with Ted Maxwell, Adel Moustafa, Mahmoud Yousif, Abdel Halim Abdel Basit, and Abdel Moneim Osman. Trenching of this dune was made possible by the kind cooperation of the Egyptian Iron and Steel Company, especially engineer Sayed Abdel Razik of the El Gedida Iron Mine. We thank the Geological Survey of Egypt for providing the vehicles for transport between Cairo and Bahariya.

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XI. WIND STREAKS IN THE UWEINAT REGION AND MARS

FAROUK EL-BAZ AND TED A. MAXWELL

THE SOUTHWESTERN part of the Western Desert of Egypt is characterized by alternating bands of light- and dark-coloured streaks. Our field observations indicate that some of the light-coloured streaks are composed of sand sheets and highly reflective lag deposits. However, some of the light-coloured streaks appear to be extensions of the longitudinal sand dunes of the Great Sand Sea to the north (Fig. 1). Orientations of these dunes and streaks indicate a prevailing wind direction in this area from the northeast, which supports Bagnold's (1933) suggestion of a clockwise rotation of prevailing wind about a centre near Kufra Oasis, in southeastern Libya.

The Mariner 9 and Viking spacecraft photographed numerous alternating light and dark streaks and streak bundles on Mars, particularly in the Cerberus and Elysium Mons regions. Similar streaks and streak bundles abound to the east of Gebel Uweinat. In both cases the streaks emanate from crater rims and isolated knobs (Plates XXIIIa and b), and the knobby material protrudes through the surrounding terrain on a line that is oblique to the prevailing wind.

This preliminary study of light and dark streaks in the southwestern desert of Egypt indicates that: (1) the light streaks are depositional; sand dunes and/or sand sheets form most of the light streaks; (2) the dark streaks are erosional products of high mountains and hills; they represent virtually sand-free areas; and (3) the morphology of both light and dark streaks is controlled by the flow of the wind around topographic highs. These findings have significant implications for the interpretation of streaks on Mars.

In the Uweinat region, dark-coloured streaks occur in the lee of topographic barriers; the largest streak is southwest of Uweinat itself (Plate XXIIIc). This mountain stands 1900 m above the surrounding sandy plain. Under the prevailing wind from the north-northeast, this mountain ring creates a flow pattern that is similar to those observed on Mars (El-Baz, 1978). This pattern is also similar to those generated by laboratory experiments to simulate the flow of wind around Martian craters (Greeley *et al.*, 1974; and Iverson and Greeley, 1978). The morphological similarities between the terrestrial and Martian dark streaks are clearly illustrated in Plate XXIII.

The importance of local material to dark streaks in southwestern Egypt is demonstrated in the lee of Qaret el Maiyit hill (Plate XXIVa). This streak is

composed of 5–7 mm granitic pebbles eroded from the hill itself. This surface is surrounded on either side by a light-coloured sand sheet. Because of their large size, the dark pebbles of the streak are less likely to move under the sand-moving winds. Consequently, the shape of the streak will change mainly in response to the shifting of the light-coloured sand on both sides. A similar setting was encountered by the senior author in the area of Ras el Abd in Sudan (see Section I).

Field investigation of dark streaks in the Uweinat area by the senior author indicates that the surface is also strewn with irregular chips of dark rock. These chips or flakes are usually a few centimetres in diameter. They appear to be fragments from the Gebel Uweinat rocks. Usually the dark-coloured chips cover smaller, lighter-coloured fragments and sand grains (Plate XXIVb). However, the colour of the larger fragments dominates, giving the area a dark colour in the field and in Earth-orbital photographs. These findings may help us better understand both light- and dark-coloured streaks on the surface of Mars.

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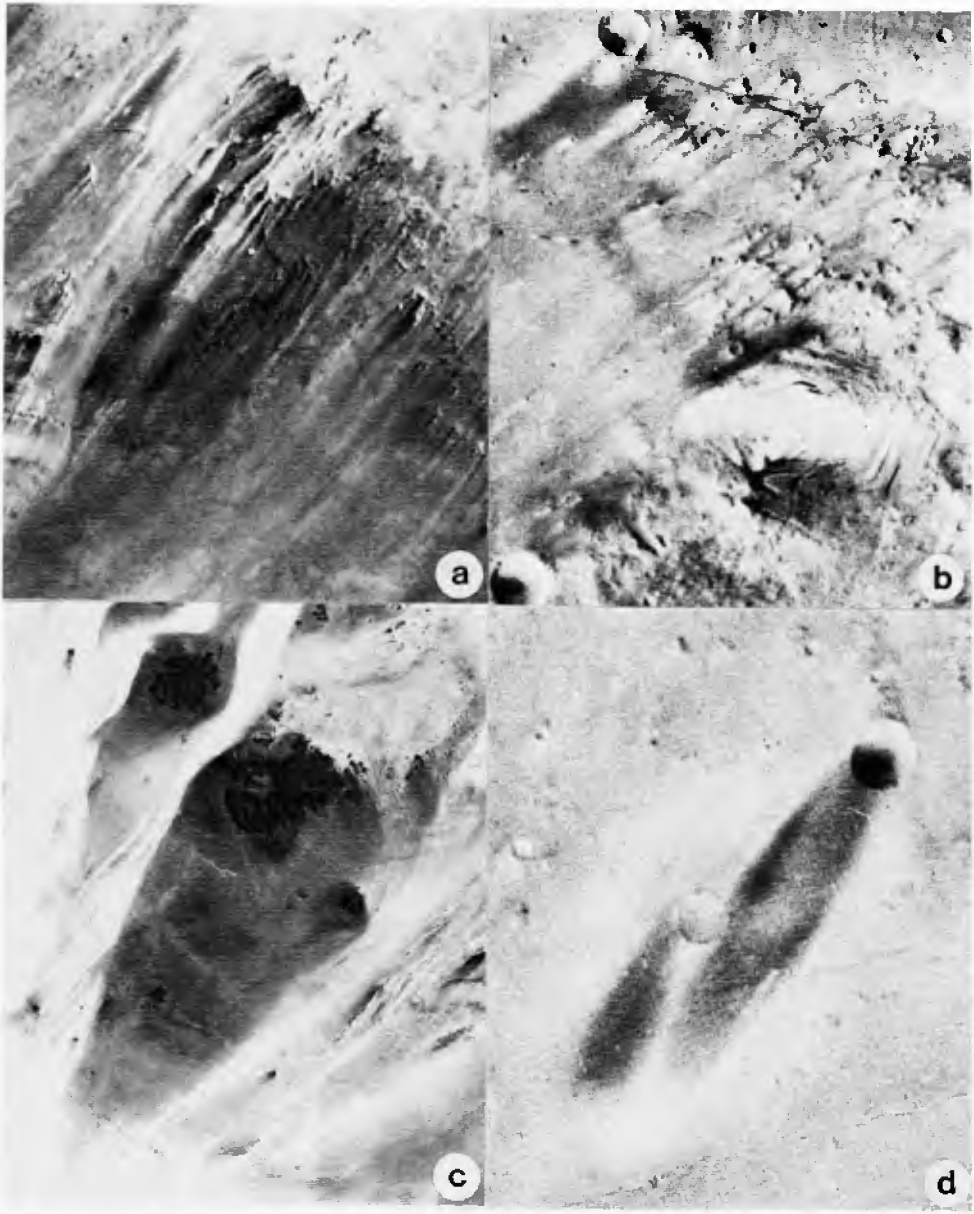
XII. FUTURE WORK IN THE SOUTHERN PART OF THE WESTERN DESERT

FAROUK EL-BAZ

SCIENTIFIC interest in the southern part of the Western Desert of Egypt goes beyond the study of the well-developed aeolian landforms. The part of this desert south of 24° north latitude is not well known and its potential has not been fully evaluated. For this reason our remarks will not be limited to the Gilf Kebir and Gebel Uweinat area, but will include the territory that is bordered by Lake Nasser to the east (Fig. 9).

It is clear that the southern segment of the Western Desert of Egypt received more rain in the past. Ancient lake boundaries, underground water close to the surface, and drainage patterns are physical evidence of this. Archaeological evidence indicates that the area was inhabited from 3000 to perhaps 200 000 years ago. Furthermore, during our expedition from Tarfawi West to the Gilf Kebir we encountered many areas where fertile, clayey soil was exposed or buried under a thin sheet of sand.

This indicates that there are some agricultural prospects in this part of Egypt; the prospects of good soil should be investigated along with groundwater resources. Also, there is the question of whether or not the underground water reservoir in the Western Desert oases is being replenished by the flow of water from the south or west. This question will not be resolved until the southern part of the Western Desert is more fully studied. In addition, areas of good soil in the eastern part may be utilized in crop-raising by the transport of fresh water from Lake Nasser via canals or, better, pipelines.



(a) Light and dark streaks east of Uweinat; (b) light and dark streaks in Cerberus region of Mars; (c) dark streak in the lee of Gebel Uweinat; (d) dark streaks in the lee of a crater on Mars

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(a) Wind-swept dark lag in the lee of Qaret el Maiyit hill surrounded by light sand; (b) quartzite lag on top of the Gilf Kebir, near Wadi Mashi

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