

*Topography is often critical to the outcome of battles. This is particularly true for the Sinai Peninsula which is made up of contrasting kinds of terrain. This article describes the peninsula and points out the routes and areas that have historically been used in the wars between Israel and Egypt.*

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**T**HIS month, the entire Sinai Peninsula is due to be returned by Israel to Egypt as part of the peace agreement between the two countries. Henceforth, the strategists will once more engage

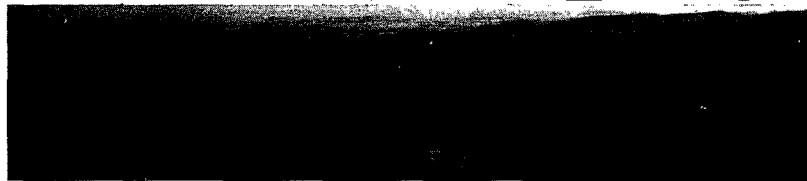
with greater intensity in the study of the military options in the peninsula in the event of a new deterioration in the relations between the two states.<sup>1</sup> Will there indeed be new options for the armies?

Arnon Soffer

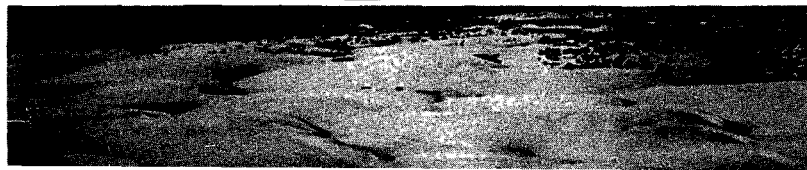
## The Wars of Israel in Sinai:



# Topography



# Conquered



This article aims to show how the physical surface of Sinai dictated both to Israel and Egypt the axes of warfare and the key points in the wars of 1948-49, 1956, 1967 and 1973. Further, it intends to prove that the same vulnerable points in the topography that played a part in the earlier wars may be the key points again in a military conflagration in the future. These statements are based on the assumption that, in the future also, in spite of the introduction of new arms, the war will proceed in the Middle East and will be decided along the axes of advance of mechanized vehicles—that is, tanks.<sup>7</sup>

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#### Transport Routes—Basic Assumptions

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Wars are largely battles for routes. The ability of an army to move into battle and its mobility in the battle, control of territory, and transfer of men and equipment all depend on control of the network of routes within the battle sector. Throughout history, good transport routes, especially when there was no alternative, have been theaters of battle.

A route having the following characteristics is the most advantageous:

- It connects the starting point to the target by the shortest distance.

- It traverses a plain.

- It has no obstacles such as dunes, sands, marshes, terraces or craters. A route with a hard surface is particularly useful (such as Hamada, the rocky uplands of a desert).

- It does not traverse mountain passes which could become death traps.

- It has water sources. Until recently, this was an essential condition, but this factor has lost some of its importance in modern warfare.

In the following, we shall see how the

topography of Sinai dictated unequivocally the routes in it and thus, in fact, determined the axes of warfare there.

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#### The Topography of the Sinai Peninsula

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*The coastal strip.* The northern boundary of the peninsula is the shoreline of the Mediterranean Sea. The section between Gaza and Abu Oudeh (west of El-Arish) is accessible from the sea as the coast is sandy. From Abu Oudeh to the railway station at Rumaneh, the coast is a narrow offshore bar which encloses the Bardawil Lagoon whose greatest width is approximately 20 kilometers. The Rumaneh area is also sandy for a stretch of 10 kilometers and also is accessible from the sea. From Rumaneh to Port Said, a new offshore bar begins which encloses a broad salt marsh. Neither the sector of the swamp nor that of the salt marshes is accessible from the sea.

The south of the peninsula is surrounded by the Red Sea (from the Gulf of Aqaba to the Gulf of Suez), the length of the coast being 643 kilometers. The coastal strip on the Gulf of Aqaba is, for the most part, hilly. In some parts, it is not passable even by foot. Penetration from the sea is also difficult over lengthy sections owing to the coral reefs that protect the shore. Two large silt fans stand out along this coast, one at Nueiba (Neviot) the other at Dhahab (Di-Zahav), but an invader attempting to gain access into the peninsula this way would be caught up in the maze of narrow valleys of difficult passage.

The coastal strip on the Gulf of Suez is constructed differently. For the most part, it is a flat shore, about 15 kilometers wide, and only a small section of it is hilly with almost no possibility of passage.

Here and there, coral reefs separate the shore from the open sea and make penetration by an enemy difficult.

In general, then, this is an area where invasion is possible and it is penetrable over large sections. In part of it, oil fields are found opposite the Egyptian coast. However, an enemy invading on this or any other section of the Red Sea coast would find it difficult to advance toward the interior of Israel as is explained below.

*The interior of the peninsula.* From the viewpoint of transport, two main topographical units in Sinai may be distinguished: the south of the peninsula and the north.

The southern unit is a high area, fortified by many narrow twisting gullies, their beds covered by sand and difficult for traffic. This region is separated from the northern unit by a system of high cliffs (the Thia cliffs), rising to a height of 400 to 600 meters, which extend from the area of Abu Zneima in the west to the region of Nueiba in the east (see Figure 1). This system of cliffs splits Sinai in half. In the past, it was possible to pass between the two units only along the coast of the Gulf of Suez or through the large riverbeds in eastern Sinai (the Israeli Defense Forces 9th Brigade did this in the Sinai war in 1956) and, more recently, along the new Elath-Ophira road.

For this reason, the southern unit has never served as a theater in the wars between Israel and Egypt, and control of this part was always conditional upon control of the northern unit. However, this does not mean that, in the future, there will be no possibility of control of part of southern Sinai independent of the north. Possibly, this may be because the Elath-Ophira road will allow easy access to the south from the direction of Israel or because of Egyptian control of some part

of it with supply routes of equipment and men via the sea. The need to guard the Strait of Tiran, the rich oil fields of southern Sinai and those that are yet to be discovered, and the possibility of tourism that the region offers all impart to this section an importance which it never had before.

The northern unit is divided into two subunits from the viewpoint of passability. The southern subunit is marked by broad Hamada plains and the extensive flood plains of the El-Arish riverbed whose height is, on average, 500 meters. These plains stretch from the region of the Thia cliffs and Jebel Egma to the mountain chain in the north, and from the mountain chain in western Sinai to the Negev and the Arava in the east (Figure 1). The mountain chain in the west crosses from the north of the Thia cliffs to the Bir Gafgafa (Refidim)—Tasa—Ismaïlia road, and its height varies from 950 meters in the south to 600 to 700 meters in the north. It is broken by several dry rivers running south and north (Figure 2).

The western side of this chain is marked by a line of cliffs (a branch of the Syrian-African rift) which extends for 120 kilometers. The line of these cliffs and the Gulf of Suez coast is separated from the Suez Canal by a plain 15 kilometers wide in the south broadening to about 30 kilometers in the north. This plain is crossed by wadis, sand fans, low hills and sands, especially in its northern part. This area is largely passable for a length of about 80 kilometers, as far as the region of Jebel Haman Faron in the south.

The northern subdivision is composed of several columns of mountains whose general direction is from the east to the west. These are the Jebel Halal, Jebel Yalek and Jebel Um Hashiba which is the connecting point between the east-west

# Sinai—Topography

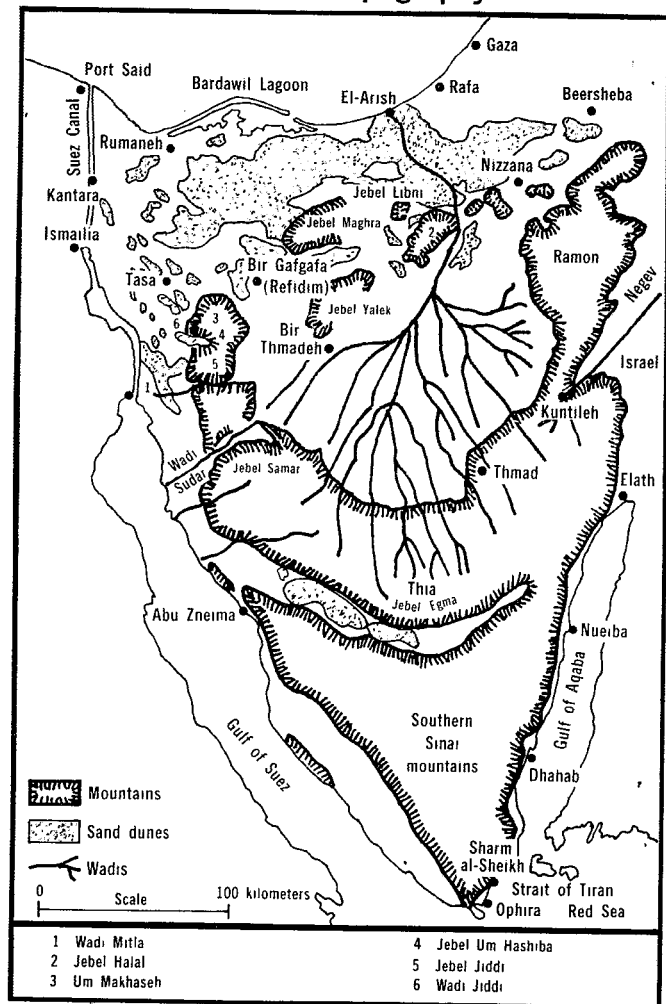


Figure 1

column and the western column. The northern column is composed of Jebel Libni and Jebel Maghra (Figure 1).

From the north of this column extends the widest dune area in Sinai, beginning near the Suez Canal in the west and terminating in the Halutza and Beersheba sands in the Negev. This area is 200 kilometers long, and its maximum width is 40 kilometers. It is interrupted once by the El-Arish riverbed which crosses it. The dunes, for the most part, are steep on their other side, and their ridges look like elongated knife blades. It is, therefore, almost impossible to cross these sand barriers with any kind of vehicle.

To the north of the dune region extends the northern coast plain of Sinai consisting of sand dunes, sand flats, salt marshes and swamps. The area is rich in ground water, both sweet and salty, and there are hundreds of palm trees along its length.

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### The Route Map of Sinai

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From the description of the components of the landscape, the map of the axes of movement in Sinai may be drawn (Figure 2):

- The northern coastal route (the historical sea route) from Gaza through El-Arish to Kantara.

- The route that passes between the two mountain columns mentioned above. It begins at Beersheba, continues through Nizzana, Abu Agheila and Bir Gafgafa, and ends at Ismailia.

- From Nizzana to Kassima, Bir Hasneh and Bir Thmadeh, and thence to the Mitla and Jiddi Passes or the Sudar Pass. From Kassima, the region of the great plains opens where movement is possible in all directions (to Kuntileh and

Elath, to Thmad, Nakhl and the Mitla Pass).

- A road from Elath to Thmad, Nakhl, the Mitla Pass or Wadi Sudar at the approaches to the town of Suez.

Connection between the four axes may be made at several points. Between the first and second axes, there is an easy passage via the El-Arish riverbed; between the second and third axes, there are four links (Figure 2); and, between the third and fourth axes, the entire plain is open to traffic.

The Bir Gafgafa—Thmadeh axis is connected to the Suez Canal as follows. The western mountain chain is split by a series of dry valleys which serve as passes. In three of them, traffic is possible, and, in two, it is possible after minor road works. The Jiddi, Mitla and Sudar Passes lead to the Suez Canal and Ras Sudar and the south. The two dry rivers in the south—Wadi Gharandal and Wadi Sumar—are difficult for passage at present, but may be made usable for motor vehicles when necessary.

The network of roads in Sinai has developed along these axes. Every war has served to expedite the building of additional roads to the existing system (Figure 2).

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### Axes of Fighting in Four Israel-Egypt Wars

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A reconstruction of the battle theaters and the axes of advance of the Israeli army in three wars—1948, 1956 and 1967—provides the following picture. In general, it reflects the aim of the Israeli army to move from east to west toward the Suez Canal sector.

*The War of Independence (the Horev Campaign, 22 December 1948—8 January 1949).* The central problem was the cap-

# Sinai—Natural Routes and Roads

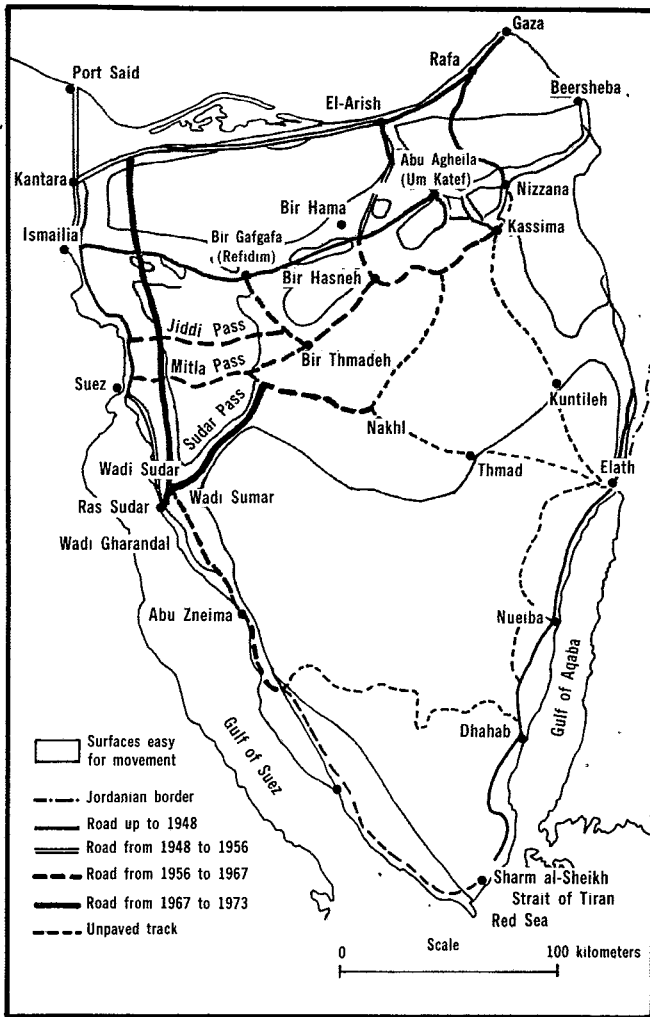


Figure 2

## The Horev Campaign 22 December 1948—8 January 1949

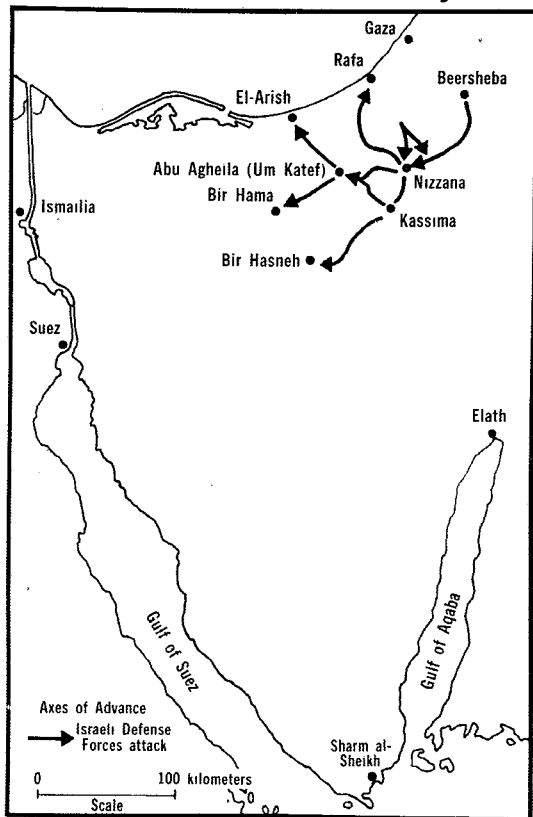


Figure 3

ture of Nizzana and then the Abu Agheila junction. After the forces had captured Abu Agheila (Figure 3), they moved in three heads: toward El-Arish, toward Bir Hama (the Ismailia axis) and toward Bir Hasneh (the axis to the south of the column of mountains). An additional force moved from Nizzana to Kassima.<sup>3</sup>

*The Sinai Campaign (29 October 1956—5 November 1956).* The main battle took place at the Abu Agheila junction. After this was taken, the Israeli Defense Forces moved in two main columns: to Bir Gafgafa via Bir Hama and to the Mitla Pass via Bir Hasneh. A third force attacked Rafa and moved along the north-

# The Sinai Campaign

## 29 October 1956—5 November 1956

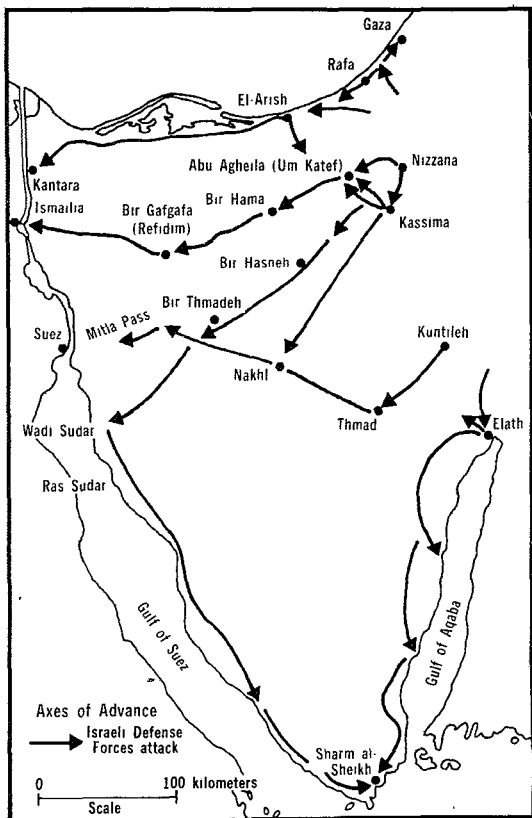


Figure 4

ern axis to El-Arish and thence toward Kantara (Figure 4). The fourth force made use of the Elath-Mitla route in order to reach Kuntileh and thence Thmad, Nakhl and the Mitla Pass. From here, the force crossed Wadi Sudar and reached the Gulf of Suez (Ras Sudar) and moved on from there to Sharm al-Sheikh. Another force

whose target had been Sharm al-Sheikh from the start set out from Elath and made its way via the winding wadis of eastern Sinai.<sup>4</sup>

*The Six-Day War (5 June 1967—10 June 1967).* To a large extent, this was a repeat of the deployments of the Sinai Campaign. One division fought for the

# The Six-Day War

## 5 June 1967—10 June 1967

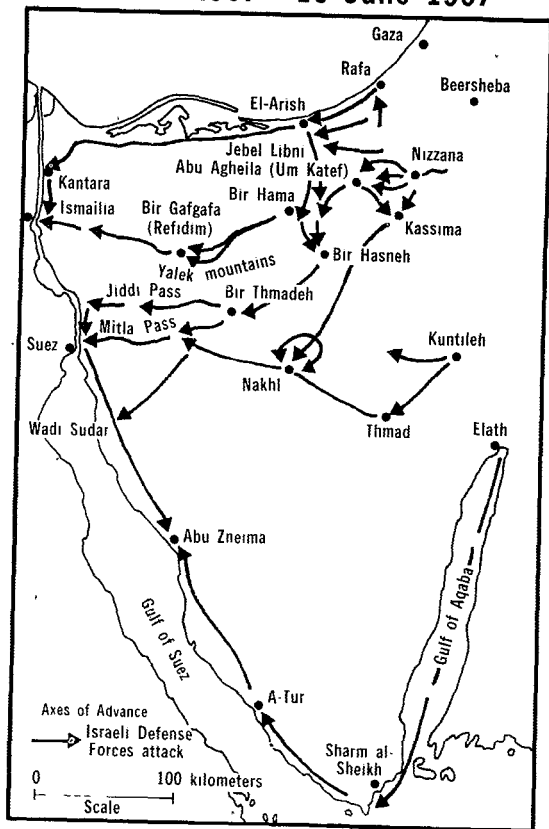


Figure 5

northern road leading to Kantara. A part of this force went south down the El-Arish—Bir Lahfan axis (Figure 5) and continued west along the Abu Agheila—Ismailia road. A second division bypassed the Abu Agheila junction (Um Katef) and continued along the southern axis toward the Wadi Sudar, Mitla and

Jiddi Passes, and thence via the passes to the canal. A third division attacked the Abu Agheila junction and continued to the Hamada plains to the south and from there to the Mitla Pass. A part of this force began its march from the area of Kuntleth, and it too swung toward the Mitla junction. The battle areas in this

war were the following junctions: Jebel Libni, Um Katef, several sections on the Gaza—Rafa—El-Arish axis, and at the entrance to the Mitla Pass.<sup>5</sup>

There is thus a great similarity in the axes and locations of fighting in the three wars.<sup>6</sup> The difference largely lies in the selection of the axis of surprise attack, the size of the forces and the quality of the weapons.

In summarizing these movements, several key points in Sinai stand out:

- *The Abu Agheila junction.* From here, easy routes extend to El-Arish, Niz-

zana, Kassima and Ismailia. It is almost impossible to emerge from that route owing to the physical conditions. Therefore, when Israeli Defense Forces attacked from east to west, they were obliged, in all three wars, to capture this junction first.

- *Rafa.* Like Abu Agheila, this served as a theater in all three wars.

- *The El-Arish junction.* The roads to Gaza, Kantara and Abu Agheila or Jebel Libni start here. It was a battle theater in two wars and a target in the third.

- *The passes in western Sinai—the Jiddi, the Mitla and the Sudar.* Passage



The southern part of the eastern coast of Sinai—a wadi near Dhabab village



Photos courtesy of author

The landscape along the road between El-Arish to Bir Gafgafa—one of the main battlefields in Sinai

through these from east to west leads to the Gulf of Suez or the southern stretch of the Suez Canal. Passage from west to east leads to the central plain of the Sinai. From there, the way to the Negev and every location in northern Sinai is open.

● *Bir Hasneh, Bir Hama (or the Jebel Libni junction), Bir Thmadeh (or the Mitla Pass from the east) and Bir Gafgafa (Refidim).* These four corners of the block of the Yalek mountains are of secondary importance.

*The 1973 Arab-Israeli War (6 October 1973—25 October 1973).* This war differed

from the previous wars in several ways, two of them topographical. The initiative this time came from the Egyptians who selected the axes of fighting, and the fighting began and was conducted on the western side of Sinai unlike the previous occasions.

In spite of these basic differences, in this case, like the others, it is seen (Figure 6) that the Egyptian effort was concentrated on the axes of advance listed above. As a result, the containing battles waged by Israel developed over a wide portion of the Kantara—El-Arish and

# The Western Sinai— 1973 Arab-Israeli War

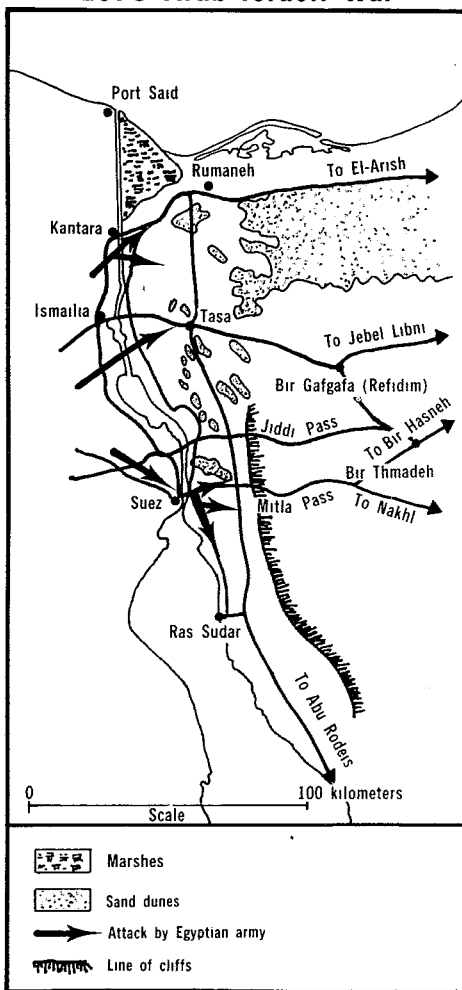


Figure 6

Ismailia—Tasa—Bir Gafgafa axes. The Egyptians tried to penetrate through the Mitla Pass and to advance toward the coast of the Gulf of Suez.<sup>7</sup>

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### Conclusions

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An examination of the topography of Sinai and the stages in the wars that preceded the 1973 Arab-Israeli War and the reconstruction of the Egyptian war aims in the 1973 Arab-Israeli War leads us to the conclusion that the natural routes of Sinai may once again play a part in a future military operation. As in the past, the only axes of advance are likely to be the Kantara—El-Arish—Gaza road; the Ismailia—Bir Gafgafa—Nizzana road; and the southern road on the Suez—Mitla—Kassima axis.

From these facts, a more general conclusion emerges. Basic topographic

features that underlie the axes of advance in the distant and recent past are likely to be the principal features in conventional wars in the future also—in spite of the continuous introduction of new types of weapons such as helicopters and amphibious vehicles. In the final analysis, the battle is determined by armor and other mechanized vehicles, and these are, of necessity, bound to easy axes. The war between Iran and Iraq bears out this fact yet again.

Finally, the physical determinism in Sinai will necessarily also shape the deployment of the international force that is to be established after the Israeli withdrawal to safeguard the separation of Israeli and Egyptian troops. This force is bound to be aware of those selfsame sensitive physical elements in northern Sinai which in the case of deterioration will be taken by the confrontation armies and thus cancel out the function of the force.

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### NOTES

1 On the fears of both sides of renewed warfare in Sinai see J. E. Moroz, *Beyond Security*. International Peace Academy Publication, Jerusalem, Israel, 1980.

2 And discounting the possibility of general nuclear war in the region.

3 The History of the War of Independence. *Ma'arachot*, 1966 p. 347.

4 A. Goian, *The Battles of Sinai*, Israeli Defense Force, Tel Aviv, Israel, 1958.

5 *Six Days*, edited by Mordechai Bar On, Ministry of Defense, Jerusalem, Israel, 1968.

6 A. Ayalon, "The War of Independence: the Sinai Campaign in the Six Day War—Lines for Comparison," *Ma'arachot*, Volume LIII,

1968, pp. 6-13. M. Pa. II. Three Battles at Rata—El Arish, 1949-1956 and 1967. *Ma'arachot*, Volume LIII, pp. 4-6, and *idem*, IDF Attacks on Abu Agha in Three Wars. *Ma'arachot*, 1970, pp. 3-23. The facts as presented contradict the theory put forward by S. J. Rosen, *Military Geography and the Military Balance in the Arab-Israeli Conflict*. Leonard Davis Institute for International Relations, Jerusalem, Israel, 1977, p. 64. Here, the author states that the northern axis in Sinai is unimportant as a military axis.

7 Elizur Peled, *One Year After the Yom Kippur War*, *Ma'arachot*, special issue, 1974, and Hassnain M. Heikal, *The Road to Ramadan*. Collins, London, Eng., 1975, p. 215, in which he states: "It is my belief that had the passes been reached and occupied the whole of Sinai would have been liberated."

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