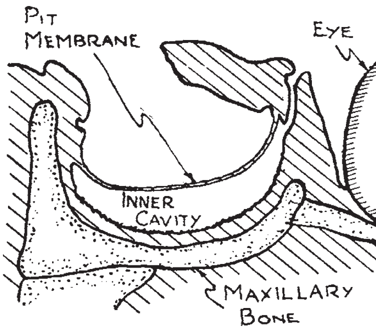

supplying the pit are distributed in the pit membrane and respond to this deflexion. This interior cavity communicates with the exterior through a small opening near the eye surrounded by a sphincter muscle, and this channel serves as a 'leak' tube in which the rate of flow can be controlled by the sphincter muscle.

Noble and Schmidt have shown that the pit can also sense gusts of air and the motion of cold objects. This can be explained by observing that the motion causes a motion of the air, which in turn can cause a deflexion of the membrane. It is also interesting to note that the surface of the interior cavity is very scalloped, thus making this surface a more efficient absorber of radiation. The membrane is guarded against damage from mechanical sources by being set in a recess (the pit) and is guarded against damage by strong radiation sources and warm environments by the ability of the sphincter muscle to open and close the 'leak' tube.

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A Dispersion of Mosquitoes by Wind

ON the nights of July 28 and August 25, 1942, there were mass migrations of mosquitoes into the camps of the Eighth Army in the Western Desert of Egypt. They became abundant in all tents and vehicles over an area of not less than 75 square miles. They then became scarcer and disappeared after three or four days, when no further specimen could be found.

On July 29 an inspection of the eaves of tents showed some dozens of mosquitoes at rest in each tent, a large majority being *Anopheles pharoensis*. Of 14 specimens collected, 11 were females of this species and 3 were *Culex* sp. (2♂, 1♀). The *Anopheles*, which were in fresh condition, contained partly digested blood, having fed before daybreak on the men in camp. Most men had been awakened by the biting mosquitoes. On August 16 several cases of pyrexia were passed through the writer's Light Field Ambulance; but as the unit had no facilities for laboratory diagnosis it was not possible to say if they were malarious. Barber and Rice[1] showed that *A. pharoensis* is a natural vector in Egypt.

The nearest possible breeding place of these swarms was the swamp near Alexandria called Mallahet Maryut, beginning about 18–28 miles north-east of the area of known invasion. A tour of the camps in this area showed that the mosquitoes were abundant in them all, and doubtless they extended still farther to the south and west.

Both migrations occurred at full moon; indeed, at the time of the second there was an eclipse. A guard on night duty on July 28 said there were no mosquitoes in the early part of the night: they arrived between 2 and 3 a.m., "coming in a cloud of vapour from the north, which looked like a dust storm by moonlight". Strong north-east winds blew on both nights. I am certain that the swarms were wind-borne, since not even large troop movements (of which none was in evidence) could have accounted for the sudden arrival of millions of mosquitoes in the static camps.

The phenomenon supports an observation by Kirkpatrick[2] which has been discounted by later writers. He stated in 1925: "I have myself taken *Anopheles pharoensis* in the Eastern Desert of Egypt almost midway between Cairo and the Gulf of Suez, 35 miles from the Nile valley and some 45 miles from the nearest possible breeding places to the north-west in the direction of the prevalent wind".

It was after this that Sergent *et al.*[3] contested "the popular belief that mosquitoes are carried long distances by wind". Eyles[4], in a recent review of the dispersion habits of Anophelines, gives 5·6 miles as the longest known flight-range of *A. pharoensis*, referring to Kirkpatrick's paper only in general terms; and De Meillon[5], describing the bionomics of the Anophelini of Africa, does not mention flights of this order by *A. pharoensis* nor, I believe, by any other species. The longest flights mentioned by Eyles[4] for any *Anopheles* are 19 miles for a seasonal flight of *A. gigas* and 15·5 miles for *A. pulcherrimus*. Reference to Manson and Ramsay[6] shows that in the case of *A. gigas* the evidence was inconclusive.

Another interesting feature of the Egyptian migrations was their occurrence each time at full moon. Another record of mosquito migrations at full moon is given by Rees[7] for *Aedes dorsalis*, over a distance of two miles at Salt Lake City. As the Egyptian migrations occurred many weeks before the end of the dry summer, they can scarcely have been pre-hibernation flights of the kind studied by Kligler[8] in *Anopheles sacharovi*. In any event, none of the *A. pharoensis* appeared to contain a developed fat body. If they were not caught involuntarily in an air current (and the fact that the swarms were mixed may point to this explanation), they may be subject to a distinct type of biological dispersion depending on the lunar cycle.

Whatever the cause, is it not possible that one or more species has in the past reached such a place as the Siwa Oasis, where Barber and Rice[1] took *A. sergenti*, *A. multicolor* and *A. pharoensis*, on a wind which could travel two hundred miles across the desert in one night?

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