

Ancient Ecologies and the Biblical Perspective

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The word "ecology" was first coined in 1873¹ but men in ancient times were at least partially aware of "the inter-relationships of living things to one another and their surrounding environment."² Today we understand much more clearly the delicate balances involved in the relationships between nature and man's activities. But even now we do not always foresee all the results of constructing a project like the Aswan Dam in Egypt.³

Although we may comprehend the causes and processes, we are still unable to do much more than the ancients to prevent such natural disasters as droughts and locust plagues. In recent years disastrous droughts caused by the failure of the summer monsoon rains affected twenty million people in the Sahel region of Africa.⁴

Periods of drought kill the predators of locusts and grasshoppers, and also leave cracks in the ground which provide good nesting areas. If such periods are followed by moist seasons, conditions are ripe for the formation of plagues of such swarming insects. In the summer of 1978, 33 locust swarms were reported over Ethiopia and 17 over Somalia, some covering up to 40 square miles.⁵ At the same time huge infestations of grasshoppers have been reported attacking the fields in Colorado, Kansas, Nebraska, Oklahoma, and Texas.⁶ Such swarms of hoppers, so thick that they obstructed the view of the sun, devastated Kansas in 1873 and in 1919.⁷

In the following study I examine how the peoples of the ancient world viewed such calamities. I compare the view-

points of the pagans and those of Jews and Christians, noting both similarities and differences. Such a study raises questions which I consider in the conclusion.

THE CLIMATE OF THE MEDITERRANEAN

The lands of the Bible include for the Old Testament period Palestine, Phoenicia (Lebanon), Syria, Egypt, and Mesopotamia (Iraq); for the New Testament period we have in addition the lands to which the Gospel was carried: Anatolia (Turkey), Greece, and Italy. Almost all of these areas border the Mediterranean Sea and are affected by the climatic conditions associated with it with, of course, local variations. The chief features of the common "Mediterranean" climate are: (1) a prolonged summer drought, (2) heavy winter rains, and (3) a relatively small range of temperatures.⁸ Throughout the entire area, with few exceptions, rain water was precious and was conserved by cisterns.⁹

Mesopotamia

The land "between the rivers," the Tigris and the Euphrates, was irrigated by two of the four streams associated with the Garden of Eden (Gen. 2:14). At the northern edge of the Fertile Crescent sufficient rain fell on the "hilly flanks" of the Zagros Mountains, which divide the alluvial plains of Mesopotamia from the upland plateau of Iran, to make this area Robert J. Braidwood's candidate for the first area to develop the Neolithic "revolution" of agriculture.¹⁰ As for the central area of Mesopotamia itself, M. A. Beek observes:

Because of the dryness of the climate the soil of Mesopotamia is hard and nearly impenetrable. Consequently, when the heavy rainfall in the northern areas coincides with the melting of the snow in the Taurus and Zagros Mountains, the rivers wreak destruction. . . .¹¹

The Mesopotamian floods are not only destructive but they are highly unpredictable. They come in the spring

rather than in the summer when the water is most needed. Especially swift are the flood waters of the Tigris, whose Akkadian name *Idiglat* (cf. Hebrew *Hiddeqel*, Gen. 2:14) means "Arrow." The people of Mesopotamia, however, were able to use the waters of the rivers through canals for irrigation purposes, though this demanded the combined efforts of communities as constant attention was required to maintain the dikes and canals.¹² In times of war, the canals would be neglected and the weeds would grow in them. In his lamentation over Ur, a poet cried out: "Your river which had been made fit for the *magur*-boats-in its midst the . . . -plant grows."¹³

Egypt

In striking contrast to Mesopotamia is the felicitous situation of Egypt. The statement of Herodotus that Egypt was "the gift of the Nile" still holds true today. Fed by the tropical rains of central Africa, the White Nile and the Blue Nile from Ethiopia join together near Khartoum to flood with such regularity that the Egyptians were able to regulate their calendars by the annual floods.¹⁴ The flooding also came at the most propitious time for agriculture. The four months of inundation (June to September) were called *Akhet* "Flood," followed by *Perit* "Coming Forth" (October to January) and by *Shemou* "Deficiency" (February to May).¹⁵

The Egyptians could tell how high the Nile would rise by a Nilometer which they had carved at the island of Elephantine near Aswan. A low Nile would mean that not enough fields would be irrigated and that famine would ensue. On the other hand, a Nile that was too high might mean the destruction of dikes. Ordinarily Egypt had a sufficient surplus to supply starving bedouins from Palestine such as the biblical patriarchs (cf. Gen. 12:10 ff., 26:1 ff., 43:1 ff.).¹⁶ Down through the period of the Roman Empire Egypt served as the most important "bread basket" of the Mediterranean.

By the 14th cent. B.C. the Egyptians had invented the *shaduf*, a weighted lever to lift the water. The *saqiya*, the animal-drawn water wheel, was introduced only in Persian or Ptolemaic times (5th to 3rd cent. B.C.).¹⁷ Archimedes (287-212 B.C.) is credited with the invention of the hydraulic screw.

Apart from the coastal region, rain rarely falls in Egypt. According to H. Kees:

At the present day Alexandria enjoys annually about 25 to 30 days of rain with a rainfall of about 8 inches, while Cairo and its environs has on the average, mostly in January 1 ½ to 2 inches. In the upper Nile valley on the other hand for as far back as our knowledge reaches, rain has always been an exceptional phenomenon, the accompaniment of occasional storms and less a blessing than a catastrophe, associated in people's minds with the dangerous powers of the desert.¹⁸

Greece

Greece enjoys a typically Mediterranean climate with a rainless summer from the middle of May to the middle of September. The stormy weather of winter generally brought sailing and fighting to a halt. As the prevailing winds are from the west, three times as much rain falls in the west as falls in the east, for example, in Corcyra (Corfu) as compared to Athens.¹⁹

In 1966 Rhys Carpenter offered a climatological explanation for the fall of the Mycenaean kingdoms c. 1200 B.C. in place of the traditional view of a Dorian invasion.²⁰ His theory was criticized by E. Wright, who pointed out that pollen samples from northwestern Greece from this period indicated no drought.²¹ But climatologists have shown from records for 1955 that the climatic pattern which Carpenter posited, with an extensive drought for the Peloponnese but not for northwest Greece or for Athens, is quite possible.²² Whether or not such a drought caused the Mycenaean decline is still a moot point.²³ It is more likely that a combination of factors, including drought and

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famine followed by the dislocations of such groups as the Dorians and the Sea Peoples, caused the Mycenaean collapse and the beginning of the Greek Dark Age.²⁴

Palestine.²⁵*Meteorological Factors.*

Several factors produce the characteristic weather of Palestine. The country lies between 33' 15" and 31' 15" N as far south as Beersheba, which is the same latitude as the southernmost section of California. It is therefore on the northern margin of the subtropical region. The presence of the Mediterranean to the west, and the deserts to the south and the east play a major role, as does the great variety of topographical features.

The following regional generalizations may be made: (1) temperature decreases with height and increases with depth below sea level. (2) The temperature ranges increase as one moves away from the moderating influence of the sea. (3) Rain tends to decrease from north to south. (4) Rain decreases from west to east. (5) Rain increases as heights are encountered. (6) As the prevailing moisture bearing winds are from the west, rain precipitates on the western slopes, leaving the eastern slopes in a "rain shadow."²⁶

*Winds.*²⁷

During the summer Palestine lies midway between a monsoon low over the Persian Gulf and a high pressure area in the Atlantic. It therefore enjoys steady NW Etesian winds and a sunny almost rainless summer, as there are no frontal storms of cold air clashing with warm air masses. In the winter, however, cold maritime air pushes south into the Mediterranean where it clashes with warm tropical air masses, creating wet and stormy weather (Job 37:9).²⁸

In the winter season the moisture bearing winds from the W and SW precipitate rains as they encounter colder land and air masses (I Kgs. 18:44; Lk. 12:54). But during the summer the drier NW winds encounter only warm land and air masses and do not precipitate any rain. The winds do, however, mitigate the heat of the day. The westerly winds reach the Transjordanian plateau about 3 p.m. These regular winds are used for the winnowing of grain (Ps. 1:4)

even to this day.

North winds are relatively rare. There are two types. Chiefly in October a cold dry wind seeps over the mountain barriers from Central Asia (Sirach 43:20). In March a surge of polar air across the Balkans may produce heavy rains (Prov. 25:23).

The scorching desert wind (*sirocco, khamsin*) from the E, SE, or S was and still is a dreaded phenomenon. It strikes for three to four days in the transitional seasons. A sirocco will produce the hottest temperatures of the year, often 20 degrees above the average (Jer. 4: 11). What makes matters worse is the fact that it is an exceedingly dry wind, dropping relative humidity by 30-40%, fraying tempers, and debilitating energies. The air is filled with a fine yellowish dust which veils the sun and reduces visibility. The siroccos of the spring are particularly devastating, withering the winter vegetation in a few hours (Ps. 103:15-16; Isa. 40:6-8; Ezk. 17:10, 19:12; Hos. 13:15; Jon. 4:8). The fullest fury of the sirocco is experienced in the Transjordan, the Negev, and the Rift Valley. In coastal regions the sirocco winds may pour down the slopes at 60 miles per hour, shattering ships in the harbors (Ps. 48:7; Ezk. 27:26).

*Precipitation.*²⁹

The Rainy Season. The exact commencement of the rainy season is not predictable but in general the rainy season runs from mid-October to mid-May.³⁰ The rainy season includes, but is also more extensive than our winter months (cf. Song 2:11). In this season three to four days of heavy rain alternate with dry days during which cold desert winds blow from the east.³¹

The Early and the Latter Rains. The Bible refers repeatedly to the early (RSV "autumn") and the latter (RSV "spring") rains (Deut. 11:14; Jer. 5:24; Joel 2:23), giving the average reader the impression that rains fall only at the beginning and the end of the rainy season. As a matter of fact most of the heaviest rains fall in the middle of the season (Lev. 26:4; Ezra 10:9, 13). These initial and final

rains are stressed because they are crucial for agriculture. The early rains come in October before plowing and sowing. The latter rains fall in March and April and are needed to make the grain swell for a good harvest (Hos. 6:3; Zech. 10:1).

Drought and Unseasonable Rains. If the high pressure areas over Europe and Asia in the north link up with the high pressures over Africa and Arabia, this blocks cyclonic storms from arriving through the trough of low pressure in the Mediterranean. In this case rain is sometimes delayed until as late as December; in some years rain amounts to only 50 to 75% of the average. A catastrophic drought that lasted 3 1/2 years is recorded for Elijah's day (I Kgs. 17:1; Lk. 4:25; Jas. 5:17. Cf. Deut. 28:23-24; I Kgs. 8:35; Jer. 14:3-6).³²

If the thermal difference between the warm and cold air masses is not great, rainless clouds float by (Prov. 25:14; Jude 12). On rare occasions a late surge of cold Atlantic air penetrates into the area of Palestine in the summer, bringing unseasonable rain (I Sam. 12:17; Prov. 26:1).

The Distribution of Precipitation. As Amos 4:7 indicates, there are considerable local differences in the distribution of rainfall in Palestine.³³ Galilee receives the greatest amount of rain from 28" to 40". Haifa on the coast receives an average of 24", Tiberias 16-18", and Beth-shean in the Jordan Valley only 12". In Judea the foothills receive 16-22". Rainfall at Jerusalem generally fluctuates from 17" to 28", with an average of 25".³⁴ Jericho receives an average of 4-6"; in the very wet winter of 1944 it recorded 13".³⁵ The southern end of the Dead Sea receives only 2".

The steppe region around Beersheba receives between 12" to 16"; areas in the Negev to the south receive less than 8". In the Hellenistic and early Roman era, the Nabataean Arabs by a careful conservation of water by terraces were able to raise wheat, barley, legumes, grapes, figs and dates in the Negev.³⁶ Modern Israeli researches have attempted to reduplicate their feats.³⁷

*Dew.*³⁸ The summer drought was not due to the lack of humidity, which is in fact twice as intense in the summer as in the rest of the year. The lack of rain storms is due to the absence of frontal clashes between warm and cold air masses. The summer humidity manifests itself in the dew that condenses as the ground cools during the night. At Gaza with its extremes of temperatures dew may form as many times as 250 nights per year. Gideon was able to collect a bowl full of water from the fleece which he had set out (Jud. 6:38).

Dew is vital for the growth of grapes during the summer (Zech. 8: 12). It was indeed a calamitous drought when not even dew was available (II Sam. 1:21; I Kgs. 17:1; Hag. 1:10). Its value may be seen in the numerous comparisons of God's grace and goodness to the benefaction of dew (Gen. 27:28; Isa. 18:4; Hos. 14:5; Mic. 5:7; Sirach 43:22).

THE MYTHOLOGICAL VIEWS OF THE PAGANS

Mesopotamia

Among the early Sumerians (3rd millennium B.C.) the bringing of rain and subsequent flooding was attributed either to Enlil, the leading god of the pantheon, or to Enki, god of water and wisdom. Without Enlil "in heaven the rain-laden clouds would not open their mouths, the fields and meadows would not be filled with rich grain, in the steppe grass and herbs, its delight would not grow."³⁹

For the later Babylonians (2nd-1st millennium B.C.) the pre-eminent rain god was the Syrian god Adad (Hadad). In the *Atrahasis Epic*, the full text of which was discovered only in 1965, we have the following developments preceding the catastrophic Flood. When Enlil is disturbed by the clamor of proliferating mankind, he orders:

Cut off supplies for the peoples,
Let there be a scarcity of plant life to satisfy their hunger.
Adad should withhold his rain,

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And below, the flood should not come up from the abyss.⁴⁰

Let the wind blow and parch the ground,
Let the clouds thicken but not release a downpour, (II.i.9-16)⁴¹

People sought to placate Adad with gifts of loaves and offerings, so that "he may rain down in a mist in the morning, and may furtively rain down a dew in the night." (II.ii.16-17)⁴² But "Adad roared in the clouds," and sent not just rain but the Deluge.

From the *Gilgamesh Epic* we learn that when the Flood came,

(Even) the gods were terror-stricken at the deluge,
They fled and ascended to the heaven of Anu;
The gods cowered like dogs. . . .⁴³

Important mythological concepts regarding fertility centered on the Mesopotamian cult of Inanna (Ishtar) and her consort Dumuzi (Tammuz). In the text of the famous myth, "The Descent of Inanna (Ishtar)," the goddess descends into the Underworld and is slain by her sister. Upon her death procreation among animals and humans ceases only to be restored with her resurrection.⁴⁴ The Mesopotamians practiced a *hieros gamos* or "sacred marriage" rite between the king representing Dumuzi/Tammuz and a sacred prostitute representing Inanna/Ishtar to ensure the fertility of the land by sympathetic magic.⁴⁵

Egypt

The Egyptians honored the Nile River as the god *Hapy*; whom they depicted as a well nourished man with pendulous breasts. Thousands of miniature figures of this god were made and offered to him in temples prior to the flooding of the river.⁴⁶ The most important god of the Egyptians apart from the sun god was Osiris, the god of the underworld. As early as the Old Kingdom (3rd millennium B.C.) Osiris was identified with the life-giving waters. According to Breasted:

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It was water as a source of fertility, water as a life-giving agency with which Osiris was identified. It is water which brings life to the soil, and when the inundation comes the Earth-god Geb says to Osiris: "The divine fluid that is in thee cries out, thy heart lives, thy divine limbs move, thy joints are loosed," in which we discern the water bringing life and causing the resurrection of Osiris, the soil.⁴⁷

Greece

The seasonal cycle of fertility and drought is most vividly depicted by the Greek myth of Demeter and her daughter Persephone, who was abducted by Hades. While Demeter, the goddess of grain, mourned for her missing daughter, the entire land was afflicted with infertility.⁴⁸ After she was discovered, Persephone still had to spend four months each year in the Underworld because she had eaten four pomegranate seeds there. The mysteries of Demeter and Persephone were celebrated at Eleusis, just west of Athens.⁴⁹

Because of the regularity of the seasons in Greece, it was seldom necessary to pray for rain. According to Nilsson:

On Mount Lykaion (in Arcadia) there was a well called Hagno. When there was need of rain the priest of Zeus went to this well, performed ceremonies and prayers, and dipped an oak twig into the water. Thereupon a haze arose from the well and condensed into clouds, and soon there was rain all over Arcadia.⁵⁰

Syria and Palestine

The climate of Syria and Palestine played an important role in the development of Canaanite religion. Baly and Tushingham describe the situation as follows:

Precariousness, indeed, is everywhere the dread companion of rain-fed agriculture in the Middle East, and especially toward the south and inward from the seacoast. Over very large areas it is impossible to exaggerate the sense of desperate insecurity which accompanies the farmer upon his rounds. . . . Almost the whole of Canaanite religion was built around this desperate anxiety, this passionate longing for a fertile earth, . . .⁵¹

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Our understanding of the Canaanites has been greatly advanced by the discovery of Ras Shamra (ancient Ugarit) on the coast of Syria, and the subsequent publication of Ugaritic texts. These reveal that the Canaanite *Baal* or "Lord" par excellence was Hadad, the god manifest in storms and rains.⁵² Millard comments:

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Controlling the rains, mist, and dew, Hadad held the keys of good harvests, so the existence of a myth describing his battles with death, barrenness, and threatening flood waters among the texts of Ugarit is no surprise.⁵³

As in Mesopotamia the vitality of the king was linked magically with the fertility of the land. When the legendary "king Kret was sick, nature likewise languished. When prince Aqhat died, a great drought ensued:

Thereupon Danel the Rephaite prayed (that) the clouds in the heat of the season, (that) the clouds should rain early rain (and) give plentiful dew in summer for the fruits. Baal failed for seven years, the rider on the clouds for eight (years, leaving the land) without dew, without showers. (Aqhat I.i.38-44)⁵⁴

Many scholars have supposed, in analogy with Greek mythology, that Baal died annually and rose to life, symbolizing the rainless summer and the rainy winter. But the epic does not speak of an annual event but of a prolonged drought. As Gordon points out, the summer is normally dry and what was dreaded were dewless summers and rainless winters.⁵⁵

The priests of Baal, who were confronted by Elijah (I Kgs. 18), tried to arouse their god to produce rain not only by their prayers but also by magical rites such as leaping about the altar and shedding their blood-but in vain.⁵⁶ Patai has suggested that Elijah also used magical gestures. But it is quite clear that when Elijah had water poured on the offerings, he was not making a libation but was demonstrating the supernatural power of God by making the ignition more difficult.⁵⁷

THE OLD TESTAMENT PERSPECTIVE

Though some have blamed the Judeo-Christian tradition of man's relation to nature as expressed in Gen. 1:28's command "to replenish the earth and subdue it" as the grounds

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for our present ecological crisis,⁵⁸ further reflection demonstrates that this is not a sound conclusion. As John Black notes, the Hebrews evolved "a concept of man's responsibility to God for the management of the earth, a concept which was duly carried over into Christianity, becoming part of the western heritage."⁵⁹ Commenting on Judeo-Christian theology, Glacken observes:

Most striking for our themes, is the idea of the dominion of man as expressed in Genesis, and repeatedly expressed in other writings, notably Psalm 8. But one must not read these passages with modern spectacles, which is easy to do in an age like ours when "man's control over nature" is a phrase that comes as easily as a morning greeting. . . . Man's power as a vice-regent of God on earth is part of the design of creation and there is in this fully elaborated conception far less room for arrogance and pride than the bare reading of the words would suggest.⁶⁰

It is man's sinful exploitation of the universe, his contempt for God's creation, which has led to our present ecological crisis. As E. M. Blaiklock writes:

The ravaged world, the polluted atmosphere, the poisoned rivers, dead lakes, encroaching desert, and all the irreversible damage to man's fragile environment comes from treating the globe we live on with contempt. Modern man is arrogant and domineering. Man was put in a garden, says the old Hebrew account in Genesis "to tend it."⁶¹

If blame must be placed, we might well consider our western heritage from the Romans. From his survey of the ancient world and ecology, Hughes concludes:

Our Western attitudes can be traced most directly to the secular businesslike Romans. Today the process of dominating the earth is seen not as a religious crusade following a biblical commandment but as a profitable venture seeking economic benefit. In this, we are closer to the Romans than to any other ancient people, and in this we demonstrate to a great extent our heritage from them.⁶²

The Blessings of Rain (Citations are from the RSV.)

According to Deut. 11:10-11, 13-14, the Lord said to the children of Israel:

For the land which you are entering to take possession of it is not like the land of Egypt, from which you have come, where you sowed your seed and watered it with your feet, like a garden of vegetables; but the land which you are going over to possess is a land of hills and valleys, which drinks water by the rain from heaven, . . . And if you will obey my commandments. . . (I) will give the rain for your land in its season, the early rain and the later rain, that you may gather in your grain and your wine and your oil.

Jeremiah proclaims that it is only the Lord rather than the pagan gods who sends rain (Jer. 14:22): "Are there any among the false gods of the nations that can bring rain? Or can the heavens give showers? Art thou not he, O Lord our God? We set our hope on thee, for thou doest all these things." But the wayward children of Israel fail to recognize this (Jer. 5:24): "They do not say in their hearts, 'Let us fear the Lord our God, who gives the rain in its season, the autumn rain and the spring rain, and keeps for us the weeks appointed for the harvest.' "

Elihu, Job's friend, declares:

Behold, God is great,
For he draws up the water, he distils his mist in rain which the skies pour down and drop upon man abundantly. Can anyone understand the spreading of the clouds, the thunderings of his pavilion?
(Job 36:26-29)

Among the questions which the Lord Himself posed as He spoke out of the whirlwind to Job are the following:

Who has cleft a channel for the torrents of rain, and a way for the thunderbolt, to bring rain on a land where no man is, on the desert in which there is no man; to satisfy the waste and desolate land, and to make the ground put forth grass? Has the rain a father, or who

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has begotten the drops of dew? (Job 38:25-28)

God has promised rain as a blessing for obedience: "If you walk in my statutes and observe my commandments and do them, then I will give you your rains in their season,

and the land shall yield its increase, and the trees of the field shall yield their fruit." (Lev. 26:3-4)

The Judgment of Drought

Conversely for disobedience the Lord has threatened drought:

Take heed lest your heart be deceived, and you turn aside and serve other gods and worship them, and the anger of the Lord be kindled against you, and he shut up the heavens, so that there be no rain, and the land yield no fruit, and you perish quickly off the good land which the Lord gives you. (Deut. 11:16-17)

The most famous instance of drought as a judgment of God is the three and a half year drought called down by Elijah in the reign of Ahab in the 9th cent. B.C. (I Kgs. 17; Sirach 48:2-3; Luke 4:25; Jas. 5:17). In the early 6th cent. B.C. when Judah forsook the Lord, Jeremiah called upon the heavens to be appalled, literally "be exceedingly dried up" (Jer. 2:12). Cf. Jer. 14:1-6 for a vivid description of drought conditions.

Still later in the 6th cent. after the Exile, the Jews returned from Mesopotamia and were challenged to rebuild the temple. When they were less than dedicated to the task, the prophet Haggai rebuked them with a paronomasia or play on words. He proclaimed that because the Lord's house had remained in "ruins" (*hareb*, Hag. 1:4,9) the Lord would bring a "drought" (*horeb*, Hag. 1:11) upon the land.

On the other hand, as a sign of God's displeasure Samuel called down rain during the late wheat harvest (June), when rain was not expected:

"Is it not wheat harvest today? I will call upon the Lord, that he may send thunder and rain; and you shall know and see that your wickedness is great, which you have done in the sight of the Lord, in asking for yourselves a king." So Samuel called upon the Lord, and the Lord sent thunder and rain that day. . . . (I Sam. 12:17-18)

Prayers for Rain

When a drought was prolonged, the remedy lay in repentance and in prayer as we see from Solomon's famous intercession (I Kgs. 8:35-36):

When heaven is shut up and there is no rain because they have sinned against thee, if they pray toward this place, and acknowledge thy name, and turn from their sin, when thou dost afflict them, then hear thou in heaven, and forgive the sin of thy servants, thy people Israel, . . . and grant rain upon thy land, which thou hast given to thy people as an inheritance.

The most dramatic instance of the prayer of a godly man to end a drought was, of course, Elijah's intercession in his contest with the priests of Baal (I Kgs. 18; Jas. 5:17). Joel called for a fast along with repentance to end the double calamity of drought and locust swarms in his day (Joel 1:14-20). Zech: 10:1 encourages such prayer: "Ask rain from the Lord in the season of the spring rain, from the Lord who makes the storm clouds, who gives men showers of rain. . . ."

Problematic is the interpretation of M. Dahood that Psalm 4 is actually a prayer for rain. His interpretation is based on rendering the Hebrew word *tob* "good" in verse 7 as a word for rain by comparing Jer. 17:6, Deut. 28:12, etc where it is clear that "good" means "rain."⁶³

THE NEW TESTAMENT PERSPECTIVE

In the Sermon on the Mount Jesus commended the benevolence of God in that He "makes his sun rise on the evil and on the good, and sends rain on the just and on the unjust" (Mat. 5:45). He further cited the heavenly Father's care over the birds of the air (Mat. 6:26), the lilies of the field (Mat. 6:28), and the grass of the field (Mat. 6:30) as ample reasons trusting in God's provisions and for eschewing anxiety.

In his sermon to the pagan Lycaonians of Lystra, Paul

adduces God's provision in nature as evidence that He had not left the pagan nations without a witness (Acts 14:17): "yet he did not leave himself without witness, for he did good and gave you from heaven rains and fruitful seasons, satisfying your hearts with food and gladness." Cf. Rom. 1:19, 20.⁶⁴

As an example of the effective prayer of a righteous man James cites the example of Elijah who first prayed for a drought and then ended it (Jas. 5:17-18): "Elijah was a man of like nature with ourselves and he prayed fervently that it might not rain, and for three years and six months it did not rain on the earth. Then he prayed again and the heaven gave rain, and the earth brought forth its fruit." In the Apocalypse the two witnesses of Rev. 11 "have power to shut the sky, that no rain may fall during the days of their prophesying" (Rev. 11:6).

A number of droughts and famines are recorded by Roman historians for the New Testament era. In 22 B.C. a mob shut up the Roman Senate in the Curia building and forced them to vote Augustus the dictatorship so that he could deal with the food situation. In his autobiographical *Res Gestae* (5.2) Augustus boasted: "I did not decline in the great dearth of grain to undertake the charge of the grain supply, which I so administered that within a few days I delivered the whole city from apprehension and immediate danger at my own cost and by my own efforts."⁶⁵ There was a later famine in his reign in A.D. 6.

During the reign of Claudius a noteworthy series of droughts and poor harvests culminated in a widespread famine during the procuratorial administration of Tiberius Julius Alexander over Judea (A.D. 46-48). Josephus reports (Antiq. III.320 ff.; XX.51-53, 101) that Queen Helena of Adiabene, a recent convert to Judaism with her son Izates, sent aid to the Jews in the form of monetary gifts, grain from Egypt, and figs from Cyprus. This is the same drought which was predicted by Agabus, a prophet from Jerusalem, to the church at Antioch (Acts 11:27-30):

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Now in these days prophets came down from Jerusalem to Antioch. And one of them named Agabus stood up and foretold by the Spirit that there would be a great famine over all the world; and this took place in the days of Claudius. And the disciples determined, every one according to his ability, to send relief to the brethren who lived in Judea; and they did so, sending it to the elders by the hand of Barnabas and Saul.

Kenneth S. Gapp correlates the famine under Claudius with an unusually high Nile in the year A.D. 45 when grain prices doubled.⁶⁶ He concludes that "the evidence of official documents among the papyri from Egypt and of independent sources. Pliny and Josephus, so supports Luke's account of the universal famine that the accuracy of the statement can no longer be challenged."⁶⁷ Gapp makes the acute observation that in the ancient world famine was essentially a class famine:

Since the poor and the improvident never had large reserves either of money or of food, they suffered immediately upon any considerable rise in the cost of living. The rich, on the other hand, had large reserves both of money and of hoarded grain, and rarely, if ever, experienced hunger during famine. Thus, while all classes of society suffered serious economic discomfort during a shortage of grain, the actual hunger and starvation were restricted to the lower classes.⁶⁸

Christ taught that one should be satisfied with one's "daily bread."⁶⁹ In view of the disparity of wealth, the "Christian ethic inspired sharing with those in need" (Acts 4:34, 6:1; II Cor. 8:8-15; Jas. 2:14-16; I John 3:17.)⁷⁰

POST-BIBLICAL JEWISH DEVELOPMENTS

The Jewish rabbis of the first three centuries of the common Era (1st-3rd cent, A.D.) elaborated upon biblical precepts, sometimes by fanciful exegesis.

Rabbi Simeon ben Yohai said: Three things are equal in their value: Earth, Man and Rain, R. Levi bar Hiyya said: And all the three are of three letters. . . . , to teach you, that if there is no earth, there is no rain, if there is no rain, there is no earth, and without both of them no man can exist.⁷¹

In the early 2nd cent, A.D. the rabbis attributed a gradual diminution in rain to the sins of the people. Rabbi Eleazar b. Perata (fl. A.D. 110-35) said: "From the day the

Temple was destroyed the rains have become irregular in the world. There is a year which has abundant rains and there is a year with but little rain."⁷²

To assure the coming of rain the rabbis laid stress on the feast of Sukkoth (Tabernacles) on the basis of Zech. 14:16-17. They also laid down elaborate regulations for the observation of fasts in times of drought in the Mishnah (Ta'anith 1.2-7). If by the seventh of Marheshvan (around November) there has been no rain, one begins praying for rain. If none has fallen by the 17th, public fasts are ordered on Mondays and Thursdays all through the winter season.⁷³

Commenting on Eccl. 10:11, "If the serpent bite before it is charmed, then the charmer (lit. whisperer) hath no advantage," Rabbi Ami said: "If you see a generation over whom the heavens are rust-colored like copper and do not let down dew or rain, it is because there are no 'whisperers' (i.e. people who pray silently) in that generation."⁷⁴

One sage, Honi the Rainmaker, had a legendary gift for calling down rain. It is said that he drew a circle, and standing in the middle of it said:

"Lord of the world! . . . I swear by your great name that I shall not move from here until you will turn merciful unto your children." When the rain began dripping he said: "Not thus did I ask but a rain for cisterns, pits and caves." Then the rain began to fall violently and Honi said: "Not thus did I ask but a rain of mercy, blessing and generosity." Then the rain fell as it should fall.⁷⁵

Even in such calamitous times as droughts there were always the unscrupulous few who tried to exploit the situation for their own advantage. The rabbis denounced the wealthy who hoarded up large stocks of grain, wine and oil to sell them at inflated prices by quoting Amos 8:4-7. In the days of Rabbi Tanhuma, the people came to him and asked him to order a fast for rain. "He ordered a fast, one day, a second day, a third day, and no rain came. Then he went to them and preached: 'My sons, have compassion on each

other and the Holy One blessed be He will also have compassion on you."⁷⁶

POST-BIBLICAL CHRISTIAN DEVELOPMENTS

During the early Roman Empire the pagans sought to blame the Christians for any unnatural disaster. As Tertullian so pungently expressed it: "If the Tiber reaches the walls, if the Nile does not rise to the fields, if the sky doesn't move or the earth does, if there is famine, if there is plague, the cry is at once: 'The Christians to the lion.'"⁷⁷ The pagan Symmachus blamed the famines of A.D. 384 upon the Christians.

Arnobius, a Christian apologist (fl. A.D. 300), in his work, *Against the Heathen*, asks:

What is the ground of the allegation, that a plague was brought upon the earth after the Christian religion came into the world, and after it revealed the mysteries of hidden truth? But pestilences, say my opponents, and droughts, wars, famines, locusts, mice, and hailstones, and other hurtful things, by which the property of men is assailed, the gods bring upon us, incensed as they are by your wrongdoings and by your transgressions. . . . For if we are to blame, and if these plagues have been devised against our sin, whence did antiquity know these names for misfortunes?⁷⁸

Augustine likewise responded by pointing out that such calamities had occurred long before the conversion of Constantine and the Christianization of the Empire: "Let those who have no gratitude to Christ for His great benefits, blame their own gods for these heavy disasters."⁷⁹

Finally, Christians turned the accusation against pagans, Jew, Samaritans, and heretics, blaming them for unseasonable calamities. In the *Novellae Theodosiani* 3.1.8 (4th cent. A.D.) we read the following denunciation:

Shall we endure longer that the succession of the seasons be changed, and the temper of the heavens be stirred to anger, since the embittered perfidy of the pagans does not know how to preserve

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these balances of nature? For why has the spring renounced its accustomed charm? Why has the summer, barren of its harvest, deprived the laboring farmer of his hope of a grain harvest? Why has the intemperate ferocity and the winter with its piercing cold doomed the fertility of the lands with the disaster of sterility? Why all these things, unless nature has transgressed the decree of its own law to avenge such impiety?⁸⁰

LOCUSTS

As noted in the introduction, periods of unseasonable heat and drought are sometimes accompanied by plagues of locusts. The Canaanite texts speak of the dreaded succession

of dry or locust years.⁸¹ Their frightening numbers made them an image of frequent appearance in the ancient texts. In the Sumerian lamentation the possessions of Ur are devoured as by a "heavy swarm of locusts."⁸² In the Ugaritic Keret Epic (I.iv.29-31) the soldiers of an army are said to have "settled like locusts on the field(s), like hoppers on the fringe of the wilderness."⁸³

At the end of treaties a frequent curse which was invoked upon those who might be tempted to break the agreement was the locust plague. In the Aramaic Sefire treaty of north Syria (8th cent. B.C.), we read: "For seven years may the locust devour (Arpad), and for seven years may the worm eat. . . ."⁸⁴ A similar curse is found in the treaty between the Assyrian king Esarhaddon (7th cent. B.C.) and his Median vassals: "Like locusts devour. . . may they cause your towns, your land (and) your district to be devoured."⁸⁵

There are nine Hebrew words which designate locusts in the Old Testament.⁸⁶ Akkadian recognizes 18 names and the Talmud 20 names for locusts. Of the many Hebrew words *arbeh* is used most frequently, 24 times. The word is probably derived from the root *raba* "to become numerous." It occurs in Akkadian as *erebu*, *arbu*, and in Ugaritic as *irby*.

The *arbeh* plague (Deut. 28:38) is listed as one of the divine curses which would befall the Israelites if they disobeyed God's commands. The *arbeh* is one of the plagues which Moses called down upon Egypt (Ex. 10:4 ff.; Ps. 78:46, 105:34).⁸⁷

Locusts are used in similes of vast numbers in Jud. 6:5, 7:12; Jer. 46:23; Nah. 3:15. Though they had no leader yet their mass movements are coordinated (Prov. 30:27). Resting at night, they stir with the heat and disappear (Nah. 3:17). Job is asked whether he can make the horse "leap like a locust" (Job 39:20).

Locusts belong to the order of the *Orthoptera* "straight-winged" insects. With the grasshoppers they belong to the sub-family, Saltatoria, "leapers," which were considered edible (Lev. 11:21-22).⁸⁸ Locusts belong to the *Acridiidae*

family of "short-horned grasshoppers." Of the 91 species found in Palastine only the desert locust (*Schistocerca gregoria* or *Acridium peregrinum*) has served to plague the Near East from time immemorial. It was only in 1929 that the phase change from solitary green grasshoppers to the larger, yellow gregarious phase was first observed. According to Baron:

Basically, the Desert Locust is a winged big brother of its fellow-acridid, the familiar grasshopper of English meadows, and quite often leads much the same sort of life. Like other species of locusts, however, it has the peculiarity of being able to change its habits-to live two lives, as it were--and it is this characteristic that makes it so great a potential menace.⁸⁹

At maturity the desert locusts are two and a half inches long. They have two sets of wings and an enlarged pair of legs for jumping. Their appearance has been compared to horses (Joel 2:4; Job 39:20; Rev. 9:7; cf. German *Heupferd*, Italian *cavallette*.)

Desert locusts are phenomenal travelers. They are able to fly for 17 hours at a time and have been known to travel 1500 miles. The sound of their wings can be compared to the sound of chariots (Joel 2:5; Rev. 9:9). Their route of travel is determined by the prevailing winds (Ex. 10:13, 19). In the 1915 plague the locusts came to Jerusalem from the northeast (cf, Joel 2:20).⁹⁰

The Bible does not exaggerate when it speaks of swarms of locusts covering the ground (Ex. 10:5). According to Baron:

We know from modern measurements of swarm areas and volumes that the descriptions repeatedly given in the Bible and elsewhere, of the sky being darkened and the sun eclipsed, are literally correct. For instance, during the plague that continued from 1948 to 1963, several swarms were recorded as exceeding a hundred square miles; and one is said to have been the size of London.⁹¹

A truly large swarm may contain ten billion locusts! What is devastating is that each insect eats its own weight every day; a large swarm may weigh up to 80,000 tons.⁹²

The four words used by Joel (1:4, 2:25) in his vivid description of the locust plague evidently represent stages of the locusts' development (RSV) rather than separate species of insects (KJV).⁹³ In Joel 2:25 we have first the *arbeh*, the mature locust which deposits the eggs.⁹⁴ The *yeleq* may be the larva as it emerges from the egg.⁹⁵ The *hasil* may be the intermediate instar (stage between moults): The *gazam* may be the ravenous nymph who strips the bark from trees,

To remove such insect plagues pagans resorted to prayer and to magical spells. From Sultantepe in northwest Mesopotamia we have "an incantation to remove caterpillar, devourer. . . cricket, red bug, vermin of the field from the field."⁹⁶ The Greeks prayed to Apollo Parnopios (Locust) to obtain aid against locusts, just as they prayed to Apollo Smintheus (Field Mouse) against the plague. To get rid of caterpillars the Roman writer Columella "directs that a young menstruous girl should walk three times round the garden with bare feet and loosened hair and garments."⁹⁷

In contrast to the pagans, the Israelites resorted to fasting, repentance, and prayer in cases of locust plagues and other kinds of pestilences (I Kgs. 8:36-37; II Chr. 6:28). In the midst of a devastating locust plague the prophet Joel called the people to fasting and prayer (Joel 1:14, 2:15-17), and promised that the Lord would see their repentance and bless them (Joel 2: 18-32). The later Jewish rabbis also prescribed the blowing of the ram's horn to announce a fast: "For these things they sound the shofar in every place: blasting or mildew, locust or caterpillar, wild beasts or the sword. They sound the shofar in that they are an overrunning affliction." (Ta'anith 3.5)⁹⁸

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CONCLUSIONS

1. How is the biblical revelation different from pagan mythologies?

Unlike materialistic naturalism the biblical perspective shares with the ancients a belief in the supernatural. But it differs radically from contemporary mythologies in

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upholding a single, omnipotent God, who though He may be depicted in human similes, wholly transcends man and nature--in contrast to the pagan gods who were crudely anthropomorphic and who were intrinsically a part of the natural order.⁹⁹ The Babylonian gods, for example, sent the Flood in capricious annoyance at man's rambunctious noisiness. Jehovah sent the Flood as a judgment against man's wickedness.

2. Why was God's revelation given where it was?

Certainly the local geographic and climate conditions of the Holy Land have qualified the human reception of the Lord's revelation. The sovereign God chose Palestine as the location for His revelation, a land whose climate made the Hebrews very conscious of their reliance upon God for rain and food.

3. Now that we know the causes of droughts and the progression of locust plagues are they any less the works of God?

Such a conclusion may be reached by unbelievers, but believers can only stand in greater awe as they learn more of the marvels and intricacies of God's creation. He is the God who uses the hurricane but also the lowly worm (Jonah 4:6) to reveal His power and purpose. As C. S. Lewis has remarked, "Each miracle writes for us in small letters something that God has already written, or will write, in letters almost too large to be noticed, across the whole canvas of Nature."¹⁰⁰

4. Why do natural disasters occur? Are they judgments of God?

Natural disasters remind us that we do not live in a Paradise, and that the Creation itself groans for its redemption (Rom. 8:19-22). We cannot comprehend the reason for each tragedy but can realize that we live in a flawed universe. Though any given calamity may not be a specific judgment for sin (cf. John 9:1-3), each reminds us of our

creaturely weakness and the fragility of our life. From the divine perspective death is not the ultimate tragedy but rather a life lived without recognizing the Creator (Rom. 1:19-21.¹⁰¹ If we are not thankful for His daily provision (Jas. 1:17; I Tim. 4:3), He may get our attention by more drastic events.

5. If God works through Nature, ought we do anything to interfere with it?

Some extreme Calvinists opposed the introduction of anaesthesia in the light of Gen. 3:16. Within the past year members of a Dutch Reformed group have refused inoculations as an interference with God's natural order. But God does not call us to the passive fatalism of some Muslims who say to everything, *In sha'Allah* "If Allah wills," and then do nothing. Rather He has called us into partnership with Him as stewards of His grace and creation. Times of disaster provide us with opportunities for sharing and even witness as organizations like World Vision have demonstrated in our day.

REFERENCES

- ¹Lynn White, "The Historical Roots of Our Ecologic Crisis," *Science* 155 (1967), 1203.
- ²J. Donald Hughes, *Ecology in Ancient Civilizations* (Albuquerque: University of New Mexico, 1975), 2 ff.; Clarence J. Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California, 1967).
- ³*Time*, 105 (Jan. 25, 1971), 31; *idem*, 109 (May 5, 1975), 65.
- ⁴R. A. Bryson and T. J. Murray, *Climates of Hunger* (Madison: University of Wisconsin, 1977), pp. 95, 104-105.
- ⁵*Time*, 112 (June 19, 1978), 36; *The Cincinnati Enquirer* (July 7, 1978), A-15.
- ⁶*Time*, 112 (July 24, 1978), 19; *idem*, 112 (Aug. 28, 1978), 20.
- ⁷Lawrence Svoboda, *An Empire of Dust* (Caldwell, Idaho: Caxton Printers, 1940), pp. 15, 17.
- ⁸Marion I. Newbigin, *The Mediterranean Lands* (London: Christophers, 1924); Ellen C. Semple, *The Geography of the Mediterranean Region* (New York: Henry Holt, 1931); Erwin R. Biel, *Climatology of the Mediterranean Area* (Chicago: University of Chicago, 1944);

ANCIENT ECOLOGIES AND THE BIBLE 200c

Michael Grant, *The Ancient Mediterranean* (New York: Charles Scribner's Sons, 1969).

- ⁹T. J. Jones, Quelle, *Brunnen und Zisterne im A.T.* (Leipzig: Morgenland. Texte und Forschungen, 1928); Cyril E. N. Bromehead, "The Early History of Water Supply," *Geographical Journal* 99 (1942), 142-51; J. G. D. Clark, "Water in Antiquity," *Antiquity* 18 (1944), 1-15.
- ¹⁰Robert J. Braidwood, *The Near East and the Foundations for Civilization* (Eugene, Oregon: Oregon State System of Higher Education, 1962), pp. 11-13. Two other areas that independently developed the domestication of crops are Thailand and Mexico. See Edwin M. Yamauchi, "Problems of Radiocarbon Dating and of Cultural Diffusion in Pre-History," *J.A.S.A.* 27 (1975), 25-31.
- ¹¹M. A. Beek, *Atlas of Mesopotamia* (London: Thomas Nelson, 1962), p. 12.
- ¹²Cf. The Hammurabi Law Code, ## 53-57; Stanley Walters, *Waters for Larsa* (New Haven: Yale University, 1971).
- ¹³S. N. Kramer, *The Sumerians* (Chicago: University of Chicago, 1963), p. 143; cf. J. B. Pritchard, ed., *The Ancient Near East* (Princeton: Princeton University, 1969), p. 612.
- ¹⁴Alan Moorehead, *The White Nile* (New York: Harper & Row, 1971); *idem*, *The Blue Nile* (New York: Harper & Row, 1972).
- ¹⁵Richard Parker, *The Calendars of Ancient Egypt* (Chicago: University of Chicago, 1950); P. Montet, *Everyday Life in Egypt* (London: Edward Arnold, 1958), pp. 31-33.
- ¹⁶P. Montet, *Egypt and the Bible* (Philadelphia: Fortress, 1968), pp. 3-4.
- ¹⁷K. W. Butzer, *Early Hydraulic Civilization in Egypt* (Chicago: University of Chicago, 1976).
- ¹⁸Hermann Kees, *Ancient Egypt: A Cultural Topography* (Chicago: University of Chicago, 1961), p. 47.
- ¹⁹A. Zimmern, *The Greek Commonwealth* (New York: Oxford University, 1961), pp. 36-40; cf. M. Cary, *The Geographic Background of Greek and Roman History* (New York: Oxford University, 1952).
- ²⁰Rhys Carpenter, *Discontinuity in Greek Civilization* (Cambridge: Cambridge University, 1966).
- ²¹E. Wright, "Climatic Changes in Mycenaean Greece," *Antiquity* 42 (1968), 123-27.
- ²²Bryson and Murray (note 4), p. 16; R. A. Bryson, H. H. Lamb, and D. L. Donley, "Drought and the Decline of Mycenae," *Antiquity* 48 (1974), 46-50.
- ²³Robert Claiborne, *Climate, Man and History* (New York: W. W. Norton, 1970), p. 326.

ANCIENT ECOLOGIES AND THE BIBLE 200d

²⁴Edwin M. Yamauchi, "Homer, History and Archaeology," *Bulletin of the Near East Archaeological Society* 3 (1973), 36; *idem*, *Greece and Babylon* (Grand Rapids: Baker, 1967), pp. 42-46.

ANCIENT ECOLOGIES AND THE BIBLE 201a

- ²⁵Edwin M. Yamauchi, "Palestine," *Wycliffe Bible Encyclopedia*, ed. C. F. Pfeiffer, H. F. Voss, and J. Rea (Chicago: Moody, 1975), II, 1270-72. In general, the climate of Palestine has remained more or less the same since New Testament times. D. Sperber, "Drought, Famine and Pestilence in Amoraic Palestine," *Journal of the Economic and Social History of the Orient* 17 (1974), 272, writes: "While it is known that there were no significant climatic changes in Palestine over the last two thousand years. . . , undoubtedly there were climatic ups-and-downs within this period."
- On the other hand, for Old Testament times palynological analyses, that is, studies of pollen from boreholes from the Hula Valley and the Mediterranean coast, indicate periods of a more humid climate at certain eras. A. Horowitz, "Human Settlement Pattern in Israel," *Expedition* 20 (1978), 58, concludes: "A more favorable climate returned during Middle Bronze Age II and to some extent also during the Late Bronze Age when, it may be recalled, Israel was regarded as a 'land of milk and honey.' "
- ²⁶M. Harel, "Reduced Aridity in Eastern Lower Galilee," *Israel Exploration Journal* 7 (1957), 256-63.
- ²⁷Efraim Orni and Elisha Efrat, *Geography of Israel* (Jerusalem: Israel Program for Scientific Translations, 2nd ed., 1966), pp. 108-11.
- ²⁸D. H. K. Amiran and M. Gilead, "Early Excessive Rainfall and Soil Erosion in Israel," *Israel Exploration Journal* 4 (1954), 295: ". . . the basic conditions for the development of excessive rain appear to be the formation of extended upper troughs reaching in a meridional direction from polar latitudes into the Eastern Mediterranean, together with the formation of a Cyprus Low."
- ²⁹Orni and Efrat, pp. 111-15. Note: 1" of rain = 25.4 mm.; conversely 1 mm. = .03937".
- ³⁰Orni and Efrat, p. 114: "Between November and February almost 70% of the annual rainfall occurs." Biehl, p. 89, table 25, lists the frequency of days with precipitation.
- ³¹R. Patai, "The Control of Rain in Ancient Palestine," *Hebrew Union College Annual* 14 (1939), 283: "The ancient Jewish inhabitants of Palestine knew also more certain signs by means of which they could guess whether rain would fall, and in what quantity. A sure sign of rain were the clouds called 'PWRHWT,' i.e., thin clouds below thick clouds. . . . Bright clouds were regarded as an omen of light rain, dark clouds as of heavy rain." Cf. Mat. 16:2-3.
- ³²Semple (note 8), p. 506: "Modern records show that the rainfall at Jerusalem fluctuates between 12.5 and 42 inches (318 mm. and 1,091

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mm.); that during the sixty years from 1850 to 1910 it dropped twelve times below the critical 20 inches (500 mm.) " Orni and Efrat, p. 116: "Drought years in Israel are frequent, and often affect the entire country. In 1950/51, for example, only 35% of the annual average fell on the northwest shore of the Sea of Galilee, 43% in Jerusalem, 53% in Haifa, and 65% in Tel-Aviv. Often there are series of drought years, as in the five winters between autumn 1958 and spring 1963." Cf. J. Neumann, "On the Incidence of Dry and Wet Years," *Israel Exploration Journal* 6 (1956), 58-63.

- ³³D. Sharon, Variability of Rainfall in Israel," *Israel Exploration Journal* 15 (1965), 169-76.
- ³⁴N. Rosenan, "One Hundred Years of Rainfall in Jerusalem," *Israel Exploration Journal* 5 (1955), 137-53; A. Bitan-Buttenwieser, "A Comparison of Sixty Years' Rainfall between Jerusalem and Tel Aviv," *Israel Exploration Journal* 13 (1963), 242-46.
- ³⁵M. Zohary, "Ecological Studies in the Vegetation of the Near Eastern Deserts," *Israel Exploration Journal* 2 (1952), 202.
- ³⁶M. Evenari and D. Koller, "Ancient Masters of the Desert," *Scientific American* 194 (April, 1956), 39; N. Glueck, *Rivers in the Desert* (New York: Grove Press, rev. ed., 1960), pp. 210-25; Philip Hammond, "Desert Waterworks of the Ancient Nabataeans," *Natural History* 76 (June-July, 1967), 36-43; J. I. Lawlor, *The Nabataeans in Historical Perspective* (Grand Rapids: Baker, 1974), 76-85.
- ³⁷W. C. Lowdermilk, "The Reclamation of a Man-Made Desert," *Scientific American* 202 (March, 1960), 54-63; M. Evenari, L. Shanon, and N. Tadmor, *The Negev* (Cambridge: Harvard University, 1971).
- ³⁸D. Ashbel, "Frequency and Distribution of Dew in Palestine," *Geographical Review* 39 (1949), 294: "As is well known, the Negeb is the region poorest in rainfall; in dew formation, however, it is the richest in Palestine." Cf. M. Gilead and N. Rosenan, "Ten Years of Dew Observation in Israel," *Israel Exploration Journal* 4 (1954), 120-23.
- ³⁹S. N. Kramer, *The Sacred Marriage Rite* (Bloomington: Indiana University, 1969), p. 51.
- ⁴⁰Cf. Gen. 7:11.
- ⁴¹W. G. Lambert and A. R. Millard, *Atra-Hasis: The Babylonian Story of the Flood* (Oxford: Clarendon, 1969), p. 73.
- ⁴²*Ibid.*, p. 75.
- ⁴³A. Heidel, *The Gilgamesh Epic* (Chicago: University of Chicago, 1963), p.85.

ANCIENT ECOLOGIES AND THE BIBLE 201c

- ⁴⁴J.B. Pritchard, ed., *Ancient Near Eastern Texts* (Princeton: Princeton University, rev. ed., 1955), p. 108; Edwin M. Yamauchi, "Descent of Ishtar," in *The Biblical World*, ed. C. Pfeiffer (Grand Rapids: Baker 1966), pp. 196-200.
- ⁴⁵Cf. Kramer (note 39); Edwin M. Yamauchi, "Cultic Prostitution," in *Orient and Occident*, ed. H. A. Hoffner (Kevelaer: Butzon und Bercker 1973), pp. 213-22.
- ⁴⁶J. Gwyn Griffiths, "Hecataeus and Herodotus on 'A Gift of the River'," *Journal of Near Eastern Studies* 25 (1966), 57-61.
- ⁴⁷J. H. Breasted, *Development of Religion and Thought in Ancient Egypt* (New York: Harper & Bros., 1959), p. 21. Cf. E. A. W. Budge, *The Nile* (London: Thomas Cook & Sons, 1901); *idem*, *Osiris* (New Hyde Park: University Books, 1961); J. Vandier, *La religion égyptienne* (Paris: Presses Universitaires de France, 1949), pp. 59 ff.
- ⁴⁸*The Metamorphoses of Ovid*, tr. Mary M. Innes (Baltimore: Penguin, 1955), pp. 127 ff.
- ⁴⁹C. Kere nyi, *Eleusis* (London: Routledge & Kegan Paul, 1967), pp. 34 ff.
- ⁵⁰M. P. Nilsson, *Greek Folk Religion* (New York: Harper & Bros., 1961), pp.6-7.
- ⁵¹Denis Baly and A. D. Tushingham, *Atlas of the Biblical World* (New York: The World Pub., 1971), p. 48.
- ⁵²John Gray, *The Canaanites* (New York: Frederick A. Praeger, 1964), p.30.
- ⁵³A. R. Millard, "The Canaanites," in *Peoples of Old Testament Times*, ed. D. J. Wiseman (Oxford: Clarendon, 1973), p. 45.
- ⁵⁴G. R. Driver, *Canaanite Myths and Legends* (Edinburgh: T. & T. Clark, 1956), p. 59.
- ⁵⁵C. H. Gordon, *Ugaritic Literature* (Rome: Pontifical Biblical Institute, 1949), pp. 4-5; *idem*, "Canaanite Mythology," in *Mythologies of the Ancient World*, ed. S. N. Kramer (Garden City, N.Y.: Doubleday & Co., 1961), p. 184.
- ⁵⁶Cf. J. G. Frazer, *The New Golden Bough*, ed. T. H. Gaster (Garden City. N. Y.: Doubleday & Co., 1961), pp. 21-27, 77-78; U. Basgoz, "Rain-making Ceremonies in Turkey and Seasonal Festivals," *Journal of the American Oriental Society* 87 (1967), 304-306.
- ⁵⁷Patai (note 31), p. 254.
- ⁵⁸E.g. Lynn White (reference 1), p. 1205.
- ⁵⁹John Black, *The Dominion of Man: The Search for Ecological Responsibility* (Edinburgh: Edinburgh University, 1970), p. 46.
- ⁶⁰Glacken (reference 2), p. 166.

ANCIENT ECOLOGIES AND THE BIBLE 201d

- ⁶¹E. M. Blaiklock, *The Psalms of the Great Rebellion* (London: Lakeland, 1970), p. 39.
- ⁶²Hughes (note 2), p. 149.
- ⁶³M. Dahood, *Psalms I* (Garden City, N. Y.: Doubleday & Co., 1966) pp. 23-25.
- ⁶⁴The writer of Hebrews (6:7) uses as an illustration of those who respond or do not respond to God's grace the following: "For land which has drunk the rain that often falls upon it, and brings forth vegetation useful to those for whose sake it is cultivated, receives a blessing from God."
- ⁶⁵*Res Gestae Divi Augusti*, ed. P. A. Brunt and J. M. Moore (London: Oxford University, 1967), p. 21.
- ⁶⁶Kenneth S. Gapp, "The Universal Famine under Claudius," *Harvard Theological Review* 28 (1935), 259.
- ⁶⁷*Ibid.*, p. 265.
- ⁶⁸*Ibid.*, p. 261. George E. Mendenhall, "The Ancient in the Modern," in *Michigan Oriental Studies in Honor of George C. Cameron* (Ann Arbor: University of Michigan, 1976), p. 234, likewise observes that famines often involve social as well as natural factors: "The many references to famine that almost always accompany warfare and disintegration cannot therefore be explained as archaeologists always tend to do-by appealing to natural phenomena such as drought. The repeated references in available sources to emergency shipment of grain

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proves beyond question that regions quite near the center of famine have an available surplus. The famine is therefore the result of complex socio-economic processes."

- ⁶⁹Edwin M. Yamauchi, "The Daily Bread Motif in Antiquity," *Westminster Theological Journal* 28 (1966), 145-56.
- ⁷⁰Edwin M. Yamauchi, "How the Early Church Responded to Social Problems," *Christianity Today* 17 (Nov. 24, 1972), 6-8; Adolf Harnack, *The Mission and Expansion of Christianity* (New York: Harper & Bros., 1961), pp. 153 ff.; Martin Hengel, *Property and Riches in the Early Church* (Philadelphia: Fortress, 1975).
- ⁷¹Patai (reference 31), p. 251.
- ⁷²Sperber (reference 25), p. 273.
- ⁷³*The Mishnah*, tr. H. Danby (London: Oxford University, 1933), pp. 194-95.
- ⁷⁴Sperber, p. 285.
- ⁷⁵Cited in Patai, p. 282. Cf. J. Goldin, "On Honi (Onias) the Circle-Maker: A Demanding Prayer," *Harvard Theological Review* 56 (1963), 233-37; G. F. Moore, *Judaism* (Cambridge: Harvard University, 1955), II, 235-36.
- ⁷⁶Patai, p. 285.
- ⁷⁷*A New Stevenson*, ed. J. Stevenson (London: S.P.C.K., 1957), p. 169.
- ⁷⁸Arnobius, "Against the Heathens," tr. Hamilton Bryce and Hugh Campbell, *The Ante-Nicene Fathers* (Grand Rapids: Eerdmans, 1975), VI, 414.
- ⁷⁹Augustine, *The City of God*, tr. Marcus Dods (New York: Modern Library, 1950), p. 107.
- ⁸⁰Cited in Sperber, p. 297.
- ⁸¹Cf. Gordon in Kramer (note 55), p. 184. Cf. Emmanuel Le Roy Ladurie, *Times of Feast, Times of Famine* (Garden City, N. Y.: Doubleday & Co., 1971), p. 256: "At all events, the little optimum of the Middle Ages caused Europe to experience various gusts of warmth, and even sometimes great heat. These were responsible for the plagues of locusts which in the ninth-twelfth centuries sometimes spread over vast areas, sometimes far to the north. In A.D. 873, a time of great famine, they were found from Germany to Spain; during the autumn of 1195, they reached as far as Hungary and Austria."
- ⁸²Kramer, *The Sacred Marriage Rite* (reference 39), p. 47.
- ⁸³Driver, *Canaanite Myths and Legends* (reference 54), p. 33.
- ⁸⁴J. A. Fitzmyer, *The Aramaic Inscriptions of Sefire* (Rome: Pontifical Biblical Institute, 1967), p. 15.

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- ⁸⁵D. J. Wiseman, *The Vassal-Treaties of Esarhaddon* (London: British School of Archaeology in Iraq, 1958), p. 74; cf. p. 62.
- ⁸⁶See Edwin M. Yamauchi, "arbeh," "gazam," "hagab," "hasil," "hargol," "yeleq," in *A Theological Word Book of the Old Testament*, ed. R. L. Harris, Gleason Archer, and Bruce Waltke (Chicago: Moody, forthcoming).
- ⁸⁷Greta Hort, "The Plagues of Egypt," *Zeitschrift für alttestamentliche Wissenschaft* 70 (1958), 49-54. U. Cassuto, *A Commentary on the Book of Exodus* (Jerusalem; Magnes, 1967), p. 124: "The locusts will even enter into the houses (it happened for example, in Israel in the year 1865, that the locusts in their multitudes invaded the houses by way of the windows and doors). . . ." Cf. Exodus 10:6.
- ⁸⁸L. Kohler, "Die Bezeichnungen der Heuschrecke im Alten Testament," *Zeitschrift der Deutschen Palastina-Vereins* 49 (1926), 328-31; George Cansdale, *All the Animals of the Bible Lands* (Grand Rapids: Zondervan, 1970), pp. 238-44; *Fauna and Flora of the Bible* (London: United Bible Societies, 1972), pp. 53-54.
- In Lev. 11:22 the *arbeh* and three other types of locusts are listed as edible insects. Bas reliefs from Nineveh show servants bringing skewered locusts for Sennacherib's table.
- John the Baptist (Mat. 3:4; Mark 1:6) subsisted on honey and locusts. Cf. F. I. Andersen, "The Diet of John the Baptist," *Abr Nahrain* 3 (1961-62), 60-75; C. H. H. Scobie, *John the Baptist* (Philadelphia: Fortress, 1964), pp. 138-39.
- The Damascus Document of the Dead Sea Scrolls stipulates: "As for the various kinds of locust, these are to be put in fire or water while they are still alive; for that is what their nature demands." *The Dead Sea Scriptures*, tr. T. H. Gaster (Garden City, N.Y.: Doubleday & Co., 3rd ed., 1976), p. 85.
- Many Africans and Arabs after removing the wings, legs, and heads eat locusts either cooked or ground up as flour.
- ⁸⁹Stanley Baron, *The Desert Locust* (New York: Charles Scribner's, 1972), p. 30. Cf. F. S. Bodenheimer, *Animal Life in Palestine* (Jerusalem: L. Mayer, 1935), pp. 309-24; B. Uvarov, *Grasshoppers and Locusts I* (Cambridge: Cambridge University, 1966).
- ⁹⁰John D. Whiting, "Jerusalem's Locust Plague," *The National Geographic* 28 (Dec., 1915), 511-50.
- ⁹¹Baron, p. ix.
- ⁹²*Ibid.*, p. 123. Augustine (note 79), p. 108, reports with some exaggeration a locust plague of 204 B.C. as follows: "One may also read that

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Africa, which had by that time become a province of Rome, was visited by a prodigious multitude of locusts, which, after consuming the fruit and foliage of the trees, were driven into the sea in one vast and measureless cloud; so that when they were drowned and cast upon the shore the air was polluted, and so serious a pestilence produced that in the kingdom of Masinissa alone they say there perished 800,000 persons, besides a much greater number in the neighboring districts. At Utica they assure as that, of 30,000 soldiers then garrisoning it, there survived only ten."

- ⁹³S. R. Driver, *The Books of Joel and Amos* (Cambridge: Cambridge University, 1897), pp. 82-91; Ovid R. Sellers, "Stages of Locust in Joel," *American Journal of Semitic Languages* 52 (1935-36), 81-85; John A. Thompson, "Joel's Locusts in the Light of Near Eastern Parallels," *Journal of Near Eastern Studies* 14 (1955), 52-55.
- ⁹⁴Whiting, p. 516: "Each female, now loaded with eggs, seeks a place suitable to deposit them, and with her ovipositors is able to sink a hole as much as 4 inches deep through hard compact soil, such as would try the strength of human muscles even with iron tools."
- ⁹⁵In Joel 1:4 and 2:25 the *yeleq* may represent the young larval stage of the locust. The *New English Bible* and *Jerusalem Bible* suggest "hopper." But in Jer. 51:27 the *yeleq* is described as "rough," alluding to the horn-like sheath which covers the rudimentary wings of the nymph stage. In Nah. 3:16 the latest nymph stage is indicated as the locust moults and then unfurls its wings.
- ⁹⁶O. R. Gurney and J. J. Finkelstein, ed., *The Sultantepe Tablets* (London: British Institute of Archaeology in Ankara, 1957), p. 243, cited in Hayim Tawil, "A Curse Concerning Crop-Consuming Insects in the Sefire Treaty and in Akkadian," *Bulletin of the American Schools of Oriental Research* 225 (Feb., 1977), 59-62.
- ⁹⁷W. R. Halliday, *Greek and Roman Folklore* (New York: Cooper Square, 1963), p. 60.
- ⁹⁸Danby (reference 73), p. 198.
- ⁹⁹Edwin M. Yamauchi, "Anthropomorphism in Ancient Religion," *Bibliotheca Sacra* 125 (1968), 29-44.
- ¹⁰⁰C. S. Lewis, *Miracles* (New York: Macmillan, 1947), p. 140.
- ¹⁰¹C. F. D. Moule, *Man and Nature in the New Testament* (Philadelphia: Fortress, 1967), pp. 20-21.

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