SECTION OF ASTRONOMY AND PHYSICS, OF THE NEW YORK ACADEMY OF SCIENCES, MAY 1, 1899.

THE regular meeting of the Astronomy and Physics Section was held at 12 West 31st Street, New York, on May 1, 1899, Professor Pupin, the Chairman of the Section, presiding.

The first paper, describing experiments by Professor Pupin and Mr. F. Townsend, on the magnetization of iron with alternating currents, was read by Mr. Townsend. The paper was only a preliminary account, as the experiments are still in progress. The current wave in a transformer with open secondary circuit is a complex harmonic vibration, and the particular object of this research is to determine the amplitudes and phase relations of the components of the fundamental vibration.

The component due to eddy currents is determined from the curves of electromotive force and current, together with the static hysteresis loop for the given magnetization, by a graphical method. The eddy current component is found to lag behind the electromotive force. Also, the dynamic hysteresis loop is found to have a rounded point, as distinguished from the sharp point characteristic of the static loop.

The phase of the fundamental of the total current wave is found by means of a specially constructed phase meter. Its amplitude is determined from the electromotive force and total watts.

The remaining component to be determined is that due to hysteresis and induction reaction. This and the eddy current component form two sides of a parallelogram of which the fundamental of the total current wave is the diagonal. If the last two are determined in amplitude and phase the fundamental of the distorted wave of magnetizing current can readily be found.

The ultimate object of the investigation is to formulate the laws which govern the reactions accompanying the magnetization of iron by alternating currents.

The second paper was by Mr. C. C. Trowbridge on phosphorescent substances at liquid-air temperatures. Calcium sulphide, made phosphorescent by exposure to sunlight at ordinary temperatures, was made non-luminous by immersion in liquid air. Then, when allowed to heat up gradually to normal temperature, the phosphorescence again became visible at about —100° to —75° C. The same material, if exposed to sunlight while immersed in liquid air, phosphoresced faintly while still immersed. When exposed to the electric arc it phosphoresced strongly. In both of these cases the phosphorescence became brighter when the temperature was raised. From these results, and what was previously known, it was concluded that when a phosphorescent substance like calcium sulphide is excited by light the phosphorescent energy will be given up at the temperature of excitation even when as low as —190° C. But if it is cooled below the temperature of excitation the phosphorescent discharge is arrested, and remains so until the temperature is raised again until it is within at least 100° of the temperature of excitation.

It was found that calcium tungstate, which gives a whitish fluorescence when exposed to Röntgen rays, gave a green phosphorescence when exposed to light while immersed in liquid air.

WM. S. DAY,
Secretary.

DISSCUSION AND CORRESPONDENCE.

CEREBRAL LIGHT: FURTHER OBSERVATIONS.

IN SCIENCE, 1897 N. S. VI. 138, I published a set of observations to prove that what is at present considered to be retinal light arising from chemical changes in the retina is really not derived from the retina but from the brain. The observations were essentially: 1. That there was only one field of light instead of two, and that this field showed no signs of binocular union, binocular strife or stereoscopic union. 2. That the figures in the light do not change as the eye moves, but follow the movement later. 3. That the figures do not show movement when the eye is displaced by pressure with the fingers. A recent German reviewer, while admitting the possibility that the light is cerebral and not retinal, refuses to accept my observations as sufficient proof.

Last night I was able to perform what seems to be a crucial experiment; I record its results

while they are fresh in mind. I observed the cerebral figures for some hours, repeating the observations previously reported. When the dawn faintly illuminated the window frame I was able at one stage of brightness to see both the frame and the figures. Placing the fingers of the two hands against the outer ends of the eyeballs, I displaced them simultaneously in opposite directions; this was repeated a number of times in rapid succession. As a result there appeared two images of the frame moving in opposite directions. The retinal figures seen in front of the frame still remained single and did not move. Granting that there was no error in my observation, I cannot imagine a more conclusive proof as to the cerebral nature of the light.

The problem is really one of importance. If this light is cerebral we have a means of distinctly observing some of the phenomena in the brain. The cerebral figures are intimately associated with the contents of dreams. I believe also that the forms of the figures of cerebral light are intimately connected with the phenomena of nutrition in the brain. I find at the present time that my figures are quite different from those which I have been accustomed to observing in past years; this may correspond to a radical change in the condition of the nervous system which I have observed to have taken place during the past six months. I find also that the figures on first awakening from sleep are very different from those that are seen when the mind becomes fully awake. Systematic observations by medical men may show that diagnostic conclusions can be obtained by asking patients to describe their cerebral figures.

The question at the present time concerns the sufficiency of the observations. If they are correct and reliable there is, I believe, no escape from the conclusion that the figures are cerebral. I can see no reason to believe that my carefully and repeatedly made observations are erroneous, but it is highly desirable to have them confirmed by other observers.

E. W. SCRIPTURE.

PSYCHOLOGICAL LABORATORY,
YALE UNIVERSITY, NEW HAVEN, CONN.,
May 29, 1899.

PROFESSOR SIMON NEWCOMB.

THE issue of *Nature* for May 4th contains an admirable portrait in photogravure of Professor Simon Newcomb, together with an article describing his scientific work by M. Loewy, Director of the Paris Observatory. M. Loewy says:

Newcomb must be considered, without contradiction, as one of the most celebrated astronomers of our time, both on account of the immensity of his work and the unity of view which marks the choice of the subjects treated by him.

All is linked together in our solar system; the study of the motion of each one of the celestial bodies forming part of it is based upon the knowledge of a great number of numerical data, and there exists no fundamental element whose influence is not repercussed on the entire theory of these bodies. To endeavor to build up the theory of our whole planetary world on an absolutely homogeneous basis of constants was an almost superhuman task.

After giving an extended account of some of Professor Newcomb's more important contributions M. Loewy concludes:

We have only been able to give a short sketch of Newcomb's achievements; he is gifted with a prodigious power of work, which is testified by the extraordinarily long list of his researches.

The reception which has been accorded to them by all competent men points to their author as one of the most illustrious representatives of celestial mechanics.

This activity has embraced the most diverse branches of astronomy. Not only has he given a great scope to the intellectual movement of his country, but he has also contributed, in a very successful manner, to elevate the level of the civilization of our age, enriching the domain of science with beautiful and durable conquests.

SCIENTIFIC NOTES AND NEWS.

OXFORD University conferred, on June 8th, the degree of D.C.L. on Professor Simon Newcomb.

THE new biological laboratory of Adelbert College, Western Reserve University, was dedicated on June 13th. An address was delivered by Professor W. K. Brooks.

PROFESSOR W. C. BRÖGGER, of the University of Christiania, the distinguished Norwegian geologist, has accepted an invitation to deliver the second course of the George Huntington Williams memorial lectures at the Johns Hopkins