At the upper end the brass cylinder has a lateral opening by which its interior can be connected with an india-rubber aspirating ball. The chief difficulty met with was in the construction of a suitable valve for the aspirating ball. Finally he succeeded in making a valve such that no air was ever driven back towards the thermometer when the ball was compressed, but only drawn over the bulb of the instrument during the aspiration at the rate of ·2 to 2·5 metres per second. Within these limits the rate at which the air is drawn over the bulb had no influence on the temperature recorded by the thermometer. Of extreme importance, as showing the suitability of the instruments, were the speaker's observations on the temperatures recorded by two of his thermometers, of which one was exposed to the direct rays of the sun, while the other was shaded by a distant shutter: the two thermometers recorded the same temperature, while at the same time an actinometer exposed to the sun showed a temperature 17° C. higher. The same exactness in the determination of the humidity of the air is obtained when a pair of these thermometers is used, and the bulb of one is wrapped round with a piece of moist cloth. This instrument is specially suitable for observations in a balloon. The speaker explained that only shortly before the present meeting he had found that a similar instrument had been constructed by Welsh about the year 1850.—Dr. Robert von Helmholtz gave an account of experiments which he had carried on conjointly with Dr. Sprung with a view to determining the humidity of the air. They had both arrived, independently of each other, at the idea that the determination of the dew point might best be made, not, as in the usual way, by the condensation on the bulb of a thermometer, but by measurement of the amount of rarefaction which the air must undergo in order that a mist may be produced. In a previous research the speaker, when determining the vapour-tension over solutions of salts, had compressed the air in a closed space, and then obtained a formation of mist by suddenly reducing the pressure again to that of the atmosphere. By determining the general excess of pressure which is thus requisite, the dew-point may be determined. Dr. Sprung has compared the dew-point as thus determined and as obtained by Regnault's apparatus. The experiments are not yet carried sufficiently far to yield any numerical results, but even now it may be said that this new method of determining the dew-point is extremely trustworthy.

Physical Society, December 9.—Prof. du Bois Reymond, President, in the chair.—Dr. Badde developed the mathematical formulæ by means of which he can determine the vibrational condition not only of a vibrating string, but also of a square plate—formulæ which make it possible to determine the relation between the pitch of the note and the vibration-amplitude of the vibrating plate.—Dr. Pringsheim gave an account of the experiments he has made, in conjunction with Dr. Summer, to determine the quotient (k) of the specific heat of gases. The value of k is determined either by measuring the rate of propagation of sound in gases which obey Mariotte's law, or else from the ratio of temperature to pressure when the volume is kept constant. Up to the present time the rate of transmission of sound has not been so exactly determined that the values can be used for deducing the value of k. Similarly the second method has as yet given very discordant results, while at the same time the experiments have not been free from errors. Drs. Pringsheim and Summer have compressed air in a glass balloon whose capacity was sixty litres, and determined its temperature by means of a fine silver wire passing through it whose electrical resistance was known. Hereupon the pressure in the balloon was allowed to sink to that of the atmosphere by opening a tap leading into it, and the cooling thus produced measured by means of the wire. Immediately upon this the tap was again closed, the air becoming warmed by the heat which passed into it from the air surrounding the balloon, and the rise of temperature again measured. During these experiments it was found to be of no consequence whether the rarefaction of the compressed air took place rapidly through a tap with a large bore, or through one with a narrow aperture; the wire always showed the same amount of cooling, thus proving that it follows the alteration of temperature of the air very rapidly. Similarly the length of the wire was found to have no effect on the results, thus showing that the temperature of the surroundings has no influence on the temperature recorded by the wire. The resistance of the wire was determined by the bridge-method, partly by means of a galvanometer, partly by means of a telephone. The ratios of the alterations in resistance of the wire to alterations of temperature were determined, within the necessary limits, for several fine wires. The speakers considered that the only objection which can be raised to their experiments is that the above determination was not made with the same wires which were used in their experiments, and they propose to do away with even this objection by some later experiments which have not as yet been carried out. All other possible objections have been set aside by varying the conditions of their work while obtaining constant results. As a mean of the separate measurements they obtained as a value for k the number 1·384; the deviation for the mean value amounted only to a few hundredths per cent. The above value for k cannot however be taken as being absolute until it has been proved that there is a proportionality between the temperature and resistance of the silver wire which they used in their experiments.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Ferrets and Ferreting, 2nd edition (U. Gill).—Massachusetts Institute of Technology: 23rd Annual Catalogue of the Officers and Students, &c. (Boston).—Die Theekultur in British-Ost-Indien; Hist. Naturwissenschaftlich und Statistich (Prag).—Quarterly Journal of the Royal Meteorological Society, October (Stanford).—Annalen der Physik und Chemie, 1887, No. 12 (Leipzig).—Archives Italiennes de Biologie, tome ix. fasc. 1 (Turin).—Journal of the Royal Microscopical Society, December (Williams and Norgate).—Elementary Text-book of Physiography: W. Mawer (Marshall).—Management of Accumulators, 3rd edition: Sir D. Salomons (Whittaker).—Sewage Treatment, Purification and Utilization: J. W. Slater (Whittaker).—Flour Manufacture: F. Kick, translated by H. N. P. Powles (Lockwood).—Photography Simplified, 3rd edition (Mawson and Swan).—Transactions of the Sanitary Institute of Great Britain, vol. viii. (Stanford).—A Treatise on Chemistry, vol. iii. Part 4, Organic Chemistry: Roscoe and Schorlemmer (Macmillan).—Present Religion, Part 2: S. S. Hennell (Trübner).—Die Altchristliche Fresko und Mosaik-Malerei: Dr. O. Pohl (Leipzig).—Recherches sur l'Isolement du Fluor: H. Moissan (Gauthier-Villars, Paris).—Journal of Physiology, vol. viii. No. 6 (Cambridge).—Morphologisches Jahrbuch, xiii. Band, 2 Heft (Williams and Norgate).

CONTENTS.