

season of greatest rain is slightly later and the amount is greater at points favorably situated with respect to the sea winds. On the other hand, places in the rain shadow of the mountains receive less rain than on the coast.

In Bahia the inland type as represented by the station Caetit  is nearly opposite to the coastal type in that the greatest rains occur in the months November–April and the least in winter June–August.

With increasing distance from the Equator the monthly distribution tends toward the equality of the Temperate Zone, although distance from the sea and topographic factors are still controlling influences. The three stations in S o Paulo whose graphs are given in Figure 1—Santos on the coast, Alta da Serra, a seaward-facing slope station about 15 kilometers inland, and S o Paulo on the interior highlands about 50 kilometers inland—show a considerable difference in the monthly distribution. Santos on the coast has a chief maximum in March, while the slope station, Alta da Serra, has a decided maximum in the summer months, December to February. The total annual amount of rain at that station is, moreover, the greatest reported for any station in Brazil, doubtless due to the topographic factor. The concluding group of interior stations beginning with Juiz de Fora and concluding with Cuyaba illustrate the characteristics of monthly distribution in the interior of the States of southern Brazil. A feature common to all of them is a rainy season in summer and a dry season in winter.

MAXIMUM PRECIPITATION IN 24 HOURS.

Voss, speaking of the maximum precipitation in Brazil for 24, hours, says:<sup>5</sup>

By far the greatest rainfall within 24 hours fell in the State of S o Paulo, Brazil, on the eastern slope of the Serro do Mar at an elevation of 230 meters at kilometer No. 22, on the wire-cable railroad Santos to S o Paulo. Here on March 29, 1898, a rainfall of 417 millimeters (16.42 inches) occurred. At just double the elevation at kilometer 25.2, 313 millimeters fell on the same day and at the end of the line, elevation 800 meters, the fall was only 61 millimeters (2.40 inches).

The record of maximum rains in 24 hours in Doctor Ferraz's bulletin refers, of course, to the period 1909–10. I have summarized the data by States and present the results in the table below. The arrangement of States is in the order of magnitude of the 24-hour rains.

TABLE 4.—Maximum precipitation in 24 hours (by States).

States.	Amount.		States.	Amount.	
	Milli-meters.	Inches.		Milli-meters.	Inches.
S. Catharina.....	288.3	11.39	Alagoas.....	162.7	6.40
Maranh�o.....	222.7	8.76	Goyaz.....	160.0	6.30
Minas Geraes.....	202.7	7.98	Parana.....	153.0	6.02
Ceara.....	201.9	7.95	Pernambuco.....	146.1	5.78
Amazonas.....	201.0	7.91	Matto Grosso.....	133.6	5.25
Bahia.....	193.0	7.60	Rio Grande do S.....	133.4	5.25
Para.....	177.6	6.99	Sergipe.....	122.1	4.81
Rio Grande do N.....	174.0	6.85	Parahyba.....	119.0	4.68
Rio de Janeiro.....	173.0	6.81	S�o Paulo.....	98.4	3.87

<sup>5</sup> Voss, Ernst Ludwig, Die Niederschlagsverh ltnisse S damerika, Erg nzungshft No. 157 Petermanns Mitteilungen. 3. 30.

THE ETESIENS.

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[National Observatory, Athens, Greece, May 25, 1922.]

*Introduction.*—The characteristic north winds which blow during the summer in the region of the eastern Mediterranean, are known as the etesiens. The periodic nature of these winds has been observed since the time of the ancient Greeks, their marked regularity being noted by Hesiodus. In fact, it is because of this characteristic regularity that they are called etesiens.<sup>1</sup> The name itself means “winds blowing periodically every year.” Aratus has written on this subject in his *Phenomena*, from which we quote the following:

When the corn has been harvested and the sun is approaching the constellation of Lion, then the etesiens blow with their full strength in the open sea; navigation with oars is not possible and I want then a large boat.

Theon, the commentator of Aratus, explained the name in a double way:

The etesiens blow from the time of the morning rising of the constellation of Canis Major, during, at the most, 60 days. They are called etesiens either because they blow each year during certain days, or, more truly, because they are sure to blow when their season comes. At that time, large boats are necessary, because the waves are high and the wind stormy.

*Characteristic features of the etesiens.*—The method of determining the period during which etesiens blow in Greece has been as follows: I have divided the month into 10-day periods and noted the number of days during which etesiens have blown in each period rather than counting the number of days in each month. This method has been applied to observations extend-

ing over 15 years (1900–1914) and is based on the observations made at the Greek meteorological stations. At these stations observations are made three times daily; at 8 a. m., 2 p. m., and 9 p. m. (Athens mean time). I have selected four stations in the Aegean Sea (Andros, Syra, Naxos, Santorin) and three in the Ionian Sea (Corfu, Zante, Cephallonia). For the station at Athens I have used observations from self-recording apparatus.

Table 1 gives the average number of days having north winds. I have considered as north winds all winds between the directions ENE., N., WNW.

In examining the tabulated results, especially those from the stations of the Aegean Sea and Athens, I found that these summer north winds fall into two definite periods. The maximum of the first period, which is also the shorter, occurs during the last 10 days of May while the maximum of the second period takes place during July and August. The etesiens are thus divided into two classes known as *prodroms* and *etsiens*. Generally speaking etesiens blow from the second 10-day period of May until the middle of October, with two periods of maximum, as just mentioned.

During the first period the etesiens are less strong and more intermittent than during the second. During June these winds are interrupted, and not very frequent. In July and especially in August they are, on the contrary, much more steady and frequent but their occurrence diminishes continually throughout September and October. This distinction was observed as early

<sup>1</sup> The etesiens are known in the Orient under the Turkish name *meltem*.