The strength of the argument to the effect that the descending track of the buzzard proves the existence of ascending currents of air lies in the assumption that the odor is carried upward by simple convection. Now Prof. John Zeleny, of the University of Minnesota at Minneapolis, has made a study of the rate of diffusion of odors in still air, and has communicated his results to the American Association for the Advancement of Science at its meeting in St. Louis in December, 1903. It is evident that if diffusion were more rapid than convection, then our argument would fall to the ground, but the contrary seems to be the case.

Professor Zeleny writes as follows:

In answer to your inquiry in regard to my experiments on the rate of propagation of smell, I beg to say that I find that smell diffuses very slowly. To prevent the disturbance due to convection currents, the experiments were carried on by having the odors diffuse through glass tubes of small diameter. As an example, it took over two hours before the smell of ammonia was detected at the end of a tube a meter and a half long. For shorter distances, the time required was roughly proportional to the square of the distance.

It seems, therefore, that the rapid way in which an odor spreads through a room is due almost entirely to convection currents.

Your elegant way of proving the existence of ascending currents in the atmosphere surely can not be affected by diffusion phenomena, since their effect is so slow.

I was especially interested in making my experiments to see if the particles producing smell might not be subatomic. The slowness of the diffusion is against this. But we do not know how much stuff is necessary before we can recognize the smell. Ammonia I could detect as soon chemically as with my nose. A peculiarity appears in camphor (large molecular weight) where in a vertical tube the smell ascended twice as fast as it descended. For ammonia, the rates up and down were about the same.

The only gas that I have used that may come from carrion is H_2S. The odor of this was detected at a meter's distance in about 35 minutes. In the formula $t=kl^2$, which applies roughly for short distances, $k=0.21$ about, for H_2S and 0.27 for NH_3, t being measured in seconds, and l in centimeters; l is length of tube, and t is the time before the odor is detected at one end of the tube from the substance at the other end.

LOW BAROMETER DURING THE "PRESIDENT" STORM OF MARCH 12, 1841.

Prof. George Davidson, of the University of California, in a letter of December 27 to Prof. Alexander McAdie, says:

A case of excessive low barometer is given in Sir George Simpson's journey round the world in 1841-42. He was making the passage from Liverpool to Halifax in the *Caledonia*, Captain McKellar, a vessel of 1300 tons and 450-horse power. He says, on the morning of the ninth day out (March 12, 1841) Captain McKellar discovered that the barometer had fallen between two and three inches during the night, having descended to 26.9, the lowest point which, in his experience, it had ever reached. He then tells about the storm, and mentions that it was in this very storm that the steamer *President* was lost. "My recollection of a high barometer was in a terrific storm from the northwest, some time near the end of November, 1857. I was then off Barnegat (New Jersey), getting home. My memory puts the barometer at 31.4, but that was on shore."

THE MISCHIEF OF WRONG THEORIES.

During the past century there has been such steady progress in all branches of science that the more intelligent portion of the community has abandoned those notions with regard to astrology, alchemy, spontaneous generation, witchcraft, and other philosophies that were formerly accepted by the most learned. The diffusion of education has raised the children of the present generation above the level of the philosophers of a former generation. And yet we have seen it demonstrated again and again that the popular majority does not fully appreciate the extent of our present knowledge of the laws of the weather, and is still liable to resort to unscientific methods in hope of accomplishing that to which science has not yet attained.

We have seen communities in America and Australia carried away with the idea that cannonading can produce rain, or in Europe that the ringing of church bells or the offering of prayers can avert droughts and floods. In southern Europe the agriculturists are but just recovering from the strange belief that hail can be prevented by shooting rings of smoke toward the clouds. During the past ten years a wealthy engineer of Russia has devoted his fortune to the conversion of the people to his idea that the moon controls the weather, and so seriously does his advocacy of this error affect the uneducated agricultural community that the director of the weather service at Odessa (Klossovsky) has gone to the trouble of publishing an elaborate statement of the errors in fact and theory committed by this engineer. He shows very clearly that Demtchinsky's method of predicting the weather by lunar periods amounts to nothing more than predicting an average condition, an average which very rarely occurs, whereas the departures from it are very frequent. The verifications of these predictions are like the combinations in an ordinary game of chance, where there is an equal number of heads and tails, or hits and misses.

As the collection of meteorological statistics depends so largely upon the voluntary work of thousands of unpaid observers, it is to be feared that the good work we are doing in America may be seriously interrupted if erroneous views are allowed to have an influence in this country as profound as they seem to have in southern Russia.

We can not repeat too often and too clearly the general proposition that meteorology is to be advanced only by studying in details the effects on the atmosphere of insolation, radiation, the diurnal rotation and annual revolution of the earth, and the presence of continents and oceans.

AURORA AND MAGNETIC DISTURBANCES OF OCTOBER 30—NOVEMBER 1, 1903.

On October 30, 31, and November 1, some remarkable disturbances of the magnetic needle, a so-called magnetic storm, were reported from nearly all portions of the globe. Attending this great disturbance there also occurred auroras and earth currents on our globe, and sun spots and solar prominences. Of course this combination of phenomena is very common, as it has long been known that they are all associated together, but the magnetic disturbance of October 31 appears to be the most important that has yet been recorded. Although terrestrial magnetism proper is usually considered to be distinct from meteorology, yet the aurora is always included. We have, therefore, collected a few of the records of its recent appearance.

In the Annuaire of the Meteorological Society of France for November, 1903, the editor, M. Th. Moureaux, Director of the Observatory, Parc Saint-Maur (Seine), publishes a short note on this great magnetic perturbation, in which he says:

Magnetic pertubations have been rare and feeble during 1901, 1902, and 1903. But a more intense and long sustained series of pertubations began October 11, and after a calm interval of several days a new series of exceptional intensity began on October 31. This started suddenly at 6:12 a. m. with a simultaneous jump in the declination needle D and the horizontal component H, and a diminution of the vertical component Z. The great oscillations of D and H began at 7 a. m. and continued without interruption until 10 p. m. Then, between 10 and 11 p. m., H fell off greatly, but the phase of maximum density did not occur until about noon. At this moment Z, which had been but slightly disturbed thus far, rapidly increased, and the two other elements, D and H, experienced rapid and great variations. The observers remained constantly at the apparatus, and noted that D diminished by 1° 39′ in the interval between 1:52 p. m. and 1:55 p. m., but recovered by about 1° 18′ between 2 and 2:05 p. m. During the rapid movement of the declination needle eastward, the two components H and Z increased simultaneously in such a way that the total magnetic force also experienced a great increase at this time. Similar great oscillations were observed at 4 p. m., 5.30 p. m., and 7 p. m. In fact, the magnets were troubled throughout the whole night, and it was only at 2 a. m. of November 1 that Z returned to its normal value. In general the disturbances drove D and H below the average and those of Z above the normal. The extreme amplitudes of the variations were, respectively, 0.00680, or $\frac{1}{29}$ of its absolute value for the horizontal component; 0.00520, or $\frac{1}{81}$ of its absolute value for the vertical component; 2° 4′ for the declination. Disturbances of the same kind