

Introduction

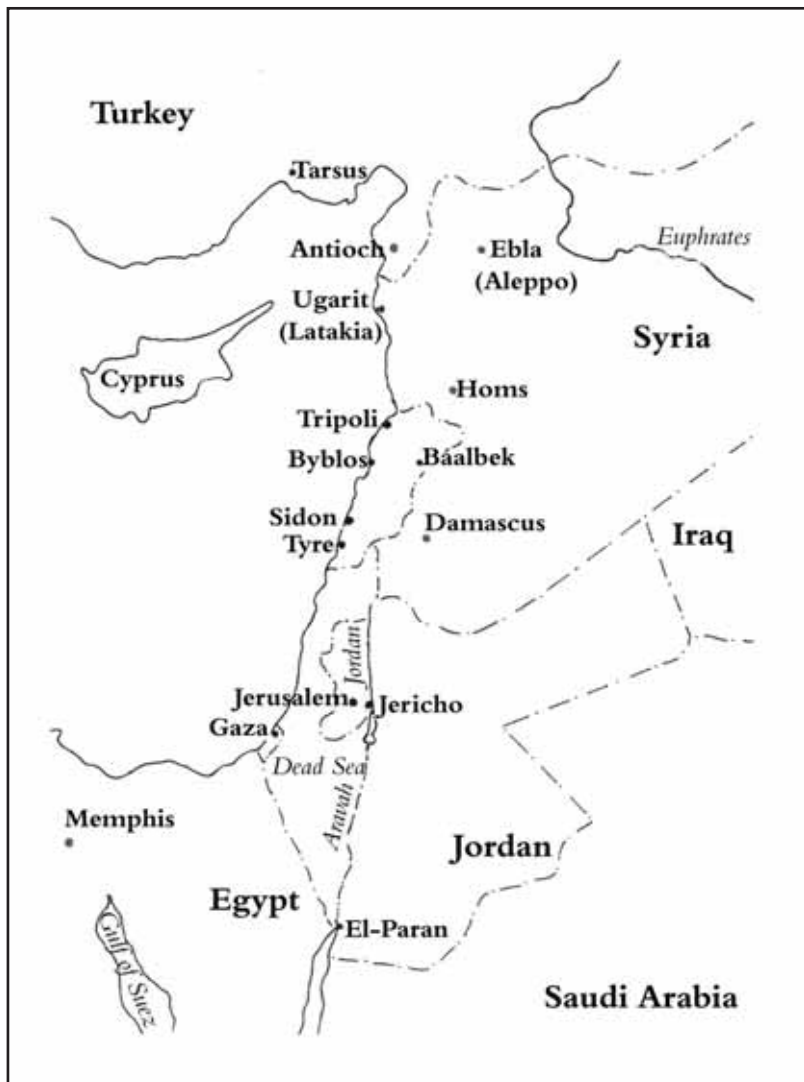
The narrative of the destruction of Sodom and Gomorrah and the transformation of Lot's wife into a pillar of salt, as related in the Book of Genesis, has intrigued generations. Destroyed as a consequence of God's displeasure with the inhabitants because of their lax morals, the five 'cities of the plain' (Sodom, Gomorrah, Admah, Zeboiim, and Zoar) have presented archaeologists with both an enigma and a challenge. Did the cities exist? If so, where? Answers to these questions have hitherto defied systematic search. The two issues remain unresolved.

There are few who haven't heard the story of how God destroyed these ancient cities with fire and brimstone, saving only Lot and his daughters. Genesis depicts Lot's wife being turned into a pillar of salt because she looked back at the scene of carnage from which they were fleeing. St. Luke's gospel (17:32) warns 'Remember Lot's wife', and St. Peter in his second epistle (2:6-7) also makes reference to the destruction of Sodom and Gomorrah, as does Ezekiel (16:49-51). Over the centuries numerous sermons and homilies have been delivered using this dramatic Old Testament story, urging people to turn from sinful ways into the paths of righteousness.

How real was the drama told in this tragic and spectacular tale? When a violent and vivid event like this occurs in the very dawn of history, an event which cannot be rationalised or understood at the time, it is inevitable that myth and legend arise and, as a consequence, the disaster is assigned to immorality and a wrathful God.

The dictionary defines myth as a 'fable containing an historic or moral truth', whereas a legend is 'an unauthenticated fable'. This book might well be subtitled 'Post-Mortem on Sodom' being an attempt to dismiss both myth and legend surrounding the Biblical account, and to rationalise the destruction using scientific knowledge and argument. This does not displace any theological perspective, or even dispute the account in the Book of Genesis. As will be seen it augments these by presenting a solid technical argument which accounts not only for the existence of Sodom, but the mechanics of its catastrophic demise. It is hoped it will prove useful to those interested in the resolution of this ancient enigma, whatever their profession, background, or religion.

Numerous scholars have concluded from the evidence available that the legendary cities did exist, even though they may dispute their locations:



1. Regional map of the Near East.

There can hardly be any doubt that the Biblical traditions about Sodom and Gomorrah . . . are only part of a complex of ancient and hazy recollections that go back to some actual event. (Vawter, 1977)

It is quite possible that the tradition contains a distant recollection of an ancient catastrophe. (Rad, 1971)

In 1975 a great archive of clay tablets dating to 2400-2350 BC was discovered at Tell Mardikh, ancient Ebla, in northern Syria. One of the tablets is a geographic atlas listing 289 place names. An analysis of two

segments of the list by Shea (1979) indicates that they are sites located in Palestine, possibly places visited by merchants. The second segment traces a route from Syria south through the central hill country of Cisjordan, along the western shore of the Dead Sea, south of the Dead Sea Plain and then north along the east side of the Plain and Dead Sea. In the area corresponding to the east side of the Dead Sea Plain there are two places named – Admah and Sodom. (Wood, 1999)

The unearthing of the royal archives at Ebla in 1976 has brought many new facts to light. It was reported then denied, that one of the Ebla tablets lists the five ‘Cities of the Plain’ in the same order as Genesis (Ch 14). (Hattem, 1981)

The discovery of the Ebla tablets at Tell Mardikh in 1975, near Aleppo, Syria, was a watershed in Middle Eastern archaeology. Almost fifty years earlier, in 1929, a similar discovery had unearthed Canaanite tablets on the Mediterranean coast at Ugarit, now Ras Shamra, near Latakia, Syria. The initial find at Ebla resulted in the exhumation of 1800 intact tablets, 4700 in fragments, and numerous chips relating to the period c. 2500-2250 BC after which the city was destroyed. More tablets were discovered in later digs, the total understood to number between 4000 and 5000. Though the clay tablets had not been fully translated it was clear that by 2500 BC Ebla was politically influential, and possibly dominant, over a vast region extending as far south as Damascus.

Dr Giovanni Pettinato, a Sumerologist who was engaged in the deciphering of the tablets, noted they possessed a markedly Sumerian influence, and concluded the Sumerian writing system was used by the scribes as a basis of composing a non-Sumerian West-Semitic text, i.e. Syro-Palestinian or Caananite.

It was apparent that the Eblaites worshipped a pantheon of gods, some five hundred all told. However, there was a hint of henotheism, i.e. the worship of a supreme god above all other gods. There were also lists of geographical place names with which the king of Ebla conducted trade, and among these Pettinato reported (in 1976) that all five ‘cities of the plain’ were mentioned, but in reverse order to those listed in Genesis. He was later to revise his statement to the effect that only the cities of Sodom and Gomorrah could be positively identified, but their names were found on more than one tablet.

The importance of the discovery of the tablets at Ebla cannot be underestimated. Not only did they reveal Ebla to have been a capital city, but one which was large and powerful in terms of trade and commerce, with wide-ranging influence. According to Roux (1964) the tablets provide a wealth of information on the organisation, social structure, economic systems, diplomatic and commercial relations, areas of influence, and cultural affinities of this long forgotten kingdom, and will continue to do so as long as studies continue into their contents. No city-state of the period has bequeathed such a legacy.

Professor Biggs (1974, 2005) of the University of Chicago, published a list of geographical place names discovered at Abu Salabikh (ancient name unknown), close to Nippur, the capital of ancient Sumer. This list received scant attention the first time it was published, as it was compiled in Sumerian logograms and, thus, largely unintelligible. However, the list from Ebla was spelt phonetically, thereby facilitating direct comparison of the two discoveries.

The mention of Sodom and Gomorrah on the Ebla tablets implies two things. Firstly, the cities existed at the time of their writing. Secondly, that trade connections existed between Ebla and the 'cities of the plain'.

Though pictograms were used in cuneiform texts, and hieroglyphs in Egyptian texts, to denote objects and numbers, written language appears to have evolved not much earlier than about 1000 BC. The first five books of the Old Testament, the Pentateuch, are considered to have been compiled in the present format mostly in the period 400-300 BC. The vivid nature of the catastrophe that engulfed Sodom and Gomorrah would have ensured its inclusion in the first book of the Pentateuch, i.e. Genesis, if only for the moral lessons the event demanded; prior to that an oral tradition would have prevailed.

The destruction of the temple in Jerusalem by the Romans in AD 70 resulted in the loss of many ancient Hebrew scrolls. This entailed much rewriting. It would have been perfectly natural for any scribe, in the predicament he found himself, to have drawn upon all available sources to resurrect Hebrew history, and this would not have excluded recourse to myth, legend and folklore. Perhaps, as a consequence, it is inevitable that a dichotomy relates to certain passages, in particular to the story of Abraham and Lot set against the dramatic backdrop of the destruction of Sodom.

Though there is consensus of the actual existence of Sodom and Gomorrah in the vicinity of the Dead Sea, there is little consensus among Biblical scholars regarding how or when the cities met their fate. Hattem (1981) quotes Freedman (1977) as saying:

While I do not think we can pin down the dates of the Genesis 14 stories precisely, it seems to me most likely that they belong to the period around 2400 to 2100 BC. Attempts by other scholars to resolve this issue more closely, with no input of science, have generally relied on genealogical studies of the Patriarchs – Abraham, Isaac, Jacob and Joseph.

Tubb (1998) gives his opinion from an archaeological viewpoint, stating:

The question of the historicity of the Patriarchal narratives is a complicated and largely unanswerable one. Archaeology cannot hope to prove the existence of Abraham or Isaac, or indeed any of the other characters referred to in the book of Genesis. On the other hand there is little reason to doubt that in very general and very basic terms the founding fathers of what was to become Israel might well have entered Canaan at some stage

during the third or early second millennium. Unfortunately this is about all that can be said. For it must be appreciated that the stories relating to the Patriarchs were not put into their final form until sometime between the seventh and fifth centuries BC.

Alter and Kermode (1987) stated bluntly – '[The Old Testament] is a rather loose anthology that reflects as much as nine centuries of Hebrew literary activity.' This suggests a certain degree of flexibility is desirable in interpreting Biblical texts.

Scholarly opinion suggests the likelihood that the writers of Genesis, preoccupied in recording the Patriarchal narrative, included the Sodom and Gomorrah event to demonstrate God's power for a multitude of possible reasons. The power, which had manifested itself in the Creation of Earth and all therein, could also be summoned to wipe out those who lived in sin or disobedience. A dire warning if ever there was!

Trifonov (2007) expressed the opinion that the destruction of Sodom and Gomorrah with brimstone and fire, as depicted in the Bible, indicated influence of volcanic action. He suggests the fate of Sodom and Gomorrah more likely rested with earthquake and flood as the Dead Sea basin shows no evidence of recent volcanism. This suggested to him that the oral tradition from these two separate geologic events may have been merged in the Biblical account. The closest location to the Dead Sea valley where volcanic evidence has been noted is at two settlements in southern Syria, Khirbet El-Umbashi and Hebariye, where many animal bones were discovered buried in basaltic lava. The settlements were dated to the latter half of the third millennium BC. He concludes:

Located in the Dead Sea region, Sodom and Gomorrah were most probably destroyed by a strong earthquake or flood [or both], but the fresh memory about two settlements perishing from a volcanic eruption caused the population to merge these two events.

Viewing the incident through twenty-first century eyes, it is tempting to ask what other cities have been similarly destroyed since in like manner, for equally just cause. The moralist would have little difficulty in assembling a long list of potential candidates for destruction, both in the past and in the present – but God has withheld His hand and, apparently, continues so to do. His wrath does not appear to have been repeated in such a dramatic way, as we are urged to believe was inflicted upon the inhabitants of Sodom and Gomorrah. Why? It is difficult to accept that the citizens of Sodom were any more sinful in their sexual perversions than the world today! And if, as is concluded in this book, the cities of Sodom and Gomorrah had a sound economy based on the industrial production of a desirable commodity, which was tantamount to a virtual monopoly, then the behaviour of its citizens is likely to be no better, or any worse, than the average industrial centre of the modern era fortunate to be bequeathed with similar riches.

The conclusion must be that the destruction of Sodom and Gomorrah was not the unique moral nemesis as portrayed by the writers of Genesis. The fact it can be explained by the interaction of natural physical processes goes a long way in providing reassurance that the God of Creation is, indeed, a long-suffering and merciful God. Nevertheless, it is understandable that the mysterious circumstances of the destruction of those notorious cities supplied fuel for much priestly speculation in a bygone age when superstition ruled on matters inexplicable.

One of the difficulties faced by archaeologists in dating events of the long distant past, whether those events are Biblical or not, is that for centuries life changed very little or, when it changed it changed slowly. By contrast the present age is one where changes of lifestyle often occur on a daily basis. To choose a trivial example, a person's age can be determined fairly accurately by which film star they remember best, or what music recordings they cherish whether on vinyl, tape or CD. But four to five millennia ago the sameness of everyday life understandably presents hurdles in dating events with any great accuracy. In tackling this problem archaeologists have placed great reliance on the identification of pottery shards, among other artefacts, as changes in pottery manufacture, glazing and decoration during the course of history helps to establish a timeline of events. It also assists in determining patterns of trade.

Archaeological investigations in the vicinity of the Dead Sea have identified a number of sites which can be traced back to the Early Bronze and Middle Bronze ages. The most notable of these are Safi, Numeira and Bab edh-Drha located towards the southern end of the Dead Sea. It is tempting to associate some of these with the infamous 'cities of the plain'. However, such speculation is unprofitable if we are to place any reliance on the Genesis account in our search for Sodom, as the account records in vivid detail how the cities were totally obliterated, suddenly and without trace, with the exception of Zoar. It was a perfect apocalypse. Therefore, it is obvious that if there aren't any remains of Sodom or Gomorrah (at least on land) then, *a priori*, neither Safi, Numeira, nor Bab edh-Dhra can be considered prime candidates for either. Also, placing five of the reputedly most degenerate cities of antiquity on a salt plain in the South Basin of the Dead Sea, as some have suggested, hardly makes sense. From the aspect of town planning alone, and the necessity of possessing a reliable source of fresh water for domestic consumption, it is obvious the locations of Sodom and Gomorrah, and their satellite cities, must be sought on the alluvial fans, of which there are several in the general area.

The Greek geographer Strabo (c. 54 BC – AD 21) travelled extensively throughout the Roman world in the compilation of his monumental work *Geographica*. In this he describes the Dead Sea in great detail, and provides a useful commentary regarding the destruction of Sodom and Gomorrah. Strabo is reported as being well acquainted with Egypt, so it is likely he visited the Dead Sea. *The New Encyclopaedia Britannica* (fifteenth edition, 1992) states that:

Strabo's descriptions of Mesopotamia, Syria, Palestine, and the Red Sea (Book XVI) were based on the accounts of the expeditions sent out by Mark Antony (about 83 to 30 BC) and by the emperor Augustus, as well as on chapters on ethnography in Posidonius and on the book of a Red Sea voyage taken by the Greek historian and geographer Agatharchides (second century BC).

Bunbury (1959) says this of Strabo's work:

The *Geography* of Strabo is not only the most important geographical work that has come down to us from antiquity: but it is unquestionably one of the most important ever produced by any Greek or Roman writer. It was indeed, as far as we know, the first attempt to bring together all the geographical knowledge that was attainable in his day, and to compose what would be called in modern times a general treatise on geography.

One of Strabo's descriptions of the Dead Sea follows:

Many other evidences are produced to show that the country is fiery; for near Mossada are to be seen rugged rocks that have been scorched, as also, in many places, fissures and ashy soil, and drops of pitch dripping from smooth cliffs, and boiling rivers that emit foul odours to a great distance, and ruined settlements here and there; and therefore people believe the oft-repeated assertions of the local inhabitants, that there were once thirteen inhabited cities in that region of which Sodom was the metropolis, but that a circuit of about sixty stadia [11 kilometres] of that city escaped unharmed; and that by reason of earthquakes and eruptions of fire and of hot waters containing asphalt and sulphur, the lake burst its bounds, and rocks were enveloped with fire; and as for the cities, some were swallowed up and others abandoned by such as were able to escape. (Book XVI, 2, 44)

This description by Strabo is of considerable value, because it was written by a geographer well versed in recording factual observations with the greatest accuracy possible, whether or not they were his own. Though written some two thousand years after the event it is, nevertheless, of inestimable value. It is also the only written evidence we have other than that recorded by the writers of Genesis, thereby giving credence to the Biblical account.

If, as Strabo states, 'Sodom was the metropolis' then it follows there should be some economic *raison d'être* for the existence of Sodom and its satellite cities. This can be explained, in part at least, by the exploitation of the region's bitumen resources for which the Dead Sea was renowned. The Romans named the Dead Sea *Lacus Asphaltitis*, and Strabo describes how the bitumen was harvested from the sea when risings occurred, thereby indicating bitumen production to be still practised during the Roman occupation. Therefore, the bitumen industry of the

Dead Sea can be concluded as having not only existed for many centuries, but was of considerable economic importance both before and after the destruction of Sodom.

It is likely that this industry was supported by the extraction of other useful raw materials, e.g. salt, limestone, and silica sand, which abound in the region. Therefore, it is not beyond the bounds of possibility that the Sodomites represented the world's first oil refiners and chemical engineers, crude though their engineering talents may have been in comparison to ours today.

Assuming Sodom to be the prime centre of commercial activity, one must focus on the area where bitumen risings predominate for its location, and where an abundant supply of fresh water is assured to support a large metropolitan population, probably the largest population of any of the 'cities of the plain'.

Historical studies into the seismicity of the Dead Sea valley have concluded that the destruction of Sodom can be dated to about 2350 BC, whereas Biblical scholars generally attribute the story of Abraham and Lot to some three to four centuries later, i.e. 1900-1800 BC, though there is no particular consensus. This seeming contradiction does not discredit the Biblical account of the destruction of Sodom, but instead it enhances it. By its selection as a backdrop to the Abraham-Lot saga, which is central to much of Genesis, it adds considerable force to the moral message.

Neev and Emery (1995) go further in linking the destruction of Sodom and Gomorrah to a cataclysmic seismic event. They write:

The destructive potential of earthquake energy affecting the trough of a basin filled with uncompacted sediments [i.e. the Dead Sea] would be much greater than along its solid perimeter, as illustrated by the 20th-century earthquakes at Mexico City, San Francisco, and Los Angeles. The Sodom and Gomorrah event could have been even more severe because other factors were involved in it, such as the gliding of sedimentary fill [i.e. a landslide] toward the centre of the basin. . . . Biblical script derived from oral tradition of the disruption of Sodom and Gomorrah as a supernatural event should not be dismissed as an exaggerated fictitious story written to satisfy religious motives.

By these remarks Neev and Emery do not rule out a liquefaction induced landslide which led to the destruction of Sodom and her satellite cities, followed by an equally devastating tsunami. In fact they imply its every possibility.

As a people, what were the inhabitants of Sodom like? The Biblical account portrays the Sodomites as lewd and lustful, prosperous but profligate. This view may or may not be true, but the moral tone of Genesis suggests it may be a sweeping generality which, of course, is incapable of authentication.

Rappoport in his *Ancient Israel: Myths and Legends* (1928) retells many of the familiar Bible stories, but he draws upon a wider selection of sources claiming to have consulted original documents in Hebrew, Aramaic and Greek, the majority

of which are inaccessible to the average reader. One of these appears to be the apocryphal Book of Jasher, which though of doubtful authenticity is considered to possibly represent a 'lost book of the Bible', as various stories are duplicated in the Old Testament. In one chapter – The Sin of Sodom – Rappoport depicts the Sodomites as mean and grasping, as does the Book of Jasher. He writes in the following terms:

Moreover, the inhabitants of Sodom never gave of their substance to the poor and the alien who came to their city. They passed a law according to which all aliens were to be expelled, and poor men seeking food never to receive a piece of bread. Charity was a crime punished heavily within the walls of Sodom. The men of Sodom elected as their judges and rulers men of falsehood and wickedness, who mocked justice and equity and committed evil deeds. Whenever a stranger happened to enter the city of Sodom, the inhabitants at once took away his goods and substance, divested him of his clothes, and sent him away poor and naked. There was no use to appeal to the laws of the city, for the judges themselves approved such deeds.

Thus the inhabitants of Sodom, who knew neither charity nor human kindness, waxed rich and exceedingly prosperous, and lived in peace. They even passed a law that whoever was guilty of a charitable action, were it only the gift of a piece of bread to a starving beggar, was to die.

Rappoport paints the Sodomites in harsh and unremitting tones. The reason for this might be explained by the exploitation of an economically vital and strategic resource, such as Dead Sea bitumen, which constituted a virtual monopoly jealously guarded by the authorities. Understandably, the wealthy traders and merchants would have been eager to protect the monopoly they held with the utmost zeal, and this zeal may have extended into broadcasting lies about themselves to discourage outsiders penetrating their domain. The supply of bitumen, and allied products into Egypt and elsewhere, was the lifeblood of Sodom – those who had no business there would have been given short shrift, in case they were interlopers, spies, or other undesirables. In this sense the uncharitable attitudes of the merchants of Sodom probably differed little from those of 'big business' in any century thereafter.

As with Genesis, we have no way of judging the veracity of Rappoport's description of Sodom or the Sodomites, and whether it was based on the Book of Jasher or from elsewhere. However, there is a basic similarity between the available accounts describing the destruction of Sodom and Gomorrah. Rappoport writes in his translation; 'what had been prosperous towns and laughing verdant valleys were now a heap of ruins, and the smoke of the country which went up as the smoke of a furnace was seen far and wide.' In Genesis (20:28) we read: 'And he [Abraham] looked towards Sodom and Gomorrah, and toward all the plain, and beheld, and, lo, the smoke of the country went up as the smoke of a furnace.'

The practice of sodomy has always been associated with sinfulness of the Sodomites, from which it derives its name, though there is no direct Biblical evidence that it existed. Homosexuality was rife throughout much of the ancient world, being more prevalent in some societies than others, and there is evidence that the fertility rites of the Sodomites, in their worship of Baal, involved both male and female prostitutes. The Book of Jasher (18:12-15) describes the revelry of the inhabitants of Sodom and Gomorrah in the following verses:

And they had in their land a very extensive valley, about a half day's walk, and in it there were fountains of water and a great deal of herbage surrounding the water.

And all the people of Sodom and Gomorrah went there four times in the year, with their wives and children and all belonging to them, and they rejoiced there with timbrels and dances.

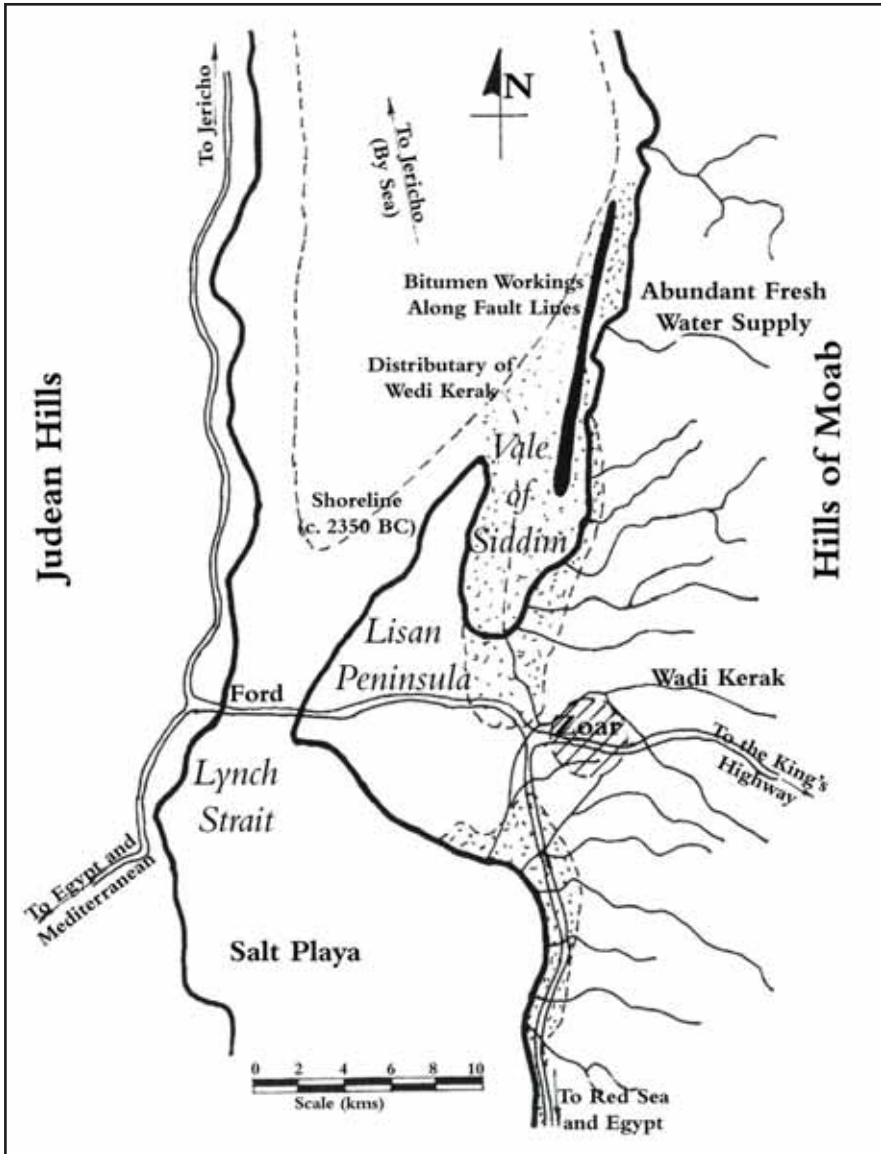
And in the time of rejoicing they would all rise and lay hold of their neighbours' wives, and some, the virgin daughters of their neighbours, and they enjoyed them, and each man saw his wife and daughter in the hands of his neighbour and did not say a word.

And they did so from morning to night, and they afterward returned home each man to his house, and each woman to her tent; so they always did four times a year.

What follows in this book is an attempt to reconstruct the disaster that engulfed the 'cities of the plain' drawing on the evidence available, but since this occurred in the very dawn of history it is not without its own peculiar and unique challenges. Understandably, therefore, the contents of this book cannot be considered authoritative; neither can they be considered all-encompassing. However, it is hoped they will be viewed by archaeologists, historians, laymen, and others, as a contribution from a technological perspective to a better understanding of that age-old question – what happened to Sodom and Gomorrah?

Julian Champkin (2001) graphically summed up the cataclysm that befell the 'cities of the plain':

With the earthquake, with the flames of burning methane and black smoke of boiling bitumen, another terror in the night for the sinners of Sodom and neighbouring Gomorrah. The very ground beneath their feet betrayed them. They fell and floundered as the ground failed to hold, while their homes sank before their eyes into the once solid earth. It drowned men, women and children, and all their livestock.



2. The postulated location of the Vale of Siddim and Biblical Zoar.

The conclusions of this book may be summarised as follows:

- (1) The destruction of Sodom and Gomorrah, and the other 'cities of the plain', was an actual historical event. Reconstruction, based on scientific evidence, supports the Biblical account.
- (2) The catastrophe occurred around 2350 BC, and was a consequence of earthquake induced liquefaction, the first in Judaeo-Christian

history. It involved a massive amount of material, which slid beneath the surface of the Dead Sea generating a tsunami wave which would have swept away all shoreline settlements, and struck well inland to both the north and the south. As Strabo wrote so succinctly in the excerpt reproduced earlier, 'the lake burst its bounds'. The sequence of events, from start to finish, would have lasted no more than about twenty minutes.

- (3) Sodom was the centre of an industrial metropolis engaged primarily on the harvesting and processing of bitumen from the Dead Sea.
- (4) The bitumen trade of the Sodomites was mostly with Egypt.
- (5) The destruction of Sodom would have totally disrupted the bitumen trade, led to turmoil in commerce with its inevitable impact on regional politics, and initiated large-scale emigration out of the Dead Sea region to other parts of Canaan and beyond.
- (6) The legendary Vale of Siddim, in which Sodom was sited, was located at the southeast extremity of the North Basin of the Dead Sea within the Bay of Mazra'a (Jordan).
- (7) The bathymetry of the North Basin indicates the existence of a 'scar surface' in the Bay of Mazra'a, suggestive of a major underwater landslide involving a volume of about 3.5 cubic kilometres, i.e. 3.5 billion cubic metres. Debris mounds are evident at, or close to the foot of the slide in the general vicinity of Longitude 35° 31'E and Latitude 31° 26'N. This area, it is postulated, is where the remains of Sodom are most likely to be found. Though lying within Jordanian territorial waters at depths of between 300 and 700 metres, the target area is adjacent to the International Boundary, the slide debris extending into Israeli waters.