property according to forestry principles. Forest Commissioner Fox, of New York, reported on the acquisition of Adirondack lands by the State to the extent of one and a-half million dollars. On Tuesday afternoon the Association, in a body, drove through the Middlesex Fells, and the discussions in the evening, after a dinner at the hotel situated in the forest park, turned naturally on the application of silviculture to such parks. It appeared that the Metropolitan Park Commission had not yet formulated plans as to the management of the woodlands. Dr. Schenck, of Baltimore, and Mr. Olmstead, of the well-known firm of landscape architects, advocated sound measures for the replacing of the worthless coppice growth, which is bound to deteriorate, by a healthy seedling growth.

An important feature of the meeting was the discussion of the aims and objects of the newly established State College of Forestry at Cornell, by its Director, Dr. B. E. Fernow. This address will be printed in full in SCIENCE. In the discussion Professor Lazenby referred to a movement in similar direction which was shaping itself in Ohio. Among the usual resolutions which it is the custom to pass at these meetings the most important was one calling upon the federal government to place its forest reserves under technical non-political management.

The Association adjourned to hold another summer meeting at Omaha, in connection with the Trans-Mississippi and International Exposition.

NOTES ON PHYSICS.

GAY LUSSAC'S LAW AND ATMOSPHERIC NITROGEN.

A VERY curious deviation of atmospheric air from the Laws of Gay Lussac and Boyle has been studied by H. Teudt (Zeit. für Phys. Chem., XXVI., p. 113). When first heated, the expansion above 350° is excessive. The deviation from Gay Lussac's Law being 2 per cent. at 400° and 3 per cent. at 450°. This anomalous expansion is exhibited by atmospheric nitrogen alone, but not by oxygen, carbon dioxide, chemically prepared nitrogen, by air which has been previously heated, nor by air collected after a rain. Teudt suggests, in explanation, the existence of an allotropic form of nitrogen and points out that the close relationship between nitrogen and phosphorus supports this view; the allotropic form of nitrogen being changed to the ordinary form at high temperatures. Holborn and Wien, in connection with their work on the air thermometer, have pointed out that air at the first heating does not conform to Gay Lussac's Law.

LIQUID AMMONIA.

E. C. FRANKLIN (Paper read before Section C at Boston) has made an elaborate study of liquid ammonia, which has been known for some time to approach water in its properties as a solvent. He finds its heat of vaporization to be about 330, while the calculated value is 358 by Trouton's formula, 321 by the formula of Wood, and 330 by the formula of Peabody. He finds the constant of molecular elevation of the boiling point of liquid ammonia to be 3.4, which is lower than for any other known substance. He has measured the electrical conductivity of various substances dissolved in liquid ammonia, and he finds the conductivity to increase with temperature, reach a maximum and then decrease, becoming zero at the critical temperature of liquid ammonia.

H. M. Goodwin (Paper read before Section B at Boston) has determined the dielectric constant of liquid ammonia and finds it larger, indeed, than the dielectric constants of alcohol, ether and the like, but not so nearly equal to that of water as was

expected from its electrolytic dissociating power.

MEASUREMENT OF THE INTENSITY OF SOUND.

INSTRUMENTS for the measurement of sound intensities were described before Section B at Boston by Professor A. G. Webster and by Dr. J. O. Reed. In Professor Webster's instrument the amplitude of vibration of a thin glass diaphragm is measured by the interferometer, the fringes being photographed on a moving plate. In Dr. Reed's instrument the amplitude of vibration of a diaphragm is observed by means of a micrometer microscope focussed upon the tip of a stylus attached to the diaphragm.

Professor Webster outlined a method for calculating the absolute intensity of the sound (amplitude of the periodic force acting upon the diaphragm) from the observed amplitude of vibration. In this outline Professor Webster made use of the equation of motion of a system with one degree of freedom, namely,

$$\frac{d^2x}{dt^2} + \beta \frac{dx}{dt} + \alpha x = Ae^{pt}.$$

Now, this equation is, in fact, applicable to any system vibrating in a given simple mode (*i. e.*, when the period of each particle of the system is the same and its amplitude a one valued function of its position) but it is impossible to determine the coefficient α by static measurements of any kind. The effect of the air which vibrates with the diaphragm can, however, be taken into account so that the coefficient α may be approximately determined, by using as a resonator a long air column. However, the results of some determinations by Professor Webster agree quite well with sound intensities as measured by Rayleigh.

W. S. F.

NOTES ON INORGANIC CHEMISTRY.

THE first number of the *Chemical News* in September is known as the 'Students' Number,' and is devoted to a description of the chemical departments of the British universities and colleges. It is noticeable at once that the facilities for chemical study in Great Britain are very far behind those of Germany, and I think we may fairly say below those of America. Probably a dozen or even more institutions could be found in this country where greater advantages are offered than anywhere in England. Three colleges only have more than one professor in the chemical department, viz.: Victoria University, Yorkshire College, Leeds, with a professor in the dyeing department, and a professor in the leather industries department, in addition to the professor of chemistry; Owens College, Victoria University, Manchester, with a professor of chemistry and a professor of organic chemistry; Glasgow and West of Scotland Technical College, with a professor of chemistry and a professor of technical chemistry. The Royal College of Science and Royal School of Mines has, in addition to a professor of chemistry, an assistant professor, and King's College has a professor of metallurgy. In the number of teaching force also the British colleges would seem to be deficient. The average number of instructors, including all assistants and demonstrators, in the twenty-nine colleges mentioned is less than four, and this average is strongly brought up by Owens College and Yorkshire College, each of which has a corps of ten instructors, and the University College, Liverpool, with seven. The two former would appear to be the only colleges of Great Britain with adequately equipped chemical departments; Oxford and Cambridge hardly seem to be in the race.

THE same number of the *Chemical News* contains, as its single item of current news,