ASTRONOMY.

SWIFT'S COMET.

Swift's periodic comet, which has now become quite faint, was observed on December 10th and 11th, with the 26 in. equatorial of the Naval Observatory, and it is hoped that more observations will be obtained as soon as the moon has passed. On account of an elliptic motion, it has been slowly departing from the ephemer's computed by Mr. Upton with parabolic elements and published in Vol. I, No. 21, of "SCIENCE."

The following is a continuation of Mr. Upton's ephemeris, which he has corrected, however, from the most recent observations:

EPHEMERIS.—WASHINGTON MEAN MIDNIGHT.

DATE.	R. A.			DECL.		
	H.	M.	S.			
1880, December 18	5	14	44	+38°	5	2′
" " 20	5	20	40		36	45.1
" " 22	5	25	53		35	29.9
" " 24	5	30	35		34	19.6
" " 26	5	34	47		33	14.0

A NEW Astronomical Journal, *Urania*, edited by Dr. Ralph Copeland and Mr. J. L. E. Dreyer, is to appear early in January. It will be published in numbers of from 16 to 24 quarto pages, as material can be accumulated. The names of the editors, Mr. Dreyer as a former assistant to Lord Rosse, and Dr. Copeland as Lord Lindsay's assistant, are sufficient assurance that this will meet the want long felt in England and Ireland of a journal, published at frequent intervals, especially devoted to the interests of astronomers.

Lieut. S. E. Tillman, of the Corps of Engineers, whose name is well known in connection with the American Transit of Venus Expedition to Tasmania, has been appointed Professor of Chemistry, Mineralogy and Geology, at West Point, in the place of Professor H. L. Kendrick, who has voluntarily retired in order that this appointment might be made. Professor Tillman has had a very varied experience as an officer of engineers, his duties having led him to astronomical and geodetic work in the field and to geographical and geological explorations. The military academy may be congratulated upon having secured a valuable addition to its present strong academic staff.

The volume of Washington Astronomical Observations for 1876, containing, in an appendix, the reports on the total solar eclipse of 1878, is expected, in a few days, from the Government printing office.

Mr. S. C. Chandler, Jr., publishes, in *Science Observer*, a description of an instrument, the "Almacantar," which he has invented for determining time and latitude. The instrument is designed for the observation of "Equal Altitudes," the principle upon which it is made being that of Kater's floating collimator. The Y's, in which the pivots, rest are secured to opposite sides of a hollow iron rectangle which floats in a rectangular basin of mercury. The telescope can be clamped in altitude and the whole instrument rotated about a vertical axis. The float is allowed to seek its level, and thus the telescope will indicate equal altitudes on either side of the meridian. The probable error of a clock correction, as determined from a series of observations with this instrument, is about ± 0.05 sec. W. C. W.

P. S.—For notice of a new comet see page 297.

To the Editor of SCIENCE:

I observe what appears to be some errors in dates in the list of minor planets discovered by the late Prof. J. C. Watson, mentioned by your correspondent.

(133) Cyrene was discovered August 14, 1873. (*American Journal of Science*, III., vi, 296).

(174) Phædra was discovered August 8, 1877. (*American Journal of Science*, III., xiv, 325).

(175) Andromache was discovered September 2, 1877. (*American Journal of Science*, III., xiv, 325).

He also discovered, October 20, 1857, the planet observed a few days before by Luther, and since named *Aglaia;* also, October 9, 1865, the planet seen by Peters a few days previously, and since named *Io;* also, July 29, 1873, a planet which on account of cloudy weathe, eluded his subsequent observation. (*American Journal of Science*, III., vi, 296).

A. WINCHELL.

University of Michigan, Ann Harbor, Dec. 11, 1880.

MICROSCOPY.

In the American Monthly Microscopical Journal for December, Dr. J. J. Woodward claims for Professor J. L. Riddell, M. D. of the United States, the priority in inventing at least two forms of Binocular Microscopes, since introduced by Beck of London, and Nachet of Paris.

This communication of Dr. Woodward appears to prove beyond a doubt that to an American, Dr. Riddell, then of New Orleans, is due the credit of first demonstrating and publishing the optical principle, on which all the most successful binoculars, made prior to the present year, depend. He first showed that the cone of rays proceeding from a single objective may be so divided by means of reflecting prisms, placed as close behind the posterior combination of the objective as possible, that orthoscopic binocular vision can be obtained both with the simple and compound microscope.

While giving full credit to Dr. Riddell for all that is due to him, we think, in justice to Mr. Wenham, the fact should be admitted that he was the first to produce a binocular arrangement for the microscope, so simple and perfect in its form, as to render its general use possible. We once asked a London microscope maker, why the Stephenson form of binocular was only adopted by a very few microscopists, and were informed, in reply, that the expense was great in constructing microscopes on this model, and on that account they were not popular.

As we find from Dr. Woodward's paper that the improved form of Dr. Riddell and that of Stephenson were practically alike, it may be that for this the reason neither received the attention anticipated.

An interesting paper on *Cercaria hyalocanda*, by Herman C. Evarts, may be found in the same Journal. This larval form of a trematode was observed to come from the common pond snail (*Physa heterostropha*) when placed in a shallow dish containing water.

In form, the body when contracted was globular, and this form was maintained by the animal while actively swimming about; at rest it would extend its tail, and then assume a somewhat triangular form.

They were sufficiently large to be seen by the naked eye, and were observed to encyst themselves, contracting during the process to a globular form, around which was secreted a glutinous mass. A few seconds after the cyst commenced to form, the tail detached itself and swam away.

We are also indebted to this journal, for the description of the following method of mounting opaque objects, contributed by Mr. A. H. Chester:—

"The object is first fastened to the slide, which is centered on the turn-table, by means of a weak solution of gelatin,

gum water, or Brunswick black. For very small objects a small circle of the gelatin is turned in the centre of the slide, and then allowed to dry. The objects are arranged on the spot, and then, by carefully breathing on the slide, they are fixed in position. If larger objects are to be fixed to the slide a spot of gelatin or gum that the object will entirely cover is put on, and after drying, the object is fixed in the same way. For larger and heavier objects a circle of Brunswick black is turned, and after it has been thoroughly hardened by heat, so that when cool a needle point will not mark it easily, the object is arranged on the spot and fastened by warming again.

In whatever way the object is fastened, the next thing to be done is to lay the slide on the plate and heat it until it is perfectly dried and ready to be covered.

The slide is then centered on the table and a circle of shellac, which has been thickened and colored with Chinese vermillion, is run around the specimen, at such a distance from it that its inner edge is just larger than the cell to be used. The cell is then laid on, centered, and pressed hard to set it. If the slide is slightly warm and the cement thick, it will not run at all, but will hold the cell firmly in place, so that the cover can be put on at once. If it is thin it must first be allowed to harden somewhat. When ready, as it will be in a few moments if properly managed, a ring of the same cement is run on the cell and the cover is then laid on, pressed down, clipped in position, and the mount laid aside to harden. It is well in an hour or so to remove the clip and run cement in the joints between cover-glass cell and slide, in order to be certain that no air-holes remain. It can then be reclipped, and set aside until the cement is perfectly hard. The mount is complete and will last a long time if proper care is taken of it. I think for security it is well to put on additional rings of cement more elastic than the shellac, and to make a final finish for the sake of appearance. I, therefore, put on a ring of white zinc cement which completely fills up the joints, and makes a smooth surface from cover-glass to slide. This must harden several days, and the slide is then complete, unless additional rings are run on for a finish.

In making the rings on slides it is not always easy to make the edges true, and sometimes the cement spreads too far. In such cases I turn them down with the point of a knife until they suit. If the cement is taken just at the right time this is easily done, and it improves the appearance very much."

BOTANY.

THE COLOR OF FLOWERS.—At a recent meeting of the Vaudois Society of Natural Science, Prof. Schnetzler read an interesting paper on the color of flowers. Hitherto it has generally been supposed that the various colors observed in plants were due to so many different matters—each color being a different chemical combination without relation to the others. Now, however, Prof. Schnetzler shows by experiment that when the color of a flower has been isolated by putting it in alcohol, one may, by adding an acid or an alkali, obtain all the colors which plants exhibit. Plants of Pæony, for example, yield, when macerated in alcohol, a violel-red liquid. If some acid oxalate of potassa be added, the liquid becomes pure red; while soda changes it, according to the proportion used, into violet, blue or green. In the latter case, the green liquid appears red by transmitted light, just as a solution of chlorophyll does. The sepals of Pæony, which are green bordered with red, become wholly red when placed in a solution of acid oxalate (binoxalate) of potassa. These changes of color, which may be obtained at will, may quite well be produced in the plant by the same causes; since, in all plants, there always exist acid or alkaline matters. Further, it is stated that the transformation from green into red, observed in the leaves of many plants in autumn, is due to the action of the tannin which they contain, on the chlorophyll. Thus, without desiring to affirm it absolutely, Prof. Schnetzler supposes, *a priori*, that there is in plants only one coloring matter—*chlorophyll*, which, being modified by certain agents, furnishes all the tints that flowers and leaves exhibit. As for white flowers, it is well known that their cells are filled with a colorless fluid, opacity being due to air contained in the numerous lacunæ of the petals. On placing the latter under the receiver of an air-pump, they are seen to lose their opacity and to become transparent as the air escapes from them.

PROFESSOR W. W. Bailey, of Brown University, states that the herbarium of the late Col. Stephen T. Olney, of Providence, R. I., was left by his will to Brown University, on condition that it be placed in a fire-proof building. It is probably known to the readers of "SCIENCE" that Col. Olney was an invalid and incapacitated for business during the last years of his life. At that time the herbarium, which had been stored in Butler Exchange, was transferred by the trustees to the fire-proof library building of Brown University, the only edifice possessed by the college which would fulfil the requirements. Professor Bailey was requested to examine and arrange the collections, which he did in connection with Mr. James L. Bennett. He is greatly indebted to this gentleman for valuable suggestions and assistance which his natural neatness of method and mature experience rendered easily possible. He it was who arranged the *Carices* (which were Col. Olney's specialty), together with the lower Cryptogams, many of which he had himself collected.

They found this elegant herbarium, one hardly surpassed by any private collection in America, badly injured by insects. The first work, then, was to poison what could be saved. It is not an exaggeration to say that one-third of the Phanerogams had suffered. In places a whole genus would be riddled by the *Anthrenus*. It was a sad sight; for the specimens had been prime, were superbly mounted, and many of them impossible to replace. Col. Olney was so neat in his methods that he disliked to see a blemish on any paper; hence his very sense of order was perhaps a means of loss. Every plant had to be thoroughly poisoned, Now that the college has come into possession, it will be necessary to throw out mutilated specimens and replace them by others. Mr. Bennett and Professor Bailey stand ready to fill the vacancies from their own herbariums.

The collection is a fine one in every way. In Rhode Island plants it is only equalled by that of Mr. Bennett. It is very rich in Southern and Western plants of Hale, Chapman, Curtis, Ravenel, Fendler, Parry, Thurber and many other well-known collectors. There is a fine set of Wright's Cuban plants, of Robin's *Potamogetons*, of Sullivant's and Austin's Mosses, etc., etc. Indeed the owner spared no expense (and he was a wealthy man) to build up his herbarium. In the genus *Carex* it must long remain unique and classic. There is much raw material and many duplicates in *Carex*. As Colonel Olney's correspondence shows him to have been in debt as regards exchanges, Professor Bailey, who now has charge of the herbarium, would be pleased to communicate with such botanists as have not received returns. He will then, acting under the direction of the college authorities, endeavor to discharge all such obligations. Col. Olney bequeathed a fund of $10,000 for the increase of his herbarium and library. The latter, containing 712 volumes also comes to Brown University, together with his Chevalier and Smith & Beck's microscopes and much valuable apparatus and material. With another $25,000 left by the deceased Colonel, a professorship of Natural History has been created. One of the duties of the professor is to give lectures on Botany.

We are under obligations to the *Bulletin* of the Torrey Botanical Club, for occasional botanical notes. This Journal has now been published for ten years, and was established as a means of communication for botanists. The address of the editor is, W. H. Leggett, 54 East 81st street, New York City. The rates are one dollar per annum, so that its cost will hardly be a bar to its use by botanists. We can probably arrange club rates for our subscribers.