animals is repeatedly advanced, despite observations which argue against this possibility (*4–6*). The vitamin A content of the diet was not determined in these studies, however, and further convincing proof was not available. The present paper furnishes these data and, with measurements of food intake, body weight, and liver vitamin A, substantiates the belief that the amount of diet consumed has no effect on the body stores of the vitamin in the castrated mice studied.

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Comments and Communications

Uncommitted Researchers

IN RE Benson's letter (SCIENCE, **116**, 233 [1952]): Most men who go in for science teaching and/or research have had their education given to them and have taken to science for their own diversion. The true scientist is only concerned with following his vocation to the best of his ability within the limits of his capacities. He is not properly concerned with hours of work, wages, fame, or fortune. For him an adequate salary is one that provides decent living without frills or furbelows. No true scientist wants more, for possessions distract him from doing his beloved work. He is content with an Austin instead of a Packard; with a table model TV set instead of a console; with factory- rather than tailor-made suits; with dollar rather than hand-painted neckties, etc., etc. To boil it down, he is primarily interested in what he can do for science, not in what science can do for him. The breed, unfortunately, is dying out.

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Pollen Counts and the Hay Fever Problem

THE transport of particulate matter by the atmosphere and, in particular, the dispersion of such matter through large volumes of air are—and have been—subjects of extended research. Much of the study to date has been devoted to problems attending the disposal of waste gases and vapors from industrial smokestacks, where there is essentially a point source of continuous emission of smoke and where the rate of emission is independent of atmospheric conditions. Such a situation has been analyzed by Sutton (*1*) for very small particles, 1 μ or less in diameter. The theory is far from complete, however, as evidenced by the recent efforts of Hewson *et al.* (*2*) to introduce a new approach to the subject.

In respect to airborne pollens, the problem of atmospheric transport and dispersion is still further complicated by the following considerations: (1) The emission of the pollen grains into the atmosphere depends directly on a complex of atmospheric conditions, including (*a*) low-level turbulence and gustiness to shake the pollen grains loose and to transport them upward into the air stream; (*b*) temperature and humidity suitable for ripening and drying the pollen grains. (2) The sources of pollen grains are spread more or less randomly over the landscape. (3) The pollen grains are in the 15–20 μ diameter range of sizes, the dispersion of which has been very little studied.

This means that there is at present no theory applicable directly to the problem of transport of hay fever pollens. It is possible, however, to speculate on the nature of the processes whereby pollens become airborne, and on the results of research on the dispersion of smaller particles. By this means one may crudely visualize the pollen distribution process.

To a sufficient approximation, the terminal velocity of fall of a ragweed pollen grain is about 2 ft/min with respect to its air environment. If one assumes that a strong gust strikes the natural pollen source and lifts the pollen grains to some height, h, above the ground, the distance to which the pollen grains will be carried may be estimated by the use of reasonable assumptions about the average vertical air speed along the path. This fails to give information as to the dispersion, or lateral spread, of the cloud of pollen grains initially involved. As emphasized by Cramer (*2*), this spread is related to accelerations of the air stream which, in turn, produce accelerations of the particles forming the cloud and cause them to separate in some kind of stepwise process.

Although Sutton's theory gives an approximate solution for the dispersion of suspended particles of the order of 1 μ or less in diameter, it is clear that the larger the particle considered, the slower will be the rate of dispersion and the more rapid will be the rate of sedimentation. Since rate of dispersion is a function of acceleration, it will bear some proportionality to force/mass, where mass is proportional to D^3 and force is proportional to D^2. Thus rate of dispersion is related inversely to D, the diameter of the pollen grains.

Standard methods of measuring the "pollen count"