

THE TOTAL SOLAR ECLIPSE OF SEPTEMBER 21, 1941

BY D. H. SADLER

SUPERINTENDENT, H.M. NAUTICAL ALMANAC OFFICE

ALTHOUGH the achievements of Dr. B. Lyot in photographing the corona without an eclipse¹ have provided an alternative method for certain spectroscopic work on the inner corona, a total solar eclipse still provides the only opportunity for observation of the outer corona, and for many other important researches such as, for example, the observational determination of the deflexion of light by the mass of the sun. The total time available for observation during totality is only a few hours a century, so that literally every second is of prime importance. That the tracks of totality may pass across the earth's surface in a band 60–100 miles wide without crossing land, or be confined solely to polar regions, together with the ever-present chance of cloud, acts merely as a greater inducement to make the fullest use of every opportunity. It is thus particularly unfortunate that the shadow of war is likely to obscure the shadow of the moon on September 21.

The eclipse of September 21, 1941, may be classed as 'about average' in regard to duration of totality, accessibility of the track of totality, and likely conditions of observation. The track passes overland for half its length, starting at a point midway between the north of the Black Sea and the Caspian Sea, passing a few miles south of Astrakhan, where the eclipse is visible shortly after sunrise, with the sun only a few degrees above the horizon; it then crosses the northern portion of the Caspian Sea and proceeds across Lake Aral into Turkestan. It passes a short distance (about 200 miles) north of the Observatory at Tashkent, but the altitude will not be more than 20° and the duration less than two minutes; even so it is a 'close approach' to an established observatory. As the track passes from Russian to Chinese Turkestan it crosses mountainous country to which access would be extremely difficult. Proceeding in a south-easterly direction the track sweeps across China, emerging at the coast almost midway between Shanghai and Hong-Kong, a few miles only north of Foochow; it passes just north of Formosa. The far interior of China is probably not readily accessible for astronomical expeditions, and in any event conditions of both altitude and duration improve towards the east; the track, however, does pass over Hankow, at which place the eclipse will occur at local noon with the sun at an altitude of 62° and with a duration (the maximum for the eclipse) of 200 seconds. It is

between Hankow and the coast that the best conditions for observation will probably be found. Leaving the coast of China, the belt of totality passes out into the Pacific Ocean and the remainder of the track does not strike land, except for two small islands (Rota or Luta Island and Tinian Island) slightly north of the important island of Guam; the southern limit of the eclipse track passes about 20 miles north of Guam itself.

It is not a very common occurrence for an eclipse to be visible from an important city, situated within a few miles of the central line of totality; it is a much rarer event, and one that must be almost unique, for a city to be within 30 miles of the point at which central eclipse occurs at local apparent noon.

Although present conditions have made expeditions from Great Britain quite impossible, it is hoped that the eclipse will not pass unobserved. It is unlikely that the Russian astronomers at Tashkent will allow an eclipse almost 'on their doorstep' to pass without making some attempt to observe it; observing conditions will not be good, however, and the difficulties of transport, combined with the overshadowing war with Germany, will not encourage a full-scale expedition. At the Stockholm meeting of the International Astronomical Union in 1938, both Chinese and Japanese delegates offered to give all facilities and assistance to astronomers intending to observe the eclipse in China; unfortunately there will now be none to take advantage of these offers. It is hoped that both the Chinese and Japanese astronomers will make an effort to secure observations, but so far no reliable information is available about any proposed expeditions.

Similarly, no definite information is to hand about American expeditions, but in view of the international tension, it must be considered unlikely that any expedition will go to China; the islands to the north of Guam (Rota Island lies well within the track) would be a possible eclipse site.

This is the second eclipse that has been partially obscured by war; the enforced absence of the European astronomers from the eclipse of October 1, 1940, was compensated by the good work of the South African astronomers, who operated instruments sent from Great Britain in addition to their own.

¹ Mon. Nat. Roy. Astron. Soc., 99, 580.