atmosphere is much affected by the number of sunspots, by auroral displays, and magnetic storms. The day and night variation can be satisfactorily explained, but sunrise and sunset fading needs further study. Auroræ are a great hindrance to wireless working, as they produce sudden and violent changes in electron density. Meteoric showers have a much smaller effect. Reasons are given for supposing that helium plays an important part in forming conducting layers. There are many natural gas springs in America that have been emitting helium for countless generations.

Production of High Vacua.—For many years certain materials have been used in lamps and vacuum tubes for removal of traces of gas, these being known as 'getters'. Two classes of getters are in use: (i) Those acting as adsorbents (active charcoal, copper oxide, thoria, etc.), (ii) those having great chemical activity (alkali metals, alkaline earth metals, phosphorus). Phosphorus is generally used in lamps. In the May number of the *Journal of the American Chemical Society*, Andrews and Bacon describe comparative experiments on the efficiencies of calcium, barium, magnesium, sodium, and phosphorus, deposited as thin coatings on the walls of bulbs or tubes, from the point of view of the attainment of vacuum. They report pressures of about 10^{-7} mm., the lowest measured pressure yet reached by other workers in the laboratory (of the General Electric Company) being less than 5×10^{-9} mm. in a gauge connected with a large tube of well degassed charcoal immersed in liquid air. The main result of the present experiments was that differences in the previous treatment of the getters are of far greater importance in the removal of gas than differences among the getters themselves. Poorly degassed materials absorb residual gas slowly and reach equilibrium at higher pressures than those attained by more gas-free material. These pressures do not depend on temperature in the range 0°-90°.

The Oxidation of Iodide by Persulphate.—A study of the velocity of oxidation of iodide by persulphate ion, described by King and Jacobs in the May number of the *Journal of the American Chemical Society*, is of interest both from the point of view of experimental technique and the Brönsted theory of reaction velocities as correlated with the Debye-Hückel theory of ion activity. Instead of titrating the iodine liberated, the authors added a small amount of thiosulphate and determined the time of first appearance of iodine by a photoelectric cell circuit with a long absorption cell of solution. This permitted the use of very dilute solutions, to which alone the theoretical equation could be expected to apply. Agreement with a linear curve of the logarithm of the velocity constant plotted against the square root of the ionic strength, as required by theory, was found up to the value 0·06 of the abscissa. Above this, there was an increasing negative deviation. When the ionic strength is made up largely of univalent ions, the best straight line extrapolates to log $k_0 = -1{\cdot}075$, whilst with a large proportion of bivalent ions it extrapolated to $-1{\cdot}06$. The difference is considered to be significant, though small, and it may be due to the inaccuracy of the Debye-Hückel equation for bivalent and tervalent ions, even in very dilute solutions. This deviation has been previously found, and can be qualitatively explained.

Astronomical Topics.

Tree-Rings and the Sunspot Cycle.—The researches of Dr. A. E. Douglass on the correlation between the growth-rings in trees and the sunspot cycle have given a probable sunspot curve for many centuries. A *Science News Bulletin* issued by Science Service, Washington, D.C., dated June 23 announces a further development of his work. He has carried the study of the rings in certain districts back to the date 700 B.C.; by examining the timbers in some ancient Indian buildings he was able to give the dates when the trees were cut, and thus to date the buildings. Dr. Antevs, of the University of Stockholm, has found correlation between the structure of clay layers in ancient lake-beds and the sunspot cycle. Both the tree-rings and the clay layers are supposed to depend directly on the rainfall, so it is really the latter that is correlated with the sunspots.

The work of both Dr. Douglass and Dr. Antevs has been honoured by the award of Research Corporation prizes, given through the Smithsonian Institution.

The Distance of Nova Pictoris.—The April issue of *Mon. Not. Roy. Ast. Soc.* contains a paper by Dr. Spencer Jones, giving the details of this investigation. Direct trigonometrical measures gave the negative parallax $-0{\cdot}009''$, with a probable error of $0{\cdot}007''$. This could only be taken as an indication that the distance is very great. An estimate was reached on the assumption that the increase of light was due to an expanding shell or series of shells of gas emitted by the star. The rate of expansion is assumed to have been uniform between the outburst and the maximum of light; it is also assumed that the effective temperature did not vary during this period. The rate of increase in the radius per day was calculated as 5·77 times the original value, while the spectroscope indicated a velocity of approach of 65 km./sec., which becomes 77 on allowing for the recession of the centre, which is 12 km./sec. Allowing for the fact that this is an integrated value over the whole disc, the parallax is deduced as $0{\cdot}0015''$, and this value is found to be practically independent of the initial temperature. At maximum the radius would be 384 times that of the sun. The absolute magnitude is deduced as 3·15 before the outburst and $-7{\cdot}9$ at maximum.

A Possible Cometary Observation by Bessel in 1832.—Bessel observed an object that he described as a nebula on Nov. 8, 1832; its position for the equinox of 1825·0 was $2^h\ 42^m\ 5{\cdot}56^s$, N.Decl. 36° 46′ 46·7″. Many subsequent observers have found a faint star of mag. 9·3 in this place, but none of them could see any nebulosity round it; there is a note to this effect in "New General Catalogue". Prof. Schulhof suggested many years ago that there might have been a comet superposed on the star when Bessel observed it. The writer of this note has recently noticed that, if it was a comet, it may have been Tempel's comet of the November meteors. If so, the date of perihelion would have been Oct. 30, 1832, which is not very far from the date indicated by the recent calculations of the Computing Section of the British Astronomical Association. If this identity should be correct, the next perihelion passage will occur in November or December 1932. If the Bessel object was Tempel's comet, it would have been extremely near the earth at the time; the earth perturbations would probably be large enough to account for the small corrections needed by the elements to make them represent Bessel's observed position. There was quite a rich shower of Leonids in November 1832, though it was apparently surpassed by that of Nov. 12, 1833. Owing to the shift of the node, Nov. 17 is the probable date this year, and Nov. 16 in the two following years. The watch should be kept on neighbouring nights also, as it is difficult to predict the position of the meteors with great precision.