the use of immersion objectives, which are now in universal use, and accepted as a valuable improvement.

The use of oil was suggested by Amici, as far back as 1844, by Oberhauser in 1845, and Wenham in 1855 and again in 1870, and only admitted in practice in 1878, so that it appears to have required 34 years to convince microscopists of a fact, that might have been settled in a week and this due to "persistence in a fallacy." Such being the case it is surely time for these fallacies to be shelved, and we are glad to find the R. M. S. has taken such a view of the case.

FLUORESCENT BODIES.

If we put some common paraffin oil, or a solution of sulphate of quinine, into a glass tube or other suitable vessel, and then look through it, the liquid will appear quite colorless; but if we allow the light to fall upon it, and then view it at a little distance and at a certain angle, some parts of the liquid will present a delicate sky-blue tinge. The effect in the case of quinine is heightened if the source of light is burning magnesium wire.

The large number of substances belonging to this class are termed fluorescent bodies, because they exhibit phenomena similar to the examples above given. The term itself, however, was suggested to Prof. Stokes by a particular kind of fluor-spar which shows this property.

Again, if we cause a room to be darkened, and allow only blue light (*i. e.*, by covering a hole in a window-shutter with cobalt-blue glass) to fall upon a glass vessel filled with water which has been standing some minutes, on floating a strip of horse-chestnut bark upon its surface, in a few moments a stream of bluish grey fluid (æsculin) will be seen slowly descending from the bark, hanging, in fact, like a bunch of barnacles from an old ocean waif. Of if, under the same arrangement of light, or by using even more powerful absorbents of the ordinary rays (such as a solution of ammonio-sulphate of copper or one of chromate of potash), we look at a piece of what is commonly termed canary glass—*i. e.*, glass colored with an oxide of the metal uranium—it will be seen to glow as it were with rich greenish yellow rays, just as though it were itself a source of light; or if we take a solution of a uranium salt (the normal acetate) the phenomena are very striking when examined under the same conditions, and still more so by the electric light. But the salts of aniline—a substance which is the parent, so to speak of mauve, magenta, and other brilliant colors—are singularly rich in exhibiting these effects.

A very beautiful experiment may be performed with the aniline red ink now so commonly in use. It affords, at one and the same time, an admirable illustration of Prof. Tomlinson's submersion figures and of the phenomena under consideration. If we take a long cylindrical glass vessel, or one with parallel sides, fill it with water, which is allowed to settle, and then gently deliver a drop of the red fluid to the surface, the drop begins to contract, and slowly from its centre descends in the form of a tube; the denser parts of the coloring-matter presently form a thick circular rim at the end of the tube,—but this is only for a moment, for a wavy edge appears upon this rim, then expands into a triangular parachute with a thickened edge, and from the extremity of each corner two or three smaller tubes descend; these in like manner pass through the same phases as the parent stem or tube.—*E. R. Hodges (Journal of Science, London.)*

INTRA-MERCURIAL PLANETS.

A collection of the observations published in the report of the Total Solar Eclipse of 1878, will give, perhaps, the best idea of the present state of the question of the discovery of Vulcan and other planets revolving within the orbit of Mercury; and it may be of some interest to present the matter in the form of a chart showing the ground covered by different observers, who, during the time of totality, devoted themselves to the search for such bodies. For this purpose, the space swept by the six observers, Newcomb, Hall, Wheeler, Bowman, Todd and Pritchett, has been indicated by different shading on the accompanying chart, which is merely a copy of that prepared by Prof. Hall for the use of observers of the eclipse, and published with the instructions issued from the United States Naval Observatory.

The two objects, "*a*" and "*b*," discovered by Prof. Watson, and thought by him to be planets, have been indicated upon the map thus: ⊙. The two discovered by Swift, also announced as intra-mercurial planets, have been marked thus: ⊗.

Swift's two stars are described as equal in brightness, of about the fifth magnitude, and 8′ apart; on a line with the sun's centre. Each had a round red disk, and each was free from twinkling. The object farther from the sun was at one time thought by Swift to be ϑ Cancri, and the other a new planet. The diameter of the field of view was 1.°5.

Watson's star, "*a*," is described as being "between the sun and ϑ Cancri, and a little to the south;" of a ruddy color and about 4th magnitude, or fully a magnitude brighter than ϑ Cancri, which was seen at the same time. The star, "*b*," was also of a ruddy hue, and is given as the 3rd magnitude.

Watson used an aperture of 4 inches; magnifying power of 45 diameters; Swift, an aperture of 4.5 inches; power of 25 diameters. We see by inspecting the chart, that the place of one of Watson's stars (that of which he was the more certain) was covered by Wheeler with a 5-inch aperture; power 100; by Pritchett, 3.5 inch aperture, power 90; and by Bowman with a 3.5 inch aperture and power of 30 diameters. The place of Swift's two stars was examined by Bowman and Wheeler, and one of the stars appears just in the corner of Pritchett's sweep. Finally, the whole ground was covered by Todd with a 4-inch aperture and power of 20.

Of these observers, Wheeler and Pritchett possessed telescopes with optical power at least equal to that of Swift, or Watson, and Bowman's glass was of sufficient power to show any object as large as the 5th magnitude,—but nothing, not already upon the chart, was found.

This should be borne in mind, however, that several ot the observers were enabled to make but very hasty sweeps,—not devoting so much of their attention to the subject as Watson did, and, indeed, at Mr. Todd's station clouds interfered seriously with the work. And, on the other hand, it appears that Prof. Watson devoted a large part of his time to sweeping on the east side of the sun.

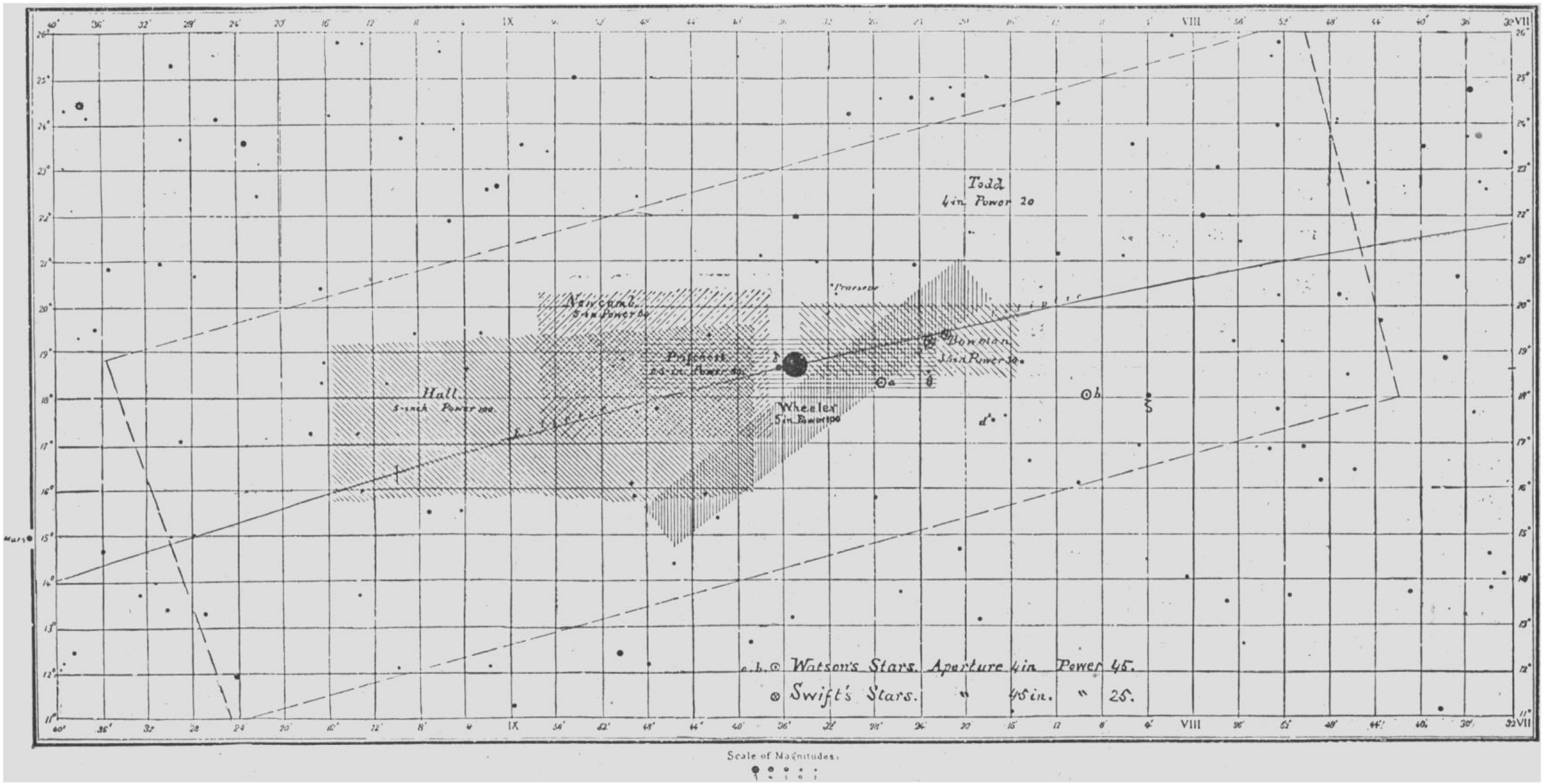
A glance at the chart will show that Watson's stars have about the same relative positions and magnitudes as ϑ and ζ Cancri, and that Swift's stars as far as relative position is concerned, resemble closely d^2 Cancri and B. A. C. 2810, or the pair of stars similarly placed on the other side of the sun. The probability of an error in pointing the telescope, which would account for such a misidentification as has been suggested, has been thoroughly discussed by Dr. C. H. F. Peters in the *Astron. Nach.*, No. 2253, p. 323, and Dr. Peters' paper has been answered by Prof. Watson in the next volume, *Astron. Nach.*, No. 2263, p. 101.

It is not the intention of this article to consider again the question of the identity of the stars seen by Watson and Swift, but merely to point out the evidence upon which the discovery of "Vulcan" rests, and to call attention to the fact that the existence of an intra-mercurial planet is not yet admitted by the majority of astronomers of the present day.

W. C. W.

WASHINGTON, D. C., *February* 24, 1881.

Planets and Stars in the Vicinity of the Sun, on July 29th, 1878.



TO ILLUSTRATE ARTICLE ON INTRA-MERCURIAL PLANETS.