thermometer, illuminated by a side light at some distance, and not visible from the camera. Here the result was quite different. In racking the lens away from the ground glass, the point of light was still represented by a spot of almost inappreciable diameter, which, however, had a halo of rapidly increasing diameter around it. In racking in, on the other hand, the point of light very soon assumed the form of a small, distinctly defined ring of light. This is, I believe, quite in accordance with what is observed in using, for purposes of stellar photography, telescopes whose objectives exhibit spherical aberration. Also there is explained, unless I am mistaken, why, in the case of a large mass of light like the lamp flame, or a black disc of considerable size on a white ground, the form of the outline of the object does not become much blurred in racking inwards for some considerable distance. The size of the object is much larger than the diameter of a ring of light representing a point, and the infinite number of small rings of light forming the edge of the image overlap, and there is formed a well-defined edge, only making the whole image a little larger than it should be if it is bright on a dark ground, smaller if it is dark on a light ground.

I may mention that I got several different people to focus for both the lamp and the artificial star, and that, in the case of the lamp flame, some focussed for very nearly the extreme outward plane of focus, some for nearly the extreme inward plane. In the case of the "artificial star" there was also considerable difference, but not so much as in the case of the lamp flame. None of them knew for what reason I asked them to focus.

I do not give these results as conclusively proving anything definite, and, as I have said, I avoid any description of the conclusions that I draw from them myself. Anyone else may draw his own deductions. I think, at any rate, they show that we have not yet got completely to the bottom of the subject, and that more might be said about it were not all mankind that have heard the name of it, probably most heartily sick of it by this time.

There was one entirely different point in connection with which I expressed difference of opinion from Mr. Dallmeyer. If I understand him properly, he holds—in accordance with Emerson's originally expressed views—that no plane in a photograph should be rendered as sharp as a photographic lens can render it, and this not on account of the mere expression of opinion of artists on the matter, but as a scientific fact based on the assumption that a good photographic lens defines better than the human eye, and that, therefore, there will be made visible by it, in a photograph, detail invisible to the eye. I protested against this doctrine on the ground that, whatever failing there may be in the defining power of the eye when viewing objects, there will be exactly the same failing in viewing a photographic image of them, even assuming the definition of the lens to be *absolute*. I do not know whether Mr. Dallmeyer holds the same position as before in respect to this matter, or rather whether he holds it absolutely. In his last communication to the PHOTOGRAPHIC NEWS in reply to me on the subject, he says: "Mr. Burton's contention *seems** unsound, for the following reasons. First, in viewing any landscape or subject, the retina of the eye is more or less flooded with a diffused light; in the case of a camera with a well stopped-down lens there is comparatively no diffused light to interfere with the powerful discriminating focus that registers the image. Then in viewing any object we have *binocular vision*. Binocular vision is, in one sense, of use only up to a certain distance, but is a very powerful means of discriminating for near planes. I believe that I have normal vision, and I can distinctly see print using two eyes at a greater distance than is possible with one."

So far as diffused light is concerned, I would ask if it does not enter the eye in viewing the photograph as well as in viewing the "subject?" In fact, is the photograph itself not a "subject" when it is being looked at? In any case, this is a matter easily determined by experiment. Let a sheet of printed matter, or a set of the test letters that oculists use, be placed in good light, and at such a distance that some of the matter—that in the larger type—can be read, whilst some cannot. Let it now be focussed with any lens and any stop, the optical centre of the lens being the same distance from the printed matter that the eye was; let a photograph be taken of it, and see if, in a similar light, and looking at the photograph from a distance equal to the focal length of the lens at the time the photograph was taken—the lesser conjugate focus, more correctly—anything can be read that could not be read before. Of course, binocular vision will be used in looking both at the original printed matter and at the photograph of it. All that I can say is, that I have never found a Dallmeyer lens that had the power (I suppose Mr. Dallmeyer would not consider other lenses a better test), and I shall consider it a miracle when I do find any lens that has. I am writing of definition in one plane only, be it distinctly understood.

* The italics are mine.—W. K. B.

## ON SOME MODIFICATIONS OF EIKONOGEN AND HYDROQUINONE DEVELOPERS CONTAINING BORAX, CARBONATE OF LITHIA, ETC.

BY COLONEL J. WATERHOUSE, S.C.

IN the October number of the *Journal*, attention was briefly drawn to a new eikonogen developer called *graphol*, the distinguishing features of which were its being self-contained, only requiring solution in water to be ready for use, and borax being the principal alkaline agent. Some further particulars regarding this developer, and of the action of borax, carbonate of lithia, sugar of milk, and some other substances in the eikonogen and hydroquinone developers may be of interest.

The sample of *graphol* was received in Calcutta about the middle of September, at a time when the temperature was high and the air saturated with moisture. It remained quite dry and fairly white for some time, but at the end of six weeks had discoloured to a dark mouse colour, and formed a very dark green solution, whereas, at first, the solution was of a bright yellow or emerald green. It did not, however, at that time seem to have lost its developing power in any very sensible degree. In January it was darker in colour, but still developed well, though it had lost some of its power, and longer exposures were necessary. It had thus kept four months in good condition in a corked bottle, though opened at the worst time of the year. Under favourable conditions it would most probably keep much longer, and it seems likely to prove a useful developer for general purposes, but especially for travelling. Used solutions of it turn brown on keeping, and from this and other indications it seems probable that hydroquinone forms one of the ingredients.

An attempt to make a *graphol* developer by grinding together eikonogen, metabisulphite of potash, borax, hydroquinone, and sugar of milk was not successful.

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