

Climate Change Apocalypse

By the same author:

Divine Weather

About the author:

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Since leaving the Met Office he has retained an active interest in meteorology, lecturing on the weather and publishing further scientific work. As a Christian (he is a lay preacher in the Methodist Church), his first book combined scientific and biblical knowledge to examine how weather events, illustrations and concepts were used in the Bible as a remarkably effective communications media for people across the millennia. The book proposed several new interpretations of biblical texts and was widely discussed.

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Jack McGinnigle



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List of Abbreviations

AD	Anno Domini	kph	Kilometres per hour
BC	Before Christ	LPG	Liquid Petroleum Gas
CFCs	Chlorofluorocarbons	mph	Miles per hour
DegC	Degrees Centigrade or Celsius (temperature measurement)	Met	Meteorological
DegF	Degrees Fahrenheit (temperature measurement)	mm	Millimetres
DegN	Degrees North (position, latitude)	m	Metres
DegS	Degrees South (position, latitude)	m/s	Metres per second
EU	The European Union	sq.km	Square kilometres (area)
GDP	Gross Domestic Production	SSW	Sudden Stratospheric Warming
in	Inches	UK	The United Kingdom of Great Britain and Northern Ireland
IPCC	The Intergovernmental Panel on Climate Change	UN	The United Nations
ITCZ	The 'Inter-tropical Convergence Zone'	UNEP	The United Nations Environment Programme
GHP	Geothermal Heat Pump	USA	The United States of America
kt	Nautical miles per hour	UV	Ultraviolet (radiation)
		WMO	The World Meteorological Organisation

Introduction

This book has been written for the people of the Christian World, especially those who for many years have lived a comfortable and affluent lifestyle, with all their essential needs met. The 20th century saw many advances in science and technology which delivered significant improvement and efficiency to the world, particularly to those who lived in the more developed countries. Today, the rapidly growing technical advances of the 21st century continue the process. It is true that the negative effects of the world economic downturn of 2007 and the following years has affected everyone across the world. Even so, many Christian World citizens who live in affluence have been able to maintain their comfortable lives, especially when their lives are compared to those across the world who live a poor and precarious existence.

The Christian World comprises those areas of our planet where Christianity is the dominant or main religion. In geographical terms, it is very extensive and occupies large parts of the world. The major Christian World regions include the whole of North America (Canada and the United States of America), Central America and the Caribbean, all of South America, South Africa and much of Central Africa, the whole of Europe, much of Russia, Northwest China, Australia and New Zealand. In addition, a number of smaller Christian areas are to be found in India, the Philippines (both of these places have many millions of Christians) and other parts of Asia and the western Pacific. The adherents of Christianity comprise over 33% of the world

population (Encyclopaedia Britannica 2005 survey), making Christianity the largest religion in the world.

Of course not everyone who lives in the Christian World is a follower of Christianity. Roman Catholic regions (mainly Central and South America along with some of the central and southern European countries) have the highest proportion of Christian followers within their total populations; in these areas, 90% or more are positively identified as Christians. Proportions in the protestant Christian areas (North America, the rest of Europe, Australia, New Zealand and Central/South Africa) tend to be somewhat lower, with over 75% of the populations designated Christians, while orthodox (Eastern) Christianity has a rather lower proportion still, perhaps nearer to 50%. These estimates were suggested by data published in the 'Adherents.com' website which assembles and publishes religious statistics obtained from sources all over the world.

For the purposes of this book, it is important to stress that it does not matter whether you the reader are a follower of Christianity or not, because all who are residents of the Christian World are required to conform to the laws and moral standards of whatever Christian country they occupy. In Christian countries, the laws and moral standards have been developed from the Christian religion; in other words, they have their basis in the Bible, the book of Christianity.

If you are a Christian, you will already be aware of this and are likely to be familiar with the biblical links which are presented throughout this book. On the other hand, if you have little or no contact with Christianity at present, it is still highly likely that you will recognise at least some of the biblical illustrations, either from earlier memory or from the fact that a great many biblical teachings and texts have been absorbed into everyday language and thought across the Christian World.

The book presents and explains the predictions of weather and climate change which flow from observations of a warming world. It shows how there are other mechanisms involved too. It seeks explanations, in particular whether human beings are responsible

for the dangers that are predicted. It examines actions to solve the problem. While doing this, the book moves from science to economics, ethics and beyond. Throughout, the focus remains steadfastly upon the individual. The suggested thoughts and actions set out at the end of the book are not for governments or scientific authorities; they are for us, personally. Each one of us.

Every book which deals with a developing scientific reality will include facts and figures to support the arguments. There are many facts in this book. Facts specifically about weather, climate and global warming as well as energy usage realities in a changing and developing world. There are facts about the reasons why all these facts keep changing and what implications flow from these changes. There are also facts about the decisions and actions of humanity when faced with the dilemmas that have been presented to them particularly over the last two or three decades. Finally, because the focus is upon people of the Christian World, the facts extend into the morals and ethics of that particular world in the knowledge that the Bible has been a fundamental influence upon such matters.

Of figures there are deliberately far fewer and the reason for this is simple. This is not intended to be a scientific book giving detailed numerical data from the most recent studies. The figures attached to the whole complex arena that contains global warming, weather and climate change continue to be in a constant state of flux, frequently updated by later measurements, studies and interpretations; even historical data is subject to variation of opinion within the scientific community. Therefore numerical data (figures) are only presented in this book when they are judged essential to argument or understanding.

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Could We Control The Weather?

Weather control is a subject with a long history. People have wanted to control the weather for many thousands of years – that is, change it to suit their own purposes and desires. Humanity has tried many ways in the past; there have been many earnest appeals to deities, sacrifices offered, special rituals, rain dances (or stop-the-rain dances!), chants, prayers and incantations. All facets of the weather have been involved. As well as the desire for rain or lack of it, there have been earnest requests for wind or calm, sunshine or cloudiness, heat or cold, dryness or humidity, etc. All this has happened throughout history and indeed still happens today to some degree.

The opportunity to be rather more proactive came in the earlier part of the last century when there was a growing scientific understanding of weather. The late 19th century had been a time of exploration into the physics of weather but it took several more decades before fundamental weather processes were understood in a reasonably coordinated way. By this time, it was recognised that large weather systems contain vast amounts of energy. To change these systems in any way implied the input of similar quantities of

energy and this was known to be an impossibility. Even relatively small weather events like individual rain showers involve a great deal of energy.

On the other hand, studies into the formation of precipitation suggested there might be a way to influence natural rainfall. Water is a fundamental of life and the delivery or prevention of rain at a particular time and place was recognised as a way to help areas that were afflicted by too much or too little rainfall. Certainly, in harsh and extreme weather environments, rainfall control of this type would be of great benefit to the life of the population in general. All these considerations led to the concept, theory and practice of a system of possible rainfall control. This came to be known as ‘cloud seeding’.

Rainfall control by ‘cloud seeding’

Cloud seeding was conceived in the USA in the 1930s. In the following decades, experiments were pursued with enthusiasm (not only in the USA) but results were far from conclusive. In those days, military interest provided a significant impetus for research. It was thought that weather control could give great battlefield advantage. For instance the enemy could be bogged down in continuous torrential rain and greatly weakened; or perhaps subjected to drought conditions that would generate huge logistical problems to meet their army’s water requirements.

It is a fact that research projects seen to have military advantages are often resourced generously and progressed with great vigour. However since 1977, the UN has outlawed the use of weather modification as a military weapon. Since then, the focus of all such work has been largely on agriculture or general population support.

What is ‘cloud seeding’?

Cloud seeding is a procedure which attempts to change the natural rainfall that may happen in a particular weather event. In theory, the procedure may be applied to a range of rainfall situations; it may be applied to everything from small individual shower clouds to the cloud formations of larger weather systems. Many people as-

sociate cloud seeding only with boosting rainfall but it may also be used to suppress rainfall. In the latter case, the rain is 'encouraged' to fall before it arrives over the target area. Also, the same theory of cloud seeding may be applied in an attempt to change the character of the precipitation, for instance to prevent hail from falling on a particular area. There are some places in the world where violent hailstones are a frequent occurrence which causes a great deal of agricultural crop damage.

Of course, to increase the rainfall of a very dry arid area of the world would be of great benefit to the local population. For some people who live with frequent drought conditions, the daily task of acquiring sufficient water is a major part of their lives and a great drain on their personal energy resources.

How is cloud seeding done?

There are two basic types of cloud seeding and the choice of which type to use is dependent upon the temperature structure of the clouds to be treated. The temperature structure of a cloud allows it to be categorised either as a 'warm' cloud or a 'cold' cloud. Because air pressure decreases with height, air expands as it rises further from the surface of the Earth. Such expansion requires energy and that energy is provided from the heat in the air, which cools as a result.

When cloud forms in the atmosphere, it also becomes colder with height. If the cooling within the cloud never takes the temperature below freezing point (Zero DegC), then that cloud is categorised as a 'warm' cloud. This type of cloud is commonplace in the Tropical and Sub-tropical regions of the world but may also occur in mid-latitude regions during the summer season. If however the cooling within the cloud takes the temperature of its upper levels below freezing point, then the cloud becomes a 'cold' cloud. This categorisation is not only important for cloud seeding but for meteorology in general because the precipitation formation mechanisms within warm and cold clouds are significantly different.

If the cloud is a 'warm' cloud (all its water droplets are above freezing-point), cloud seeding consists of spraying hygroscopic

particles into it; these are particles that absorb water, such as salt. In all clouds, condensation can only occur if there is a sufficient supply of 'condensation nuclei' because saturated water vapour needs something to condense upon. That 'something' may be sea salt, dust, sand or carbon particles, all of which have been drawn into the cloud by air rising from the Earth's surface. In many clouds, there is a shortfall of condensation nuclei and some saturated water vapour is unable to condense. In meteorology, this water vapour is referred to as being 'supersaturated'.

So the idea behind this type of cloud seeding is to provide extra condensation nuclei material so that all the saturated and supersaturated water vapour will be able to condense and form water droplets (clouds). Rain occurs when the water droplets collide and merge to form bigger water drops. When these large water drops become too heavy to be supported by the upcurrents in the cloud, they fall out as rain. The theory is that the seeded cloud will be changed to contain more and bigger water droplets, so the rain that falls from the cloud will be heavier and last longer.

However many clouds are not 'warm' clouds because they extend above the freezing level (the height where the temperature drops below zero DegC) and are defined as 'cold' clouds. Above the freezing level, cold clouds are formed partly of ice crystals but there will also be some water droplets that have stayed in the liquid water state despite being below freezing point. These water droplets are defined as 'supercooled'; this means that they are ready to freeze but they cannot do so until they encountered suitable particles around which to freeze. What they require are particles known as 'freezing nuclei'.

When the supercooled water droplets encounter already-formed ice crystals, they immediately freeze upon them, making these ice crystals bigger. When the ice crystals are too heavy to be supported by the upcurrents in the cloud, they fall out as precipitation, usually (but not always) melting to water drops as they fall into the warmer air nearer the surface of the Earth. This is by far the most common natural rain-making process.

The cloud seeding procedure for cold clouds is to spray particles into the cloud to act as an additional supply of freezing nuclei. The particles are designed to mimic the structure of ice. Common materials used for this purpose are solid carbon dioxide (dry ice) or silver iodide. At the appropriate time and place within the cloud, the introduction of these particles should in theory result in more freezing, bigger ice crystals and heavier precipitation, delivering in due course a greater amount of rain to the ground below.

The usual method of both types of cloud seeding is by aircraft. At the appropriate location, the seeding material is either released from the aircraft in a stream or it may be fired as a particle-filled explosive shell that is detonated shortly after. An alternative method is to fire the explosive shell from the ground and detonate it at an appropriate height. This method is obviously less flexible when compared to aircraft delivery but both methods have been used in the past. Obviously, the seeding material has to be placed within the cloud at the right place for there to be any chance of success.

Does it work?

Seeding warm and cold clouds has the potential to work successfully in certain highly specific circumstances. However many long-term tests have not indicated success with any sort of reliability and many experiments have been judged a failure. Some scientists have pointed out that the atmosphere is far too complex a structure to respond reliably to such simplistic hit-and-miss operations.

Today, there are still a number of nations who experiment with cloud seeding. Israel has claimed success with a 15% rainfall enhancement in a dry area of its country; Mexico continues with experiments and also claims some success. Texas, in the USA, has conducted many experiments over the years; the results are variable and disputed routinely.

Research is still carried out to some extent in other countries, mainly those who have large areas of land that suffer from a lack of rain. The specialist companies who carry out seeding operations are still awarded contracts by other states and authorities in various

parts of the world. For obvious reasons, there tend to be claims of success from these commercial sources. Certainly, any claim of success based on a single or small number of events is invalid. Most people would be highly suspicious of a single sequence of 'rain dance performed - rain arrived - total success achieved' The words 'cloud seeding' could be substituted for 'rain dance'!

So the extent of the influence of cloud seeding is very limited. Seeding done within a particular cloud can only affect that cloud. A series of seeding operations may affect a system of clouds but the chance of each cloud being poised to react similarly is remote. This is why cloud seeding has had so little positive effect over its long history.

Are there other ways to change the weather deliberately?

It is tempting to say 'no' because the amount of energy needed to alter any other element of weather is so enormous. However there is one way that has been attempted down the ages. This does not change the weather in the sense that cloud seeding tries to do but it attempts to change the weather conditions at a particular local area for a limited period of time. It is the deployment and continuing generation of a smoke screen; this has often been used to achieve military advantage.

Obviously, thick smoke will have a great effect upon those subjected to it. They will not be able to see their adversaries and this will put them in great danger. It may affect the operation of their equipment and cause it and them to become technologically impaired. Perhaps more importantly, it may affect their health. It may incapacitate or even kill. However the smoke screen can only be maintained if the general weather permits. A changing wind would blow the smoke away – or even blow it back on those who are generating it. A calm wind will result in the smoke particles sinking to the ground.

Even so, it has to be admitted that a large and persistent smoke screen does indeed alter the local weather to some limited degree. This has been seen in the deliberate or accidental burning of oil

wells, for instance; the ignited oil provides a continuous supply of dense, choking and obscuring smoke that spreads out to affect very large areas of ground downwind. Large forest fires have the same effect and their deliberate firing is not unknown. Probably the largest scale obscuration comes from volcanic action and this can certainly affect the weather over a large area.

Aside from the direct effects already discussed, the general weather within a smoke polluted zone is likely to be colder because the sun is obscured. Technically, therefore, the deliberate generation of a dense and persistent smoke screen is a method of changing the weather to some degree, although its effect is very limited and highly unreliable.

Weather control in the Bible

God and the weather

The Bible leaves us in no doubt that God is in charge of the weather and able to control it. There are many occasions in the Bible when God is reported to use elements of weather to achieve particular purposes. This ranges from huge, violent storms sent to bring retribution and punishment through to his gentle and loving delivery of life-giving rain or balmy sunshine to his favoured people; there is also his personal use of cloud as an obscuring agent during the times he wishes to communicate directly with people.

- *Wind, rain, storms and more...* the Old Testament book of 1 Samuel provides a typical example: The Israelites were disobedient to God and Samuel (an important early prophet) was determined to teach them a lesson and bring them to their senses. At the time of wheat harvest, when the weather is normally dry and settled, Samuel gathered the people together and then asked God to send ‘thunder and rain’ upon them. This was delivered immediately. Unsurprisingly, the people were convinced and returned to worship God - and of course Samuel’s reputation was greatly enhanced, too.¹

1 1 Samuel 12:16-18

An even more extreme example is given in the book of Ezekiel: Gog (Prince of the land of Magog) had attacked Israel with a huge army. God defended his people by waging war upon the attackers. He sent extreme elements of weather to afflict them, grievous storms including wind, rain, hail, lightning and thunder; in addition there were earthquakes, plagues and other illnesses. As a result, Gog and his army were defeated and Israel was saved from destruction.¹

- *Drought:* God also used his control of weather to produce drought conditions in a number of places in the Old Testament. The book of Haggai records how the people of Israel returned to Judah after their Babylonian exile. They were instructed by God to rebuild the Temple in Jerusalem. However the Israelites ignored this instruction in favour of building their own houses and farms. God then ‘encouraged’ them to start work on the Temple by imposing a drought upon them; this, of course, caused many problems including the loss of all their crops. The Bible records that the people decided to start work on the Temple immediately!²
- *Cloud:* God is first reported to use cloud as an obscuring agent in the book of Exodus when he was guiding the Israelites on their journey from Egypt to the ‘Promised Land’. In this case, God was obscured by a ‘pillar of cloud’ during the day which became a ‘pillar of fire’ at night.³ The ‘obscuring cloud’ device is used many more times in Exodus. God descended to Mount Sinai in a cloud when Moses received the Ten Commandments.⁴ God concealed in clouds was also referred to in the Psalms and in Nehemiah.⁵

There is similar use of cloud in the New Testament. For instance, Matthew’s gospel tells of the events of the Transfiguration of Jesus, when he was affirmed as God’s son. Jesus had taken three

1 Ezekiel 38:17-23

2 Haggai 1:7-11

3 Exodus 13:21

4 Exodus 19:16

5 Psalm 78:14, Nehemiah 9:12

of his disciples to the top of a high mountain. The text reads: ‘...a bright cloud enveloped them and a voice from the cloud said: “This is my Son, who I love; with him I am well pleased. Listen to him!”’¹

Jesus and weather

- *Calming the storm*: there are two occasions recorded in the New Testament when Jesus demonstrated his control of weather. The first is known as the ‘Calming of the Storm.’ Jesus and his disciples were crossing the Sea of Galilee in a small open boat. Jesus was asleep when a sudden squall brought very strong winds which soon whipped up the sea into large waves. The disciples struggled to control the small boat and became increasingly afraid that it would sink. They woke Jesus in great fear. The culmination of the story is his dramatic command to the wind and waves: ‘Be quiet, be still!’ There was instant obedience.²

The other occasion is during the very well-known ‘Walking on the Water’ account. Here, Jesus was not with the disciples in the boat. A very strong wind started to blow and the waves were rising dangerously. The disciples were again struggling with the small boat and were in great fear. Then Jesus came to them, walking on the water. When he climbed into the boat, the wind and waves were stilled. This time, there was no command spoken to the wind and waves but his presence in the boat imposed an immediate calm.³

- *Use of cloud*: in the New Testament, Jesus referred to the return of the ‘Son of Man’ – a term he often used to describe himself: ‘... they will see the Son of Man coming in (or on) a cloud in power and great glory.’⁴ (However, when this is mentioned in the book of Revelation, the text is: ‘...and seated on the cloud was one like a son of man...’⁵). In Revelation, there

1 Matthew 17:5

2 Mark 4:35-41

3 Mark 6:45-51

4 Luke 21:27

5 Revelation 14:14

is a clear description of a man's figure seated ON (upon) the cloud. While the Greek word used in the Matthew text may be translated in English as 'in' or 'on', the Greek word used in Revelation means 'on' or 'upon' only.

In fact this is an example of a very clever use of imagery description. Throughout the Bible, God is always described as being concealed in (within) the cloud. Examples of this were given in the section 'God and the weather' above. This device is always employed because it is impossible for anyone to picture God. However, Jesus can be pictured as a man, even if we cannot know exactly what he looked like. In this sort of image, we can still present him as a visible human figure sitting upon the clouds. This is a fine example of the communication of spiritual ideas by the use of weather imagery.

Broad-scale weather control today: changing the climate

The relationship between weather and climate

There is a clear difference between 'weather' and 'climate'. Both these words appear in the IPCC warnings and there is a need to recognise the difference. 'Weather' may be defined as the atmospheric conditions that exist in the open air. Although this will commonly refer to the conditions at or near the ground, it can also be the weather conditions in the atmosphere at considerable height. Both commercial and military aircraft are interested in the weather conditions that will affect them at their cruising levels.

Basically, 'weather' is a combination of the conditions which we find anytime we go outside into the free air. People have many terms to describe the weather they find, using words such as 'cold, windy, cloudy, raining, humid, etc.'. Scientific meteorology defines weather conditions by making observations that are recorded in various scientific scales; temperature is recorded in Degrees Celsius or Degrees Fahrenheit (DegC, DegF), wind speed in knots (kt) or metres per second (m/s), rainfall in inches (in) or millimetres (mm), etc. However assessed or measured, the result is an observation of the 'weather' at that place and at that time.

‘Climate’ is the general weather experienced by an area or region. In most regions of the world, there are specific seasons of weather (summer, winter, etc.). People define their climate by their community experience over an extended period. However, climate is highly related to weather, since it is the accumulation of individual weather events over a long period of time.

People describe climate in the same terms as weather, although there are some additional descriptions like ‘temperate’, ‘maritime’ and ‘continental’. Scientific meteorology defines climate by averaging its weather observation measurements; the climate values of one year are often contrasted with long-term averages of climate to determine whether the year was ‘cold’, ‘average’ or ‘wet’, etc.

So climate and weather are very closely related. Climate is a perception of weather that can be constructed from a record of weather events. Climate is a product of weather; it does not exist without it.¹

Imposing a different climate

Theoretically, there are three ways to change the climate of an area. The first is to change individual weather events. Done consistently, these changed events would cumulate over an extended period to impose a different climate. Earlier in this chapter, the discussion of cloud seeding showed that the alteration of rainfall events is difficult, unreliable and likely to be unsuccessful. Apart from the use of smoke (which is even more unreliable than cloud seeding), there are no other ways of changing individual weather events.

The second way is to deliberately alter the vegetation cover of the land, although this will need to be done over an extensive area if it is to be effective in a climate sense. Changing to a rich cover of growing plants – everything from thick grassland to dense forest – will cause heat and moisture to be added to the atmosphere, especially if irrigation is installed. The heating and moistening of the

1 Appendix B: Climate and weather, see p.209

air will generate uplift, cloud and precipitation to some degree and this will contribute to the determination of the climate in that area. Alternatively, removing vegetation (deforestation, land clearing for agriculture) will have the opposite effect, with cloud and rainfall reduced. Severe land clearance will impose a barren climate upon the land, even desertification.

The third way would be to alter the broad-scale weather patterns from previous norms. This would alter the behaviour of weather systems and change the climate. The formation and behaviour of broad-scale weather patterns is very complex. Such patterns cover huge areas of the globe and involve a great amount of energy. Mankind has never *deliberately* affected such weather patterns but current warnings of climate change show that inadvertent changes are possible. This will be discussed in more detail in Chapter 7.

Achieving reversion to a previous climate

In a real sense, this is the ultimate weather control issue which is assuming greater importance as the current situation becomes clearer. It is already apparent that global warming has substantially altered the sea ice distributions of polar and high latitude regions. This, and the general rise in sea temperature, has caused very low-lying areas across the world to be flooded; in addition, the apparently small land and sea temperature changes have already affected plant and animal life significantly.

Reversion of these effects could only be achieved by the restoration of colder sea temperatures and the reformation of ice at the Poles and elsewhere. Total reversion seems unlikely in the short term but a slowing of global warming should retard further changes. Current efforts concentrate upon slowing the global warming trend, mainly by concentrating upon reducing carbon emissions.

Global warming certainly has the potential to affect and alter weather patterns but this is a much more difficult matter to assess. If climates were altered in this way, it is certain that reversion to previous weather or climate patterns would be a most difficult, even impossible task.

God's people and weather control

Does God want his people to be able to control the weather or the climate of an area? The Bible may suggest an answer. The Old Testament is full of accounts of the people's disobedience to God's will and how he becomes angry and sometimes despairing when this happens. The people are guilty of a whole range of truly negative actions (sins) including selfishness, dishonesty, cruelty, weakness and many others.

However, the Bible establishes the worst sin of humanity early in the book of Genesis, namely any attempt to achieve equality with God. Essentially, this is what happened in the symbolism of the Garden of Eden when the forbidden fruit was eaten. Perhaps this is even more clearly illustrated by the Tower of Babel story,¹ when the people were not only being disobedient to the will of God but had returned to the sinful ambition of achieving equality with him.

In the story, God had noted that his people were multiplying satisfactorily and now he wanted them to scatter and occupy the whole Earth. Unfortunately, this was not what the people wanted! They all shared the same language and culture; they were leading comfortable lives and were well-settled in a pleasant land. So they decided to ignore God and live together in one large magnificent city which they set about building.

Then they made the situation much worse. They decided to build a very high tower in the centre of their city, a huge tower which would 'reach to the heavens', thus putting them on a level with God and achieving the equality they sought. Since God would then have no authority over them, they could do what they liked – and this was their goal. In particular, it would mean that they could all stay together forever in their pleasant lifestyle. The story tells how God observed what was happening and took swift and decisive action. He confused their single language so that they

1 Genesis 11:1-8

could no longer communicate with each other and then physically scattered them all over the Earth.

So the symbolism of the Tower of Babel suggests that God will not permit humankind to 'go their own way' to the ultimate extent. On the other hand, we know that God created mankind to have free will. Fortunately, it is possible to reconcile these two statements. Perhaps the analogy of a small child and his or her parents will illustrate this reconciliation.

The parents want the child to develop optimally; for this to happen, he or she must have freedom (free will) to discover and develop. But the free will cannot extend into actions of danger which have the potential to injure or kill, e.g. playing with a sharp knife. If the parents see that the child's actions lead to such dangers, they will prevent that particular action. Although this will frustrate the child, it is clearly an action of love and nurture.

Similarly, God wishes his people to have free will and to be intelligent and inventive; indeed, this is the way the world advances and develops. By allowing free will, God demonstrates his great love and nurture for his people. However he will not allow actions which pose extreme danger for them. If people actually achieved 'equality' with God, the father and child relationship would be destroyed and separation would occur. God knows that the loss of his love and nurture would undoubtedly be a very great danger for his people (children). In love, he is not willing to allow this to happen.

So God is willing to allow his people to acquire the scientific knowledge needed to protect themselves and the world. In many ways, this is already happening with global warming, weather and climate change; there has already been a great deal of study and inventiveness applied to the analyses and solutions of these particular problems. Perhaps even more importantly, it is increasingly appreciated that problems which are truly global require truly global solutions. This in turn needs truly global cooperation between the nations of the world. It also means personal engagement, support and compassion for others, in a global sense. All encapsulated in three words: 'love one another....'