NOTES FROM THE PHYSICAL LABORATORY OF THE UNITED GAS IMPROVEMENT COMPANY.*

A NEW NEUTRAL TINT AND A VARIABLE TINT SCREEN.

By E. Karrer.

A NEUTRAL tint screen has been constructed using small glass bars, between which is laid a very thin layer of some black opaque material. The screen has a very high maximum transmission, determined only by the transmission of the optical glass used to make the bars and the thickness of the interposed opaque material. The screen may also be made into a variable tint screen by replacing the opaque material by some colored transparent medium. As the angle between the screen and the incident beam of light is altered, more of the light is cut out by the opaque screen in the first case, and a greater portion of the light is transmitted through the colored medium in the second case.

A CONVENIENT LABORATORY CONDENSER FOR EXPERIMENTAL PURPOSES.[1]

By E. Karrer and H. S. Newcomer.

A CONDENSER for use in spectroscopy with the spark is described, in which pyrex glass beekers are used as the dielectric, immersed in a salt solution for the conductor. The performance of the condenser has been found for this purpose to be very satisfactory.

ON THE LUMINESCENCE OF RADIOACTIVE MATERIALS.[2]

By E. Karrer and D. H. Kabakjian.

A STUDY of the luminescence of phosphorescent zinc sulphide when excited by radioactive substances has been made and a more detailed study of the general phenomena of luminescence of materials due to radioactivity has been carried out. The decay

* Communicated by the Manager.

[1] In collaboration with the Phipps Institute, University of Pennsylvania.

[2] In collaboration with the Physical Laboratory, University of Pennsylvania.

curves (brightness *vs.* time) have been plotted for many samples of luminous substances. A series of curves of this character has also been made where the percentage of the radioactive material has been changed. The temperature effects upon the luminescence have been studied. The results seem to be in more general accord with Rutherford's theory than shown by previous workers. Certain new applications of the luminescence of these radioactive materials will be given in the near future.

THE APPLICATION OF GRAPHICS TO GAS MIXTURES.

By Edward J. Brady.

TRILINEAR coördinates to express the characteristics of alloys consisting of three different metals were first used by Professor Thurston in 1877.

For a better illustration of their value, we may cite their use in the theory of color where any integral color may be represented by a point on a triangle, each corner representing 100 per cent. of one of the three primary sensations.

The fact that this method of graphical representation can be admirably applied to the determination of the characteristics of gas mixtures seems to have been overlooked.

In a mixture of three gases the heating value of the mixture is equal to the sum of the products of the percentage of each constituent multiplied by its respective heating value. This is also true of specific gravity, as well as the amount of air necessary for complete combustion.

It follows from the above that if on each of the three corners of a "gas mixture triangle" we erect perpendicular lines proportional to the heating value of the constituent at that corner, the upper ends of these lines will determine a plane. This plane, which we may call the heating value plane, will, in general, make an angle with the plane of the paper. Contours, or lines of equal heating value, drawn upon this plane will be straight parallel lines, making angles with the sides of the triangle, depending upon the heating value of the particular gases mixed. Such lines are the loci of an infinite number of mixtures of the three gases represented, all having the same heating value.

Similar systems may be drawn for specific gravity and air required for complete combustion.