placed by the genus Entomophthora; but it is proposed by Giard, who has investigated the subject recently, to retain these names to designate the asexual and sexual stages respectively. These plants belong to the interesting order *Saprolegniaceæ*. Other species of the same order are abundant on dead and living fish, cray-fish, etc. They have sometimes proved very destructive to the young fish in hatcheries. The species of the order are not well known, although examples are easily obtained.

J. C. A.

MICROSCOPY.

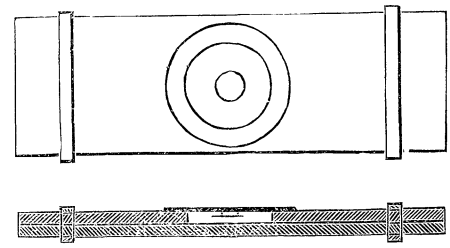
Mr. Julien Derby recently read before the Quekett Microscopical Club a paper describing various special "dodges," which may be employed by microscopists to facilitate their researches.

I. When allowing all but adepts in the use of microscope to peep through my high power glasses, I have often felt a certain degree of uneasiness, not to say of alarm, regarding the fate of valuable test-slides, or still more valuable objectives. Many others here present have no doubt experienced the same discomfort which I find an easy matter to attenuate to a considerable extent, by focussing from the eyepiece instead of from the coarse or the slow motion. All that is needed for this is a rack and pinion to the eyepiece of considerable length. An inch or two up or down corresponds here to a fraction of a turn of the fine adjustment of the microscope, so that very little danger exists of any sudden contact with the covering glass. As soon as an indistinct view of the object is obtained through the ordinary coarse adjustment of the microscope body, the focus is brought to exactness by means of the coarse motion of the eyepiece without much difficulty. For demonstrations or exhibitions in public, microscopes could thus be made without the ordinary fine motion.

II. When mapping with micro-spectroscope, the difficulty of measuring exactly the position of fine lines or absorption bands is often great, even when using the admirable micrometers invented by Mr. Browning and Mr. Sorby. I find that in most practical cases the micro-spectrum can be thrown upon a sheet of white paper by means of an ordinary camera lucida placed over the eyepiece of the spectroscope. Strong light by means of a condenser has to be thrown through the liquid under examination. By means of an ivory rule, finely divided, and brought back to a known line, say D, all other lines or bands may be directly measured off on the rule, and, if desired, the exact results in millionths of a millimetre may then be computed by any of the known interpolation formulæ, such as are given in Suffolk's useful little book.

III. The arrangement of small microscopic objects, such as diatomis, foraminiferæ, etc., on slides in regular lines, circles or patterns, can be much facilitated in the following way: "Draw with a pen and ink cross lines, or circles, or any other figure required on the surface of the plain mirror of the microscope; then focus down until the image of these lines is seen on the upper surface of the top lens of the condenser. By means of a mechanical finger, or of a steady hand with a rest, no difficulty will now be experienced in placing the objects in perfectly regular order.

IV. I now obtain excellent condensed monochromatic light by means of a bull's eye of unusual external shape, the internal portion of which, however, is filled with glycerine or oil of cloves colored to suit. This bull's eye has a plane back and a concavo-convex front, and the liquid is introduced through a hole in the flat side, closed by a small ground stopper. This apparatus is furnished with universal motions, and has a rack and pinion foot. It was made for me by Mr. J. Browning. When using blue light, produced by ammonia sulphate solutions, I have resolved, by means of this monochromatic bull's-eye amphipleura, with objectives in my possession, which will hardly show *Pl urosigma angulatum* under ordinary condenser illumination.



V. Some time ago, Mr. J. E. Ingpen, on my behalf, made a communication to the Club in regard to a growing regard to a growing slide I had devised for some special researches I was following at the time. Some difficulty seems to have been found in the making of these slides, so that it is with pleasure I now offer a still more simple contrivance for obtaining the same results. Here is the receipt: Take an ordinary glass slip with a circular hole, say, half an inch or more in diameter in the middle; lay this slip on an ordinary glass slide, not perforated. Then grease the top of the upper or perforated slide just a little way around the circular hole, and join the two slips of glass by means of two rubber rings (see Fig.). The object is then placed on a thin cover-glass, somewhat larger than the hole in the slide: it is covered by a thin glass cover, ¼ in. in diameter; the whole is then turned down and fastened to the slide by the adherence with the grease, while the small cover prevents the running of the liquid. The plant or animal under examination finds itself confined in a sort of minature Ward's case. When not under observation, the growing slide is laid flat in a shallow plate with water just above the line of junction of the two slips of glass, where, by capillarity, it creeps up to the central cell, where evaporation keeps the contained atmosphere in a state of constant and healthy saturation.

VI. *Copal Varnish.* I find this varnish dries very rapidly if slightly heated, or even if placed on a previously warmed slide. I have many hundred slides of diatoms prepared in copal varnish, and my friend, Mr. Van Heurck, of Antwerp, who was the first to use this material, has many thousands. The varnish to be used is what is called the "pale copal," and its consistency ought to be that of oil. It is much pleasanter to use than Canada balsam, does not make bubbles, and its refractive index is not very different from that of balsam, and does not interfere with the solution of diatom markings. I have of late made many preparations in copal, dispensing with the cover-glass altogether. The drop of copal is placed on the diatoms and heated lightly over the spirit-lamp. It soon takes the consistency of amber, and is hard enough to sustain wiping and brushing with a soft brush with impunity. The optical aberrations produced by the cover-glass are thus done away with.

ASTRONOMICAL MEMORANDA.

Professor C. A. Young has examined the 70 lines given on Angström's chart as common to two or more substances. Of these 70 lines, 56 were seen distinctly double, or triple; 7 single; and in regard to the remaining 7 there is still an uncertainty. The instrument used was a diffraction spectroscope with collimator and observing telescope, each of 3-inch aperture and about 42 inches focal length, and a Rutherford grating of 17,300 lines to the inch. The apparatus was strapped to a 12-foot equatorial provided with a driving clock, and powers magnifying from 50 to 200 diameters were used. A large prism with a refracting angle of 20° was placed between the object glass of the

equatorial and the sun to throw out the parts of the spectrum not under examination, and a concave cylindrical lens was used next the eye to reduce the apparent width of the spectrum, and thus increase its brightness.

From Professor Young's observations it thus appears that the coincidences are only near approximations, but a careful investigation by bringing together the bright-line spectra of the metals and the solar spectrum must be made in order to settle the question conclusively.

Mr. E. J. Stone has presented to the Royal Astronomical Society the complete sheets of his great Catalogue of Southern Stars, observed during his superintendence of the Royal Observatory, Cape of Good Hope. This very important work contains the places of between twelve and thirteen thousand stars, including, in addition to the stars observed by Lacaille, a considerable number of stars falling within similar limits of magnitude. "A stereographic projection showing the distribution of the stars contained in the Cape Catalogue, 1880, between 110° and 180° N. P. D.," has been lithographed by Mr. Stone.—*Nature.*

W. C. W.

As noted in the issue of last week, the volume of reports on the total eclipse of 1878, has been recently issued from the Naval Observatory at Washington. A few separate copies of the report of Mr. D. P. Todd, assistant in the office of the American Ephemeris and Nautical Almanac, have been reprinted, mainly for distribution among the gentlemen who co-operated in observing the duration of totality along the limits of total eclipse. Besides the usual observations of contacts, Mr. Todd had planned a search for supposed intra-mercurial planets, having provided himself with the four-inch comet seeker belonging to the Naval Observatory. At his station, however (Dallas, Texas), clouds intervened to such an extent that δ Cancri, a fourth magnitude star near the sun, could not be seen. This station was almost the only one of any importance at which clouds interfered on the day of the eclipse. Mr. Todd describes in his report a new method of procedure in the observation of total eclipses, whereby it would seem that the question of the existence of intra-mercurial planets might be speedily settled. An arrangement was concluded between Professor Newcomb (observing in Wyoming), and himself, whereby, if the former should observe any such object, its approximate position should be telegraphed immediately to the southern station for verification—there being about twenty minutes of absolute time intervening the arrival of of the moon's shadow at Wyoming and its reaching Texas. As Professor Newcomb observed no unknown object, there was, of course, no occasion for carrying out this scheme; but it will readily appear that, had the weather been clear at the southern station, and had the position of the objects seen by Professor Watson, been telegraphed for verification, the question of small planets near the sun might have been in a much less uncertain condition than it now is. It is to be hoped that astronomers may utilize this scheme on the occasion of the next total eclipse on the 16th of May, of next year. Eleven sketches and one lithograph plate of the corona accompany this report, but they do not exhibit any details of structure worthy of note. But by far the most important portion of Mr. Todd's report relates to the observations of duration of totality, which were made at his solicitation at numerous points along the northeast and southwest limits of total phase. This series of observations will afford a very accurate correction of the longitud of the node of the lunar orbit, whenever the geographical positions of the several stations have been determined with sufficient accuracy to be used in the computation.

NOTE ON SUN SPOTS IN JANUARY, 1881.

To the Editor of "SCIENCE:"

1st, at noon: 5 groups, 11 spots. One spot quite large and close to east edge. Air very tremulous, making observation bad.

7th, 3 P. M.: 1 group, 3 spots. Two are large; nearly north of centre. Air bad. Observation with spy-glass, power 36.

8th, 1 P. M.: 1 group, 4 spots. Air very bad.

10th, Noon: 1 group, 6 spots. Air very bad. Power 50.

11th, 2½ P. M.: 2 groups, 9 spots. One group of 7 spots 3′ from west edge. Two little spots and faculæ at east edge. Air pretty good.

17th, Noon: 1 group, 2 spots. A large spot near halfway from centre to N. W. margin. Observation with spyglass, power 36.

24th, 10½ A. M.: 3 groups, 23 spots. 12 spots, 2 quite large, south of centre. Air poor.

18th, Noon; 5 groups, 66 spots. One quite large and 5 good size, near west edge. Only good observation this month. The sun was hid most of the time.

Telescope 4.6 inches aperture; Power 100, except otherwise noted.

The number of solar spots has been slowly increasing since March, 1879. But it looks likely that the next maximum will be considerably more than eleven years from the last one, which occurred about August, 1870. The following minimum was nearly nine years afterward. It is generally about seven years from maximum to minimum, then four years to the next maximum. So I think it probable that the period, this time, will be about thirteen years, making the next maximum in 1883.

WM. DAWSON.

SPICELAND, IND., February 2, 1881.

CHEMICAL NOTES.

FORMATION OF BASES FROM SUBSTITUTED ACID AMIDES.—O. Wallach and Iwan Kamenski conclude, from their experiments, that if a base is formed by the action of phosphorous penta-chloride from a substituted amide of monobasic acids with a short carbon chain, two molecules of the amide enter into reaction in such a manner that hydrogen is derived from the hydrocarbon radicle pertaining to the acid in order to form hydrochloric acid.

ZINC CHLORIDE AS A REAGENT FOR ALKALOIDS, GLYCOSIDES, ETC.—A. Jorissen has found that the following bodies produce characteristic reactions with pure zinc chloride: Strychnine, bright rose; thebaine, yellow narceine, olive-green, delphinine, brownish red, berberine, yellow; veratrine, red; quinine, pale green; digitaline, chesnut-brown, salicine, violet-red; santonine, violet-blue; cubebine, carmine red. In case of strychnine the reaction can be produced with 1 decimilligrm. of the hydrochlorate. Brucine and aconitine, if present, interfere. To obtain the blue coloration characteristic of santonine, the mixture during evaporation must be continually stirred with a glass rod drawn out to a point. Digitaline gives first a green solution, similar to that produced by heating with hydrochloric acid. After evaporation there remains upon the porcelain a chestnut-brown spot which quickly blackens. The salicine reaction can be used for detecting the fraudulent addition of this body to quinine sulphate. Albumenoid substances, if heated for a time with the zinc chloride solution, leave a violet stain upon the porcelain, which may be distinguished by its instability from the colorations mentioned above. As a rule it quickly blackens. The author's method of operating is as follows: A solution of the alkaloid or its hydrochlorate is evaporated to dryness upon the water-bath, say in the inside of the lid of a porcelain crucible; two or three drops of the test-solution—1 grm. fused zinc chloride in 30 c.c. concentrated hydrochloric acid and 30 c.c. water—are placed upon the residue, and dried up afresh on the water-bath. The coloration begins at the outer edge and spreads inwards as the water is expelled.