

Conservation and environmental management – 3,500 years ago

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CONCERN FOR the state of our environment, and especially the conservation of wildlife, might be thought to be a relatively new concept. Certainly, in the author's student days, research into such matters in Britain was the provenance of the Department of Scientific and Industrial Research, and it was not until the 1960s that there was formed the Natural Environment Research Council. It seems that it then began to be discovered that we live in an 'environment', natural or otherwise. A little later, several government departments were amalgamated to form the 'Department of the Environment'.

A similar awakening was evident with respect to nature conservation. There had been concern in the nineteenth century, largely as a result of the excesses of 'sportsmen' who had been responsible for the wholesale slaughter of wildlife, especially birds. The obsession with fur and feathers in fashion and for military uniforms caused untold suffering and slaughter, and led to the establishment of protesting societies. After the Second World War, a government conservation body, the Nature Conservancy, was established to create and manage nature reserves and to protect endangered species.

Today 'Green Issues' are considered almost daily in the media. Yet very few appreciate that the crises we are facing could have been avoided had the principles and laws laid down in God's Word, some 3,500 years ago, been heeded.

Environmental responsibility

As man was created in God's image, and given dominion over creation, there must have been, by implication, also the imparting of responsibility. Very early on, Adam was given the task of naming all the creatures presented to him (Gen. 2:19). Adam was the first taxonomist! Today, ecologists have come to recognise the importance of developing a comprehensive inventory of species in order to be able to assess 'biodiversity'. This is an old concept under a new and fashionable name. It has long been rec-

ognised that a rich and varied community of plants and animals is associated with natural, unstressed and unpolluted environments, in contrast to the paucity of species to be found in habitats that have been degraded by the influence of human activity. For example, during a short walk in the countryside we may easily see a score or more of different bird species, while a similar walk through a city-centre will perhaps reveal only sparrows, starlings and the ubiquitous pigeons.

Other incidents recorded in Genesis illustrate the principle of responsibility. In Genesis 6 we have the construction of the Ark for the preservation of animal life as well as human. During the yearlong confinement within the Ark, Noah and his family would have had to attend to the needs of the animals. God had required that all the appropriate food should be loaded in order to sustain all the life on board. The covenant of the rainbow included the animal creation too, as the record indicates: "And the bow shall be in the cloud; and I will look upon it, that I may remember the everlasting covenant between God and every living creature of *all flesh* that is upon the earth" (9:16).

Conservation laws in the Pentateuch

In Deuteronomy 4 emphasis is laid on the special characteristics of God's Law, in that it differed greatly from the laws of the surrounding nations and was self-evidently superior in every respect. The contrast was so great that, had Israel kept these laws, the surrounding nations would have admired and commented favourably upon their privileged position:

"Behold, I have taught you statutes and judgments, even as the LORD my God commanded me, that ye should do so in the land whither ye go to possess it. Keep therefore and do them; for this is your wisdom and your understanding in the sight of the nations, which shall hear all these statutes, and say, Surely this great nation is a wise and understanding people. For what nation is there so great, who

hath God so nigh unto them, as the LORD our God is in all things that we call upon Him for? And what nation is there so great, that hath statutes and judgments so righteous as all this law, which I set before you this day? Only take heed to thyself, and . . . teach them thy sons, and thy sons' sons" (vv. 5-9).

Species conservation

The oldest nature conservation legislation is thus to be found in Deuteronomy. Two passages establish the principles of conservation. The first relates to the conservation of species:

"If a bird's nest chance to be before thee in the way in any tree, or on the ground, whether they be young ones, or eggs, and the dam sitting upon the young, or upon the eggs, thou shalt not take the dam with the young; but thou shalt in any wise let the dam go, and take the young to thee; that it may be well with thee, and that thou mayest prolong thy days" (22:6,7).

There are two aspects of this commandment which are particularly relevant in demonstrating Divine wisdom. By insisting that the parent bird is not taken with eggs there would be an opportunity for the bird to lay another clutch of eggs that season, or at least it would survive to breed the following year. This principle is the basis of the many birds acts included in British legislation, starting with the *Preservation of Seabirds Act* in 1869 and culminating in the 1954 *Protection of Birds Act*, in which all the many previous acts were consolidated. Even more important, perhaps, was the notion that in adopting this attitude to the preservation of wildlife Israel would enjoy a sense of wellbeing and prolonged life. The essential concept must be that by inculcating a responsible attitude to individual species they would preserve the ecosystem as a whole. We now understand the importance of the complex interrelationships of living things, and how easily the dynamic 'balance of nature' can be upset.

The other conservation law in Deuteronomy applies to trees:

"When thou shalt besiege a city a long time, in making war against it to take it, thou shalt not destroy the trees thereof by forcing an axe against them: for thou mayest eat of them, and thou shalt not cut them down (for the tree of the field is man's life) to employ them in the siege: only the trees which thou knowest that they be not trees for meat, thou shalt

destroy and cut them down; and thou shalt build bulwarks against the city that maketh war with thee, until it be subdued" (20:19,20).

The importance of trees in the maintenance of the environment is now appreciated. Many plants and animals which have become extinct as a result of the destruction of tropical rainforests are believed to have had potential benefits for mankind, especially with regard to pharmaceutical products, which are now irrevocably lost. Felling trees and grubbing up hedgerows has led to soil erosion, the formation of dust bowls, especially in North America, and the virtual extinction of many species that depend on trees and hedgerows for their survival. It is also recognised that forests have important effects on the local microclimate and control the rate of runoff from rain and snow melt.

The phrase, "for the tree of the field is man's life", is particularly apt, in view of our modern appreciation of the significance of forests, although other versions have a different rendering. It has been suggested that the contrast is being made between the long time which is needed for the growth of a tree, that is, a human lifetime, and the short time in which it may be cut down, that is, in a matter of minutes. However, many modern translations (for example, RSV, NEB, NIV) lay stress on the fact that there is no purpose in laying siege to the trees as well as to the people.

The injunction in Deuteronomy is directed against the needless felling of trees. In the conquest of the Land, Israel had to discriminate carefully between economically valuable and less valuable trees. It would be folly to destroy trees simply to gain an easier surrender of a city, especially the trees growing in the vicinity, since they were likely to be those of economic value. If, on the other hand, the trees were not valuable then they could be used if this was essential for success.

Once more God was setting down an important principle, the need to consider the longer-term consequences of one's actions. Many of man's present problems result from short-sighted expediency.

Sustainable development

Today the importance of 'sustainability' is recognised, that is, the utilisation of natural resources at a renewable rate, a rate which will not compromise the needs of future generations. A similar principle is inculcated in the Law:

“And when ye shall come into the land, and shall have planted all manner of trees for food, then ye shall count the fruit thereof as uncircumcised: three years shall it be as uncircumcised unto you: it shall not be eaten of. But in the fourth year all the fruit thereof shall be holy to praise the LORD withal. And in the fifth year shall ye eat of the fruit thereof, that it may yield unto you the increase thereof: I am the LORD your God” (Lev. 19:23-25).

Israel was taught to allow the tree to establish itself properly before it was cropped. No doubt subsequent treatment would include pruning, perhaps even root pruning, as in the Lord’s parable (Lk. 13:8).

Soil conservation was effected by allowing the land to rest every seventh year:

“And six years thou shalt sow thy land, and shalt gather in the fruits thereof: but the seventh year thou shalt let it rest and lie still; that the poor of thy people may eat: and what they leave the beasts of the field shall eat. In like manner thou shalt deal with thy vineyard, and with thy oliveyard” (Ex. 23:10,11); “Six years thou shalt sow thy field, and six years thou shalt prune thy vineyard, and gather in the fruit thereof; but in the seventh year shall be a sabbath of rest unto the land, a sabbath for the LORD: thou shalt neither sow thy field, nor prune thy vineyard. That which groweth of its own accord of thy harvest thou shalt not reap, neither gather the grapes of thy vine undressed: for it is a year of rest unto the land. And the sabbath of the land shall be meat for you; for thee, and for thy servant, and for thy maid, and for thy hired servant, and for thy stranger that sojourneth with thee, and for thy cattle, and for the beast that are in thy land, shall all the increase thereof be meat” (Lev. 25:3-7).

It is interesting to note that the principle of allowing the land to remain fallow at intervals of seven years was given even before Israel entered into the Promised Land. It contrasts with the procedure adopted in Egypt where the land was cropped every year. When Joseph interpreted Pharaoh’s dream, the seven good years were to be followed by seven lean years: the cropping was continuous (Gen. 41:29,30). Of course, the fertility of the Egyptian soil was normally refreshed annually from silt deposited after the inundation of the Nile.

In many countries soil fertility has been degraded by intensive cultivation and the repeated

application of synthetic fertilisers. The problem is compounded when the same crop is grown year after year. Economic pressures generated by intense profit motives have sometimes produced disasters. In the European Community overproduction has led to the need for regulation by quotas and the designation of ‘set-aside’ land for which the farmer is paid *not* to grow any crops! Similar economic pressures on those who raise livestock have led to intensive overgrazing, especially in uplands. Many farmers admit that this short-term expedient, undertaken in order to survive imminent potential bankruptcy, will lead to irreversible degradation of pastures.

The Law of Moses discouraged the adoption of greed-motivated, short-term, intensive agriculture by the introduction of the ‘gleaning principle’, in which a farmer must not harvest every last part of his crop but, having taken a reasonable amount, leave something for the poor, the orphans and the widows:

“When thou cuttest down thine harvest in thy field, and hast forgot a sheaf in the field, thou shalt not go again to fetch it: it shall be for the stranger, for the fatherless, and for the widow: that the LORD thy God may bless thee in all the work of thine hands. When thou beatest thine olive tree, thou shalt not go over the boughs again: it shall be for the stranger, for the fatherless, and for the widow. When thou gatherest the grapes of thy vineyard, thou shalt not glean it afterward: it shall be for the stranger, for the fatherless, and for the widow” (Deut. 24:19-21).

Incidentally, this injunction not only inculcated a proper appreciation of God’s bounty in giving Israel the necessities for life, but also reminded them of their responsibilities. It provided social security benefits and pensions!

Conclusion

The scientific basis of the precepts of the Law of Moses has only been understood relatively recently. The medical provisions regarding personal and public hygiene, preventative medicine, sanitation, dietary regulations, food hygiene, housing and similar matters were all way ahead of those of the contemporary surrounding nations, and only began to be realised in Europe in the nineteenth century. Modern concepts regarding animal welfare are not really recent innovations but were incumbent upon Israel over three thousand years ago.



Intensively cultivated land in northern Israel, with Mount Hermon behind. Modern Israeli agriculture, like most agriculture in the developed world, is based upon the intensive use of fertilisers, pesticides, etc., resulting in growing environmental problems.



Figs, vines and olives planted on newly terraced slopes at Neot Kedumim, Israel's Biblical Landscape Reserve. This is intended to demonstrate how these areas were cultivated in ancient times, a system of agriculture friendly to the environment, especially when carried out under the provisions of God's Law.

The present concern for the welfare of threatened species and other natural resources, evident among many nations of the world, coupled with the rapid degradation of our environment, with its potential toxic and climatic consequences, highlights the folly of ignoring revealed Divine wisdom.

God will not, of course, allow this process to reach an irreparable stage, but will intervene

(Rev. 11:18). The solution to current environmental problems will only be realised when the Kingdom is established and creation is released to reveal its true potential. Then the deserts will blossom (Isa. 35:1), handfuls of corn will be harvested from previously barren wastes (Ps. 72:16), and men will dwell safely in their own farmsteads, each sitting under his own vine and his own fig tree (Mic. 4:4).

Composite materials— an example of Divine design

Peter Ormiston

IN ITS WIDEST sense a composite material is one which employs two or more materials, usually quite different in nature, to obtain special properties. These properties may be absent from the constituent materials, or may be unusable because of the form or shape in which those materials are available. For example, glass fibres are very strong and stiff, but can only be produced with these properties in the form of thin fibres. However, they can be used to reinforce a plastic such as polyester. The result is a bulk material that can be used for structural applications such as bridge-building or car construction. In such a material the plastic that surrounds and supports the fibres is referred to as the *matrix*.

However, the composite materials which man has devised pale into insignificance when compared with those which occur all around us in creation. These natural materials make up the living tissue of plants and animals, although perhaps we have not thought of these as being composites.

Even man-made composite materials are not new. Well over 3,000 years ago the Israelites were forced to reinforce mud (the matrix) with straw (the fibres) for Egyptian construction projects: "Ye shall no more give the people straw to make brick, as heretofore: let them go and gather straw for themselves" (Ex. 5:7). The straw made the mud bricks stronger and more durable, by a process of crack deflection. As cracks are formed and propagate (travel and grow) through the mud they are diverted and often stopped by the many straw fibres. It is very unlikely that the Egyptians thought of this idea without any help; they

would have observed the fibrous structures that occur in a multitude of plants. The combination of fibres and matrices can provide strength and stiffness, as in wood (and the straw-reinforced bricks), or strength and flexibility, as in tender twigs and plant fronds. The latter construction is copied, at least in part, in man-made textiles.

This copying or mimicking of structures and control processes from 'nature' has become thoroughly organised in recent times. A descriptive name, *biomimetics*, has been coined for the practice.¹ The word 'nature' is placed in single quotes because, sadly, it is often used not simply to describe the created world around us, but also to obscure the fact that such things are God-made rather than man-made. Man happily acknowledges that his own designs are the products of an intelligent mind, but abandons his logic when it is clear that the even more elegant designs which he copies result from a far greater intelligence, that of the Creator Himself.

It is the purpose of this article to consider briefly one area of the Creator's wonderful handiwork. Natural composite materials provide many examples of the intricate interplay of complex designs, which could not possibly have resulted from chance processes.

Properties of fibre composites

Composite materials, both natural and man-made, require certain properties in order to function effectively. In this article, most attention

1. See "Imitating nature's designs", *The Testimony*, Sept. 1998, p. 346.