DR. R. S. CURTIS, of the University of Chicago, has been elected professor of chemistry in Hobart College.

MR. JOHN P. HYLAN has been appointed instructor in experimental psychology in the University of Illinois.

DR. HOPE, lecturer on hygiene at University College, Liverpool, has been made professor.

DR. TRAUBE, Privatdocent at Berlin, has been appointed to the newly established professorship in the Technological Institute at Charlottenburg, and Dr. Adalbert Kolb, Privatdocent in chemistry in the Technological Institute at Darmstadt, has been promoted to a professorship.

DISCUSSION AND CORRESPONDENCE.

CEREBRAL LIGHT.

IN SCIENCE for July 23d, p. 138, I find a letter from Dr. Scripture in which he makes some very acute observations on the the origin of the figures, usually irregular and obscure, but sometimes quite definite, which are seen in the dark field of the closed eyes. In past years I have spent many hours in studying these figures and they are briefly described in my little volume on Sight, pp. 66 and 67 of last edition. They are usually considered as of retinal origin and sometimes spoken of as 'retinal light;' but Dr. Scripture gives what he thinks conclusive reasons for thinking that they are of cerebral origin, and therefore proposes the name 'cerebral light.' Now, as to the question of origin, I am not prepared to say anything. I wish now only to show that his supposed tests are not valid.

1. He says that with the eyes closed there is but *one* dark field, instead of two, as there ought to be if its origin is retinal; for there are two retinæ. Now, if he means the simple field without reference to the figures in it, I would ask: How could there be more than one? Even with the eyes open, there seems to be but one field. Only by close observation can we see that there are really two partly overlapping fields forming a common field bounded on the two sides by the faint images of the nose. But in the dark field there are no images of the nose. But if, on the other hand, he means that the two retinæ could not be expected to be similarly affected in all parts, and therefore there ought to be different figures for the two retinæ in the same dark field, then I would ask again: How are we to distinguish the figures belonging to each retina in the one dark field?

2. But, in further proof, he says: These figures do *not move* with the movements of the eye; while after-images, which are admittedly retinal affections, do thus move. Now, I find, on the contrary, that these figures behave exactly as the after-images do. I find that, in looking in a different direction in the dark field, they may indeed disappear, but only to reappear at the new point of sight. After-images do the same. Unless they are very strong, they also, on changing the point of sight, disappear to reappear at the new point.

It is possible, however, that we are talking about different things. It is possible that there are two different kinds of figures in the dark field, one retinal and the other cerebral.

3. But, again, he says that these figures do not change place when the axis of the eye is displaced by pressure in the corner, whereas after-images do change place under these conditions. Now, on the contrary, I find that after-images under these conditions do *not* change place. It is true that with the eyes open they may *seem* to move, but this is only an illusion, the result of the contrary motion of all objects in the field of view. Real objects move because their images change their places on the retina while we look in the same direction, but the retinal brands which cause after-images cannot change their places on the retina. But now shut the eyes, so that there are no objects to plague us; then we find that after-images do not move by displacement of the axis of the eyes. There is only one case (that of the previous head) in which after-images follow the motions of the eye, although it is the commonest case. It is that in which the two eyes move together in the same direction. In other words, they follow the direction of looking, not the direction of the individual eye. But in displacement of the eye-axis by pressure we do not change the direction of the *looking* of the observer.

A convenient method of proving the above is as follows: Darken the experimental room slightly by closing the windows, but leave a crack between the shutters, showing a strip of bright sky. Now gaze with *one* eye, say the right, on the crack until its image is branded on the retina. If we now turn about and look at the wall in various directions the after-image, of course, follows all the motions of the eye. Even if we shut the eye and look about the field of darkness the after-image follows all the motions of the eye. But if, with eyes still shut and looking straight in front, without changing the direction of looking, we press in the external corner of the branded eye the after-image does not move. It still remains directly in front.

We have given this experiment as most convenient, but we may use a retinal brand produced by the setting sun with still more conspicuous results.

One more experiment to show the behavior of after-images in the movements of the eye. Gaze with *both* eyes on the crack of the previous experiment, until its image is strongly banded on the vertical meridian of both retinæ. On turning about and looking at the wall the after-image is distinctly seen and follows with exactness all the motions of the eyes in looking about. But now *converge* the eyes until they look at the root of the nose. Of course, each eye changes its direction at least forty-five degrees, but the direction of the after-image does not change. It is still directly in front. The reason is that, while each eye *individually* changes its direction, the binocular observer looks in the same direction, though at a nearer point. The two external images of the retinal brands cannot separate, as the images of an object do, because the brands are on corresponding points and have the same spatial representative and, therefore, must be seen single. This is the reason, as I have fully explained in my volume 'Sight,' pp. 199 and 200, why after-images cannot be used to test the motions of the eyes by rotation on the optic axis in *convergence*, although they are such accurate tests in *parallel motion*.

Joseph Le Conte.

Berkeley, Cal., July 29, 1897.

SCIENTIFIC LITERATURE.

Leitfaden der Praktischen Physik, mit einem Anhange, Das absolute Maas-system. Von F. Kohlrausch. Achte Auflage, B. G. Teubner, Leipzig.

Each new edition of this book has been characterized by such considerable additions that the modest guide to elementary laboratory work in physics, which first appeared under this title more than twenty-five years ago, has become a reference volume of some five hundred pages, as valuable to the advanced worker as to the beginner.

A laboratory manual should cover the entire field without undue specialization in any one direction, and without any omissions. Kohlrausch's book does this for physics more satisfactorily than any other. In fact, the manuals edited in America are too evidently, and often avowedly, nothing more than a compilation from the course given at the particular institution at which the author is teaching, and hence possess all the peculiarities and limitations of the work at that laboratory, and too often are of slight value elsewhere, with different conditions and facilities.

Kohlrausch sets forth not what is done at Würzburg or Strasburg, or even at Berlin, but what ought to be done under ideal conditions in a complete laboratory. The book is a guide to the instructor as to what experiments should be performed, as well as to the student as to how they are to be performed.

As regards the explanation of the operations, the author seems to have followed most successfully the principle laid down in the preface to this edition, "to carry the scheme, the explanation, and the setting-up of the apparatus for an experiment no further than is rendered necessary for the successful operation of a laboratory attended by a large number of students." He has achieved the happy mean between allowing the pupil to flounder too long in the working out of an experiment, and giving him such minute instructions that the necessity for originality of thought on his part is entirely eliminated.

It is difficult to select parts of this book as worthy of special mention, and yet certain subjects are treated in a manner in especially