The last expression shows that the temperature variation contains three parts, each havinga simple physical meaning. Möller [13a, 14, 14a] has noted that the first term in the right-hand side of (11.26) describes the air temperature change (cooling) due to radiation into outer space. The second term represents the heating due to the positive net radiation at a given level in relation to the atmospheric layers below, while the third term gives the cooling due to the negative net radiation at the level considered with respect to the overlying atmospheric layers. Figure 11.4 gives the results of calculations of the vertical variation in the total radiative cooling and its components, performed by Möller. The calculations were concerned with the case of a "normal" atmosphere ($T_G = 283°K$, $\gamma = 6°C/cm$, $H = 10$ km relative humidity constant, and equal to 70 percent in the troposphere; above the tropopause a constant mixing ratio was assumed).

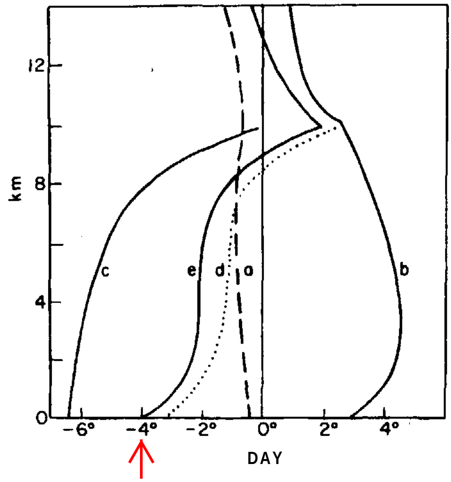

FIG. 11.4 *Radiative cooling at different levels in the atmosphere.*

The curve ***a*** of Fig. 11.4 corresponds to the first term of (11.26). As seen, the cooling of the atmosphere due to the radiation into outer space increases from 0.4°C/day at the earth's surface to a maximal value of 0.9°C/day at a height of 7 km, and then decreases as far as the tropopause, where a new increase is observed. This vertical variation of the cooling rate due to the radiation to space can be easily explained on the basis of the formula (11.26). In fact, the sum in the first term of this formula shows a monotonic increase with height until a finite valued $\sum_j p_j k_j$ is reached. This variation is overlapping with the vertical variation of specific humidity, $q = \varrho_w/\varrho$, which decreases in the troposphere and is constant in the stratosphere. At this point

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