

painted in whiting and water that has survived for more than twenty-five years, in spite of the window-cleaning that it has been subjected to. He suggests that the effect is due to molecular changes. Mr. Julius Rheinberg says that his experiments "made during the last years on the introduction of metals into the surface-layer of glass have convinced him more and more that we should regard glass as a substance full of *ultra-microscopic* pores." He suggests that material left in these pores, which would sometimes resist cleaning processes, may form the nuclei or condensation centres when the latent image is rendered visible. Mr. Rheinberg is well known among men of science interested in microscopical and photographic matters, and as he is the maker of the graticules and micrometer and other scales exhibited at the British Scientific Products Exhibition recently arranged by the British Science Guild, his opinion is of special interest. Some of these scales, etc., have the gradations made photographically in untarnishable metal in the surface-layer of the glass itself, and thus need no cover-glass to protect them.

THE stoppage of supplies of organic developing agents from Germany led to the supply of many "metol substitutes." Several of these have been examined in the research laboratory of the Eastman Kodak Co., and they have communicated their methods of analysis and some typical results to the *British Journal of Photography* for November 8. Some contained a small proportion of metol. One contained metol 10 per cent., hydroquinone 18.5 per cent., the rest being cane-sugar and sodium sulphite. Another was simply pyrogallol with three times its weight of sodium sulphite. Some were boldly labelled "metol" without the word "substitute." Two such did not contain a trace of methylated product, though one was labelled "hydrochloride of methyl-*p*-amino-*m*-cresol, guaranteed 96.3 per cent. pure." Another was half hydroquinone, and contained sodium sulphite, potassium iodide, and sodium carbonate. Of developing agents that did not claim any special relationship to metol one was half starch and moisture. There is also given a long list of adulterants and useless additions that Dr. H. T. Clarke, the analyst, has found in various commercial developing agents. Although such stuffs as those mentioned may be on the market, there is no need to use them, because reputable firms are making the genuine developing agents and marketing them under their proper names. But it behoves those who use developers to be on their guard.

A FEW months ago Messrs. Pictet and Sarasin described the production of lævogluco-sane by the distillation of cellulose or starch under diminished pressure. This body is of interest, since it can be converted into *d*-glucose and thence into alcohol. In *Helvetica Chimica Acta* (No. 3) M. Pictet shows that the reverse process is possible up to a certain point, lævogluco-sane being readily transformed into dextrin by re-polymerisation. This change is brought about by simply melting the lævogluco-sane in the presence of platinum black, which acts as a catalyst; the transformation is complete in a few minutes. As regards the product, this approximates to certain of the achroodextrins, but has a notably lower rotatory power. In the same number of the *Acta* there is another interesting instance of catalytic action. M. F. Reverdin shows that the benzylation of certain aromatic derivatives is greatly facilitated by carrying out the operation in the presence of a small quantity of sulphuric acid. Resorcin, alizarin, amino-anthraquinones, and trinitro-*para*-anisidine are some of the compounds which can thus be readily benzyolated.

#### OUR ASTRONOMICAL COLUMN.

THE PLANET SATURN.—This attractive telescopic object is now coming favourably into view in the evening hours, rising on November 25 at 10h. 34m. and on December 25 at 8h. 35m. p.m. The southern surface of the rings is visible, but the angle subtended by the minor axis is growing less as the planet's motion is directed southwards.

Surface phenomena, of somewhat similar nature to those affecting Jupiter, are visible on Saturn, but are more difficult to detect, and probably less frequent in their manifestation. Further study of the markings is desirable, and especially with regard to their rates of motion in different latitudes. Mr. Denning writes that from a number of white and dark spots placed in the planet's north temperate zone in 1903 he deduced a mean rotation period of 10h. 37m. 56.4s. This differs considerably from the period ascertained from a white equatorial spot seen by Prof. Asaph Hall in 1876-77, which gave 10h. 14m. 23.8s. In 1793-94 Sir W. Herschel made some observations of certain inequalities in a southern quintuple belt on Saturn, and found the period 10h. 16m. 0.44s. If any spots or other irregularities in the belts are detected during the few ensuing months, their transit times across the central meridian should be taken with the view of redetermining the rate of rotation. During the remainder of the present year the planet will be in a position about  $1\frac{1}{2}^{\circ}$  from Regulus in Leo, and the configuration will be an attractive one for naked-eye observers.

THE ORIGIN OF COMETS.—Prof. Ström-gren contributes an article on this subject to *Scientia* for August last. For some years past he has been studying the effect of planetary perturbations on those comets for which hyperbolic orbits have been found; his conclusion is that the excess of the eccentricity above unity can in all these cases be explained by the perturbations—in other words, that the primitive orbit was elliptical, and that the comets in question are original members of the solar system, not visitors from without. This conclusion is indeed fairly obvious *a priori*, since the relative velocities of the stars are of the order of several miles per second, and any body entering the sun's sphere of influence with such a speed would have an orbit of a decidedly hyperbolic character, whereas the eccentricity of the orbits in question is very little in excess of unity.

The remainder of the article is occupied by speculations on the cause of the prevalence of elliptical orbits of immense periods; the conclusion is that the matter now forming the planets and comets was formerly distributed as a diffused nebula over a region immensely larger than that bounded by the present planetary orbits, but excessively tenuous in the outer portions; any slowly moving fragments in these outer regions would approach the centre under gravity, their orbits being long ellipses, almost parabolic. Prof. Ström-gren makes a novel suggestion to explain the absence of cometary matter in the interstellar spaces. It is now generally accepted that there is a tendency to equipartition of energy among the stars, the smaller masses having the greater speeds. On this view small cometary masses would attain such high speeds that they would be expelled from the stellar system; those alone would remain that were within the domains of individual stars.

MINOR PLANETS.—The fifth planet of the Trojan group, discovered last year and designated 1917 CQ, was reobserved by Prof. Wolf on October 5. Its magnitude was 14.5. Prof. Wolf has given it the name Priamus.