2. The golden rod continues to bloom for several weeks after the hay fever season is over.[4] In western North Carolina, for instance, the hay fever season concludes about October 1, but the Canadian golden rod (*Solidago canadensis*) brightens the autumn landscape until November. In our hay fever clinic at the Charity Hospital of New Orleans, the fall hay fever season concludes about October 26, but the golden rod continues to bloom until December.

3. Our research department exposes its atmospheric-pollen-plates in various parts of the United States, and in this way, the atmospheric-pollens are caught and examined. The pollens of the golden rod are never found on these plates, proving that this pollen is not atmospheric. Unless the pollen is in the air, as in the cases of the ragweeds, grasses and other wind-pollinated plants, it can not cause hay fever unless the nostrils are applied directly to the flower, or are used in large quantities for room decorations, in which case the pollen may fall within the limited space.

The pollen of the golden rod may cause a reaction when applied directly to the nostrils, or when used in large quantities for room decorations. As far as being a cause of hay fever, however, it is absolutely negligible. It is one of our most beautiful flowers, and well merits its selection as the national flower of the United States.

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SCIENTIFIC BOOKS

Manual of Meteorology, Part IV. *The Relation of the Wind to the Barometric Pressure.* By SIR NAPIER SHAW, Cambridge, University Press. 1919.

The British Meteorological Office during the past four years has been called upon to answer a good many questions put to them by the Army, Navy and Air Services. The requests for detailed information regarding wind, weather and the structure of the atmosphere were numerous and urgent. For in both offensive and defensive operations the military authorities suddenly realized how all important a knowledge of aerography was. In attempting to give definite data, Sir Napier Shaw, as Scientific Advisor to H. M. Government and chairman of the Meteorological Committee, says that he found as a guiding principle of great practical utility, the relation of the wind to the distribution of pressure. The underlying assumption is that the flow of air in the free atmosphere follows very closely the laws of motion under balanced forces, depending upon the *spin* of the earth and the *spin* in a small circle on the earth.

There are eleven chapters in the book. The opening chapters give details of the determination of the pressure gradient and the wind. Land and sea relations of surface wind to the gradient, turbulence in relation to gustiness and cloud sheets, eddy clouds, the dominance of the stratosphere, coastal refraction of isobars and the dynamical properties of revolving fluid in the atmosphere, are treated in some detail in successive chapters.

Space permits of but one quotation from the book and that is almost the last paragraph; but here the author drives another nail in the coffin of the convectional theory of the cause of cyclones.

> It has long been supposed that the variations of temperature at the surface are themselves the cause of the original circulation of the cyclone, but it is much more easy to explain convection along the core as the effect of an existing circulation above, than *vice versa,* and there are so many examples of convection attended even by copious rainfall which produce no visible circulation that it is difficult to regard convection from the surface as a sufficient cause of our numerous depressions.

Sir Napier deals at some length with the relation between the surface wind and the geostrophic wind at sea-level. This is pecul-

[4] "Susceptibility to Hayfever, and Its Relation to Heredity, Age, and Seasons," W. Scheppegrell, M.D., United States Public Health Reports, July 19, 1918.

iarly his own field, and is in fact a development of the past six years. It is a distinctive contribution of the British school of aerographers. We may explain that the balance between pressure and velocity of air flow, or what is known as the strophic balance, leads to an equation for the gradient wind of the following form:

$$s = 2\omega v\rho \sin\phi \pm v^2\rho \cot r/E$$

The first term in the right-hand member of the equation represents velocity due entirely to the earth's rotation and hence is known as the geostrophic wind. The other is known as cyclostrophic. Only a few months ago J. S. Dines called attention to a rather remarkable outcome of this equation, where in the case of a path concave to the "low," velocities of the order of $6m/s$ for normal counter-clockwise rotation, and $46m/s$ for rotation in the opposite direction, appear to be possible. Thus a depression revolving with high speed in a *clockwise* direction in the northern hemisphere is dynamically possible. There are reasons why such an eddy on a large scale might not be established or last long, but small area eddies such as those around high buildings, etc., evidently can be set up with rotation either clockwise or anti-clockwise. This raises the question, How often are dust-whirls, tornadoes, and waterspouts observed with a clockwise rotation?

Sir Napier Shaw uses as a frontispiece a chart showing paths of the centers of some notable cyclonic depressions of long duration. One is the path of a *baguio* traced by McAdie from lat. 15° N. in the western Pacific, starting on November 20, 1895, and reaching the Oregon-California coast January 12, 1896, a rather definite duration of 54 days at sea and a probable history of 4 days more in the United States and 5 days over the North Atlantic. Two other long duration storm paths are given.

These paths of long duration are significant in connection with origin, directive force and persistence of structure of cyclones and anticyclones. The most pressing question to-day before aerographers is accurate knowledge of the driving forces of a depression, and the directive resultant. There can be no accurate forecasting without this knowledge.

We are promised three more volumes from the University Press; one, a general survey of the globe and its atmosphere. A second on the physical properties of the atmosphere, and a third, a formal exposition of the dynamics and thermics of the atmosphere.

Sir Napier Shaw is to be congratulated not only on the output from his own industrious pen, but upon what he has accomplished in stimulating the young men around him, Lempfert, Dines, Gold, Cave, Taylor and others.

A. M.

THE NATIONAL ACADEMY OF SCIENCES

THE eleventh number of Volume 4 of the *Proceedings of the National Academy of Sciences* contains the following articles:

The "Homing Habits" of the Pulmonate Mollusk Onchidium: Leslie B. Arey and W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. *Onchidium floridanum* lives during high tide in "nests," *i. e.*, rock cavities, containing a number of individuals. The individuals leave the nest in low water to feed, and return simultaneously to it before the tide rises again, giving evidence of homing behavior.

Growth and Duration of Life of Chiton Tuberculatus: W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. The growth curve is obtained on the assumption that the age of a chiton may be estimated from the growth-lines upon its shell. The mean duration of life is probably a little less than eight years.

Growth of Chiton Tuberculatus in Different Environments: W. J. Crozier, Bermuda Biological Station for Research, Dyer Island, Bermuda. Growth curves obtained under different conditions are compared.

The Interferometry of Vibrating Systems: C. Barus, Department of Physics, Brown University. The high luminosity of the achromatic interferences and the occurrence of but