ing and ventilating of buildings: Gilbert B. Morrison, Kansas City, Mo.

Science and art in social development: John S. Clark, Boston, Mass.

Moral tendencies of existing social conditions: Washington Gladden, Columbus, O.

The manual element in education: C. M. Woodward, St. Louis, Mo.

[Title to be announced.]: W. B. Powell, Washington, D. C.

Natural distribution, as modified by modern agriculture: John Hyde, Washington, D. C.

Calculations of population in June, 1900: Henry Farquhar, Washington, D. C.

Civil Service in the United States: H. T. Newcomb, Washington, D. C.

Federal guaranties for maintaining republican government in the States: Cora A. Benneson, Cambridge, Mass.

DISCUSSION AND CORRESPONDENCE.

ON THE U. S. NAVAL OBSERVATORY.

THE article on the U. S. Naval Observatory by Professor Asaph Hall, Jr., in the number of SCIENCE for July 14th, treats very effectively of some matters which astronomers have long wished to see altered at that institution. Many able line officers—D. D. Porter and others—have served there, as Professor Hall suggests. Any amount of such service, however, can no more make astronomers than the service of half-pay officers could do in Sir George Airy's time, although at either Washington or Greenwich the habit of naval discipline was a help toward the formation of careful habits of observation. Nor do I suppose that the earlier Greenwich assistants, Baldrey and others, were better astronomers at the start than those at Washington, who brought with them a knowledge of astronomy.

In general we should find in the earlier volumes of the Washington observations precisely what we might expect if we knew the history of the establishment derived from the accessible data beginning with Gilliss's first report, which contains, among other things, the description of the instruments procured, some of them antiquated when they were constructed, others still used to some extent, others now replaced by haphazard constructions for which some one more or less acquainted with the matter is responsible.

In general it may be said that the success or failure of the observatory now in use will be more definitely decided in two or three years after it is better known what the later reports shall indicate as to the constructive ability of the mechanicians who have been employed to replace or remodel the work of Troughton and Simms, Pistor and Martins, Alvan G. Clark and the other makers at first selected.

There is no doubt, I imagine, that the present astronomers at the observatory have had nearly *carte blanche* to do what they would, and we shall learn in a few years whether the immense amount of money expended on it has produced proportionate results, or is likely to appear to do so when they come forth to view. The excuses which were for several years offered for the delay in actually beginning the work on the zone—14° to—18° were not altogether satisfactory, as the astronomer whose observations of it are so quickly accomplished had been many years in service, and there is, so far as I am aware, nothing to show the necessity of the delay, except, if I may speak plainly, the entirely haphazard manner in which the U. S. Naval Observatory had been conducted from 1845 to the actual time of beginning observations on the zone.

It is not, in my judgment, necessary to do more to greatly improve the institution than to follow Airy's example in a simple matter of business according to the general custom at great observatories of the present day.

The appointment of a strong and intelligent visiting committee, to include a few prominent officers of the army and navy, together with a number of eminent and intelligent civilians, would add greatly, almost without expense or trouble, to the definiteness of the plans and the steadiness of the execution of the work of the institution, as one can readily see from the late autobiography of Sir George Airy.

TRUMAN HENRY SAFFORD.

WILLIAMS COLLEGE OBSERVATORY, July 19, 1899.

CEREBRAL LIGHT.

DR. E. W. SCRIPTURE, in SCIENCE of June 16th, gives an account of an experiment which

he holds proves that the so-called 'retinal light' is really 'cerebral light.' The experiment which he considers conclusive consisted in looking at a dimly lighted window in a dark room, the window being so dimly lighted that both the retinal figures and the window could be seen. He then moves the eyeballs with the fingers and notices that the retinal figures are stationary, while the image of the window moves. Dr. Scripture apparently confuses movement of the retina and movement on the retina. What he calls movement in the case of the image of the window is evidently movement of the image on the retina as shown by the 'local signs' of the retina. But the retinal figures, being impressed on the retina, move with it and not on it, and therefore the local signs of the retina give no evidence of its movement.

In repeating the experiment I gazed fixedly at the window for some time. In closing my eyes I had impressed on the retina, in addition to the retinal figures, a faint after-image of the window. If the eyes were now moved, as Dr. Scripture directs, no movement was noticeable in the after-image. It did not separate into two moving images, for this would necessitate a change in position of the two images in relation to corresponding points of the two retinas. If two dissimilar after-images are impressed, one on each retina, and the eyeballs pressed, they, for the same reason, will show no relative motion. Why, then, should we not expect the retinal figures to remain single and immovable, as Dr. Scripture found them to be?

E. B. Wheeler.
Missouri State University, July 24, 1899.

NOTES ON INORGANIC CHEMISTRY.

Two reports have recently been presented to the Home Office in Great Britain which are of considerable general interest, one on the use of yellow phosphorus in matches, and the other on the use of lead in pottery glazes. The first of these reports is by a commission consisting of Professors T. E. Thorpe, S. Oliver and Dr. Cunningham, and the other by Professors Thorpe and Oliver, and both have been reviewed at some length in *Nature*. Only two kinds of matches seem to be considered, the 'strike anywhere,' which is tipped with yellow phosphorus, and the 'safety,' in which red phosphorus is used, and is not on the match, but on the striking surface of the container. According to the report no danger seems to attend the manufacture where red phosphorus is used. In the case of yellow phosphorus, the dangerous processes are mixing the paste, dipping the matches, drying and boxing, this last involving the most handling. Already existing rules in Great Britain require efficient ventilation, non-employment of laborers who have suffered with necrosis or have lost a tooth, immediate medical examination of persons suffering with toothache, notification of cases of necrosis, and proper washing conveniences. The immediate question before the commission was as to whether they should recommend the prohibition of yellow phosphorus. In view of the competition of other countries, notably Belgium, Sweden and Japan, for export trade, and, as it has been shown that proper precautions can prevent danger in manufacture, it was felt wise not to prohibit the use of yellow phosphorus, unless an international agreement could be reached. They suggest, however, more precautions, and point to the Diamond Company, of Liverpool, where no cases of phosphorus necrosis have ever occurred. Unless we are mistaken, not a few of the American manufacturers have solved successfully the problem of tipping the match itself with a paste of amorphous phosphorus, while the use of the 'safety matches' is, happily, rapidly increasing.

The report on lead glazes is more far-reaching in its recommendations, but, according to W. Burton, in *Nature*, is hardly practical. The recommendations are as follows: (1) Prohibition of lead glazes in seven-tenths of the wares produced in the potteries; (2) That in the other three-tenths lead should be used only in the form of a lead silicate frit; (3) The use of lead white in glazes or colors absolutely prohibited; (4) Prohibition of women and children in all processes where they would come in contact with the lead work. Mr. Burton would agree to the second and third recommendations, but considers the first and last impracticable, on account of the difficulty of replacing lead glazes by leadless glazes for many wares, and on ac-