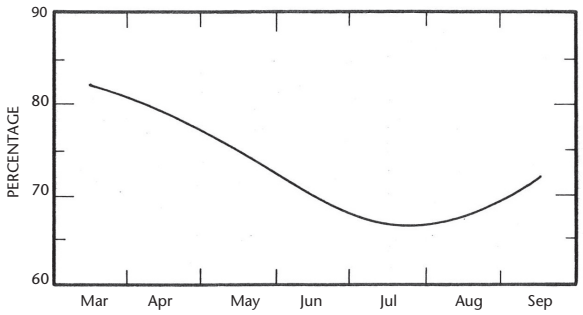

Figure 3.22. Depth–area ratios (55 426/ 20 688 km^2) for 24-hour rainfall (Schwarz, 1965)

The PMP values of Table 3.4 merely represent average depths of basin PMP, and provide limiting rainfall volumes for various possible PMP storm patterns. Examination of isohyetal patterns for a number of outstanding storms over the project basins, together with streamflow data, indicated several critical rainfall patterns for the larger basin. Figure 3.24 presents one of these patterns for the 6-hour March PMP.

In order to minimize the work involved in determining pattern configurations and resulting runoff, any selected pattern is generally considered applicable to all durations, with only the isohyet values changing. Isohyet values for the pattern of Figure 3.24 were obtained by the relation of Figure 3.25, which applies to the maximum, or first, 6-hour PMP increment. Similar relations were developed for other 6-hour increments and for 72 hours. These relations were derived in a manner similar to that described in section 2.11.3, with the so-called within-basin, or typical, depth–area curves, like those of Figure 2.14, patterned after outstanding storms in or transposable to the project basins.

Isohyet values for the PMP storm pattern of Figure 3.24 are given in Table 3.5. The isohyet values for the maximum, or first, 6-hour PMP increment of the storm pattern of Figure 3.24 were obtained as follows. The total area enclosed by each isohyet was obtained by planimetering. The area was then used to enter the nomogram of Figure 3.25 on the ordinate scale. The corresponding ratio of isohyet value to basin PMP was then obtained by laying a straight edge across the nomogram at the proper ordinate value and reading the ratio below the intersection of the straight edge and the appropriate basin area curve. This ratio was then applied to the basin PMP to obtain the isohyet value.

Isohyet values for other 6-hour PMP increments were obtained in a similar fashion from similar ratio relations except that the ratios were applied to corresponding 6-hour PMP increments. Thus, for example, the isohyet values for the second 6-hour PMP increment were determined from a corresponding ratio relation, like that of Figure 3.25, and the second 6-hour PMP increment as indicated by the appropriate depth–duration curve from Figure 3.23.

The effect of geographic distribution of rainfall on runoff generally decreases as basin size decreases. The simple oval-shaped pattern of Figure 3.26 was considered appropriate for the sub-basin. Isohyet values were determined as described above.

3.4.2.6 Time distribution of PMP

The procedures just described yielded 6-hour rainfall incremental values or maps for the 12 periods in the 72-hour PMP storm for the Tennessee River basin above Chattanooga, Tennessee, in any given month in the March–September season. The ordering of 6-hour increments was based on descending order of magnitude and not on chronological

Table 3.4. Probable maximum precipitation (mm) for Tennessee River basin above Chattanooga, Tennessee (Schwarz, 1965)

Line no.	*Duration (hours)*	*March*	*April*	*May*	*June*	*July*	*August*	*September*
					Sub-basin (20,688 km^2)			
1	6	178	177	174	171	164	167	178
2	24	357	354	349	342	334	334	356
3	72	517	513	506	496	484	484	516
					Total basin (55,426 km^2)			
4	6	128	123	116	107	98	99	114
5	24	284	273	259	239	219	222	253
6	72	426	409	388	358	328	332	379