalytic processes are known as quadratic autocatalysis and can be described by equation (2) below.

$$x_{n+1} = Ax_n (1\text{-}x_n) \qquad (2)$$

It is quadratic because the highest power of x_n is 2. An example is the well-known Belousov-Zhabotinsky (BZ) reaction.

$BrO_3^- + HBrO_2 + 3H^+ + 2M_{red} \rightarrow 2HBrO_2 + 2M_{ox} + H_2O$

Note how more $HBrO_2$ is produced than is used and how the product $HBrO_2$ can feed back into the reaction system to enhance its speed. Equation (2) behaves just like equation (1) except the stable values obtained on gradually increasing A are different. The behavior shown in Figure (2) is also exhibited by a completely different process to autocatalysis, namely, pendulum motion which obeys the following feedback equation:

$$x_{n+1} = A \sin (\pi x_n) \qquad (3)$$

What is interesting is that as A is increased for equations (1), (2) and (3), the behaviour of the ratio, $(A_n - A_{n-1})/(A_{n+1} - A_n)$ converges. Values of this ratio for equation (1) are shown in Table 1 after Scott (1991, p.22). The values converge to the number 4.66920..... known as the Feigenbaum

Table 1. Geometric convergence in relation to period doubling for Equation (1).

Period	A	$(A_n - A_{n-1})/(A_{n+1} - A_n)$
1	4.000 0	
2	5.000 0	4.253 7
4	5.235 09	4.577 39
8	5.286 449	4.649 14
16	5.297 496	4.673 01
32	5.299 86	4.653 54
64	5.300 368	4.668 29
128	5.300 477	4.669 01
256	5.300 500	

number. When this is repeated for other *feedback* equations like equations (2) and (3) exactly the same number is obtained, 4.66920.... even though the period stable values for equations (2) and (3) are different to those shown above for equation (1). So three different equations possess this underlying unity. One could say then that pendulum motion, quadratic autocatalysis, and cubic autocatalysis possess a unity which is most clearly evident in the feedback mathematics representing each process.

Ian Stewart (1995) describes how a regularly dripping tap goes through a series of period doubling steps as the drip speed slowly increases. Thus the pattern goes from drip-drip-drip-drip to drip-DRIP-drip-DRIP to drip-DRIP-*drip-DRIP* and so on until no sequence of drops repeats exactly the same pattern which is the point of *chaos*. The dripping tap also features the Feigenbaum number shown above. In Stewart's (1995, p.122) terms: "To be precise, the extra amount by which you need to turn on the tap decreases by a factor of 4.669 (the Feigenbaum number) at each doubling of the period". So physical and chemical systems display this amazing mixture of unity amidst complexity. It is this fact that has led some scholars to refer to the phenomenon as *order out of chaos* (Prigogine & Stengers 1984). *Chaos* has this special meaning in mathematics and is not to be equated with the popular image of chaos.

Some chemical concepts such as the *chemical bond* take on the characteristics of Gladwell's (2009) *puzzle* and *mystery* classifications for cancer diagnosis as previously mentioned. Here the complexity is not of the feedback kind but of the quantum-mechanical kind. The simple notion of the *chemical bond* as a physical link between atoms proved valuable in determining atomic weights and the determination of chemical structure (the puzzle) simply involved determining which atoms were linked together. With the discovery of the electron in 1897 by J.J. Thomson and the application of quantum mechanics in the twentieth century towards exploring the role of the electron in chemical bonding, the nature of the chemical bond has presented itself as a *mystery* even to the well-informed. According to some chemists a chemical bond is "not a real measureable object and it cannot be clearly defined" (Gillespie & Robinson 2007, p. 97). Charles Coulson, Professor of Theoretical Physics at the University of London and later Rouse Ball Professor of Mathematics at the University of Oxford, concluded: "Sometimes it seems to me that a bond between two atoms has become so real, so tangible, so friendly, that I can almost see it. Then I awake with a little shock, for a chemical bond is not a real thing. It does not exist. No one has ever seen one. No one ever can. It is a figment of our own imagination" (Coulson 1953, pp.20-21). Statements of this nature remind us just how complex the scientifically conditioned concept of the chemical bond has become. Thus even in chemistry more sophisticated information does not always lead to greater clarity. Chemistry educators face the challenging task of balancing simplicity and complexity when faced with the task of explaining chemical behaviour. Much like the medical insight required to deal with the mystery of cancer diagnosis, chemistry educators require cognitive and chemical insights when confronting the complexity or mystery of modern chemistry.

CHRISTIAN UNDERSTANDING

It is interesting to ponder why Jesus had such a profound influence on the direction of Western civilization given his relatively short life on earth, his humble Jewish origins, and his crucifixion as a criminal. According to the Gospels Jesus dedicated significant time to challenging the thinking patterns of his disciples, the Jewish leaders, and the general populace. One such example is found in John's Gospel where Jesus confronts a man who had been blind from birth (John 9). In John 9:2 is recorded a question asked by the disciples: "Rabbi, who sinned, this man or his parents that he was born blind?" Here the disciples were using the simple causality model in Figure 1(a): personal sin leads to sickness or parental sin leads to sickness in offspring. Jesus challenges their thinking when he says (Peterson 1993, p.207): "You're asking the wrong question. You're looking for someone to blame. There is no such cause-effect here. Look instead for what God can do". The Gospels record that a life focussed on God led to healing in many cases, as with the blind man, but there were other instances where personal deliverance from death or disease did not occur, as in the circumstance of John the Baptist. It would appear that a relationship with Jesus was more profound and complex than a simple [faith $\rightarrow$ deliverance] model.

The Pentateuch, comprising the first five books of the Old Testament, held a central place in the thinking and spiritual life of the devout Jew. In the book of Deuteronomy a simple cause-effect proposition was presented to the people before they entered the promise land: "If you faithfully obey the commands I am giving you today….. then I will send rain on your land in its season…so that you may gather in your grain, new wine and oil.. . If, however, you worship other gods, then the Lord's anger will burn against you and he will shut the heavens so that it will not rain and the ground will yield no produce" (Deuteronomy 11: 13-17). But Jesus wanted to transform obedience from an external phenomenon to an internal one mediated through people's spiritual, emotional and physical needs. For example, in Matthew's Gospel (Matthew 5: 21-22), Jesus says, "You have heard that it was said of people long ago, Do not murder,…., But I tell you that anyone who is angry with his brother will be subject to judgment". And again in Matthew 5: 27-28, "You have heard that it was said, Do not commit adultery. But I tell you that anyone who looks at a woman lustfully has already committed adultery with her in his heart". This kind of obedience was more challenging and complex than the simple alignment with a written code. While obedience to a written code may have required effort, the kind of obedience Jesus was talking about required spiritual insight.

Jesus' orientation to the sabbath commandment and sanctuary laws also went well beyond the written code. When his disciples were challenged by the Pharisees for picking ears of corn on the sabbath, Jesus directed the critics' attention to the case of the fugitive David and his men who ate consecrated bread from the house of God when they were hungry. The focus here was directed away from the written code to human need. While Jesus endorsed the written code, he nonetheless gave precedence to the human condition and declared himself to be Lord of the sabbath (Matthew 12:8). Such a claim by Jesus as well as declaring his authority to forgive sins excited great opposition amongst the people. So while people were attracted to many aspects of Jesus' ministry, they were also puzzled by many of his claims. How could someone who declared himself to be the 'light of the world', 'the water of life', and the 'living bread', allow himself to be taken captive by the ruling power (most likely the temple police) and suffer the death of a criminal? Mark Noll expresses the complexity of Jesus' person this way:

> He appears on earth and appears to be human, but he is also said to possess-and to bestow-the glory of the one true God. Mysteries, conundrums, paradoxes, and apparent contradictions abound in this strand of biblical revelation: How could an apparently ordinary human born to an apparently ordinary Galilean woman be said to partake of what the one true God enjoyed as his sole prerogative? If Jesus somehow did embody the divine glory, why was it recorded that he seemed to lack the prerogatives of deity-that he needed to eat and drink, that he became weary, that he professed not to know everything, and (most counterintuitively) that he could die? (Noll 2011, p.7).

When great scientists such as Isaac Newton and Joseph Priestley confronted these conundrums they came down on the side of what Noll (2011, p.15) calls "the powerful logic of monotheism". This correlated strongly with the logic of Newton's mathematics and the supremacy given to reason and logic in the 18th century enlightenment. This is why Newton and Priestley could not accept the trinity doctrine. When early church councils such as the council of Nicea (325AD), the council of Constantinople (381AD), and the council of Chalcedon (451AD) met to deal with the issue of the nature of Christ, they decided in favour of the credibility of the *experience* of the community of faith even though they could not explain how full divinity and full humanity could coexist in the person of Jesus. Noll (2011, p.21) claims that, "The great gift of Chalcedon to Christian scholarship is to show how basic for the truth of all things is the consubstantiality between the divine and the human, a consubstantiality that is resolved (but not fully explained) in Jesus Christ". The application of such a complex view to the human condition has not proved to be an easy task.

One of the reasons why the task has proved difficult has been our human unease associated with living with the tension of counterintuitive ideas. Newtonian mechanics seems much easier to live with than chaotic dynamics. Gabriel Fackre (1995, p.485) claims that, "the assertion of mutually exclusive propositions-humanity and divinity in one person-never satisfies human reason, which is always interested in relaxing the tension in one direction or the other". This explains why C. Everett Koop, surgeon general of the United States in the 1980's, received strong criticism for what was considered his inconsistency in dealing with the issue of abortion on the one hand and his attitudes to HIV/Aids on the other. He was, " blasted from the left for his strong personal stance against abortion on demand. But later came under fire from the right for insisting on humane treatment for those who suffered from HIV/Aids" (Noll 2011, p.55). Koop's response to this situation is recorded by Philip Yancey (2001, p.197) as follows: "What bothered me most…was the lack of scholarship by Christians-as if they felt that by leaning on a theological principle they didn't have to be very accurate with the facts". Holding the facts of human experience and need in tension with important theological principles and allowing the human situation to take precedence in this case proved a difficult task for many.

The problem we face is a human disposition not to embrace complexity when a situation demands it. This is not to deny a role for simplicity where appropriate but whether we are looking seriously at nature, spirituality or human existence, at the universe or an individual human being, there appears to be a strange mixture of complexity and simplicity. In the 1970's N.K.Clifford described one form of the Christian mind as follows:

> The Evangelical Protestant mind has never relished complexity. Indeed its crusading genius, whether in religion or politics, has always tended toward an over-simplification of issues and the substitution of inspiration and zeal for critical analysis and serious reflection. The limitations of such a mind-set were less apparent in the relative simplicity of a rural frontier soci-

> ety (Clifford 1973, p.323).

Noll (1994, p.13) gives an example of this phenomenon in relation to the Gulf war of 1991. Within weeks of the outbreak of war Christian commentators viewed the conflict as a direct fulfillment of bible prophecy heralding the approaching end of the world. There appeared to be no careful analyses of the complexities of Middle Eastern culture and little attention seemed to be given to the human needs of the Iraqi people. Instead there was a concerted effort put into debatable biblical passages and wide speculation about the significance of the conflict.

In contrast, a Chalcedonian orientation to human events and wide scholarship in many fields, including science, might make a difference in contemporary epistemology. This,

> puts point of view into conflict with information coming from outside the self; in basic physics with investigations of light as waves or particles; in historical interpretations that find two or more plausible explanations for the same event; in theories of human behaviour stressing sometimes free choice and sometimes determined action; or in biology confronted with the randomness of evolutionary change and the complexity of advanced organisms (Noll 2011, p.49).

Placing intellectual activity in the framework of the nature and work of Christ, Noll comes to the following challenging conclusion:

> If, then, the fact of substitution is a primordial human reality, the seriousness of sin is the essential human dilemma, the divine initiative in salvation is the basis for human hope, the narrative movement of grace is the primary shape for human knowledge, and the complex nature of reality is the inescapable challenge for human understanding-then the human study of the world should reflect these realities (Noll 2011, pp.70-71).

CONCLUSION

It is important to model complexity when attempting to understand it and the most useful approach has been to start the process with simple models. In chemistry, simple models are often those that *idealize* a situation by ignoring possible anomalies until, at least, model construction has commenced (De Berg 2006; Giere 1988). When Antoine Lavoisier [1743-1794] and Joseph Priestley [1733-1804] were both attempting to determine the constitution of air, they approached the task rather differently. Lavoisier initially focussed on only two constituents; one that supported combustion (oxygen) and one that did not support combustion (nitrogen). This simple classification proved fortuitous since nitrogen and oxygen are the two main constituents of our atmosphere (just over 99% by volume). It so happens that this approach also proved helpful in the discovery of the noble gas, argon, since the density of nitrogen in air, being slightly greater than the density of nitrogen obtained from nitrogen oxides, suggested the presence of another gas in the atmosphere (Rayleigh 1894; Raleigh & Ramsay 1895).

In comparison, Priestley tried to account for every complexity as he progressed and, given the fact that some of his testing samples were contaminated, was not able to make the kind of progress that accompanied a simpler approach. In relation to Priestley, Brock (2008, p.78) points out that, "he was unable to 'idealize' chemical reactions and see them in a simple form… . When science idealizes, it leaves anomalies for later followers to add explanations such as 'side reactions', the presence of impurities, altered physical conditions etc. But, as examples from the past repeatedly show…, simplification is a necessary feature of scientific progress and the first step towards advancing knowledge".

When gas behaviour was first modelled according to kinetic theory, it was assumed that, for a cubic box container, one-third of the molecules were travelling parallel to one set of opposite sides and at the same speed as each other. It was possible to show that this simple model was consistent with Boyle's Law (pressures and volumes are in inverse proportion to each other). Later, James Clerk Maxwell [1831-1879] was able to show that more properties could be explained if one allowed the gas molecules to move at random and at different speeds to each other. Computer models trying to explain and predict the outcome of feedback complexity have to be continually refined from simpler versions. Similarly, many of the models of moral behaviour outlined in the Old Testament needed to be refined when Jesus came on the scene but the point is that moral behaviour needed simple modelling before more complex models could make sense.

Whether one is studying economics, medicine, science, mathematics, theology, psychology or sociology, one is confronted with the issue of complexity, although the presence of simplicity can be a welcome relief. This has been a major theme of this paper. If all phenomena in our world followed a simplified pattern as shown in Figure 1(a), we would not benefit from the fruitfulness of diversity. From a human point of view simplicity breeds dogmatism and control whilst complexity breeds humility and freedom, even though simple models are often needed in the early stages of a process. This appears to be a central teaching of Jesus and one that remains our constant challenge.

QUESTIONS

1. There is much discussion in our media about climate change and how it might impact our world over the next few decades. Discuss whether you would

classify the climate change issue in terms of the simple or complex causality model. Try to endorse your claim with solid evidence.

2. When the New Testament church decided not to impose the everlasting covenant of circumcision on new Gentile believers (Acts 15), one could argue that they were disobeying a clear directive of Scripture (Genesis 17). How would you respond to such an argument?

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