disease than those maturing later. Rich soil was also favorable for disease development. In addition, infection of the young plants from the seed was found to be largely dependent upon the weather during the first four weeks of growth, moisture exerting the greater influence. When rain was plentiful about the time of seeding, wilt later developed in abundance, whereas the same kind of seed planted during dry periods invariably gave less infection. With moisture conditions approximately the same, the later plantings, at higher temperatures, gave the greater amount of wilt.

From the experiments it seemed apparent that anything which retarded the germination and early development of the seedlings lessened the chance of infection from the seed. Of the environmental factors, soil moisture and temperature seemed to have the greatest influence.—*J. B. K.*

RADIATION AND THE TEMPERATURE OF SNOW AND CONVECTION OF THE AIR AT ITS SURFACE.[1]

By A. ÅNGSTRÖM.

[Reprinted from *Science Abstracts*, Aug. 31, 1921, p. 549.]

Observations of snow and air temperature and of radiation at Abisko (68° 21′ N., 18° 47′ E.) during the "arctic night," January, 1916, are utilized to evaluate the "convectivity" (k) of the air near the snow surface. The actual elements observed included (1) the effective radiation (R) by Angström pyrgeometer exposed about 2 m. above the snow surface, (2) the temperature (t_2) of the air at this level, (3) the temperature (t_1) of the air 0.6 m. above the surface, (4) the snow surface temperature (t_0), (5) the snow temperature (t_s) 1.8 cm. below the surface. (1) is reduced to the effective radiation (R_0) of the snow surface by the relation

$$R_0/R = (273+t_s)^4/(273+t_2)^4,$$

the emissivity of snow for long waves being practically unity, while from t_0, t_1, and t_s are deduced the vertical temperature gradients at the surface, both in the snow and in the air. Now, considering the time of observation, direct and diffuse solar radiation are eliminated, while exchanges of heat due to condensation and evaporation at the surface are found to be of relatively small importance, and the temperature variations sufficiently slow to allow the surface to be treated as in temperature equilibrium. Accordingly $R_0 = k(\partial t/\partial h)_{air} - \lambda(\partial t/\partial h)_{snow}$. Selecting cases in which $(\partial t/\partial h)_{snow}$ is zero or small, an approximate average of k is deduced from $R_0 = k(\partial t/\partial h)_{air}$ and this, when inserted in the previous formula, yields a value of $\lambda = 0.00049$, in good agreement with the value 0.0005 deduced from Abel's formula $\lambda = 0.0068\rho^2$ or the value 0.00059 from Jansson's formula $\lambda = 000005 + 0.0019\rho + 0.006\rho^4$, where ρ is the density of the snow. Adopting this value of γ, and utilizing all observations, the average value of k then becomes 1.8. These values of λ and k apply when R is measured in gm. cals. cm.$^{-2}$ min.$^{-1}$, and the thermal gradients in deg. C. cm.$^{-1}$. Individual values of k vary with the wind speed near the surface. In the cases considered, this averaged 2.8 m. sec.$^{-1}$ as measured by anemometer 15 m. above ground.—*M. A. G.*

[1] Ark. f. Mat., Astron. och Fysik. 13. No. 21, pp. 1–18, 1919.

HIGH DAY TEMPERATURES IN EUROPE IN JULY.

Press dispatches and excerpts from English newspapers indicate that exceptionally high day temperatures were prevalent during the second week of July in the British Isles as well as in northern and western portions of the Continent. Many heat prostrations and much suffering was recorded. A thunderstorm during the early morning of July 10 in London was featured as being unusually severe.—*A. J. H.*

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RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Meteorologist in Charge of Library.

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

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