without this construction, have rendered nice observation impossible.

The series of angles of the prism which I have given appears to me well adapted to general wants. I propose to furnish each of the principal telescopes to be used for the transit of Venus with a complete series of such prisms, arranged perhaps on a long slider. Care must be taken to make the thickness of the slider-frame as small as possible, inasmuch as it must be accompanied with another slider carrying dark glasses. It will probably be found best to place both sliders between the two glasses of the eye-piece. This slightly disturbs the elements of the calculation above; but in practice the selection of the best prism will always be matter of trial, and the disturbance of calculations will be unimportant.

Before closing this subject I will advert to a remark made by one of the most acute telescope-observers who have ever been known in this Society, the late Rev. W. R. Dawes. He states that, in general, a telescope performs better with one particular point of the edge of its object-glass upwards than in any other position. The explanation of this singular remark will be found, I think, in the combination of the effect of error of centering of the two lenses of an achromatic object-glass, with the effect of atmospheric dispersion. The centre of one lens (using the word "centre" to denote that part in which the tangent-planes of the two surfaces are parallel) ought to be exactly above the centre of the other lens. But it is not easy to make this adjustment perfect; the centre of one lens is frequently above a part of the other lens where the two surfaces have a slight inclination; and the refraction thus created produces in the image of every star a spectrum which rotates as the telescope-tube is made to rotate. In one position of the tube the atmospheric dispersion is opposed to this, and may wholly or in a great measure correct it; in the opposite position the atmospheric dispersion is added to it, and increases its injurious effects.

The atmospheric dispersion between B and G is about $\frac{1}{60}$th of the atmospheric refraction. At zenith-distance 45° it is nearly 1″, at 63° it is nearly 2″, at 80° about 5″. These are the lengths of the visible spectrum.

The Cause of the Incandescence of Meteors

THE incandescence of meteors was at first ascribed to their friction against the air, until in 1854 M. Regnault showed that this was not probable. M. Govi, of Turin, now affirms that the high temperature is due to the heat disengaged by the compression exercised on the air in front of them. This accounts for the fact that the interior of a meteor sometimes shows no signs of excessive heating, and that the hydrogen is not expelled.—[Bul. Association Scientifique de France, t. vi. 305.]

AMONG the points of interest touched upon at the last meeting of the Royal Astronomical Society was the extension to the approaching transit of Venus of Professor Young's suggestion to observe times of contact in solar eclipses by means of the gradual reduction of the length of the lines of the chromosphere, as observed in a spectroscope.

BOTANY

Spontaneous Motion of Protoplasm

PROF. J. B. SCHNETZLER records in the *Archives des Sciences Physiques et Naturelles*, some observations on the spontaneous motion of the protoplasm in the cells of the leaves of the common water-weed, the *Anacharis alsinastrum*. The writer remarks that whether the cause of the motion is found, as some have maintained, in the successive contractions or vibrations of the exterior layer of the protoplasm, which transmit themselves to the interior layers; or whether the successive displacements of the molecules is produced by causes purely mechanical, as others have held, it still remains to be explained what produces these contractions or displacements. It is incontestable that they are found only in living protoplasm. Prof. Schnetzler believes that the principal cause which provokes the motion is the chemical action of oxygen, which passes through the wall of the cell, and of which a portion is probably transformed into ozone under the influence of light, as occurs also in the globules of blood. The most strongly refracted rays of light have a marked influence on these currents, which are also no doubt affected by the currents of electricity which form, under the influence of water, between the surface of the leaf and the contents of the cells. The energy of the motion depends principally on the temperature, showing the greatest vigour between 16° and 20° C. In the point of view of mechanical theory, we have here evidently an example of the transformation of light and of heat into motion. The *Anacharis* is especially favourable for the observation of these motions; as, in consequence of the transparency of its tissue, they can be watched under the microscope without any preparation.

THE Lucerne crops in several parts of the country have recently been attacked by a species of Dodder, the *Cuscuta hassiaca*, allied to the parasitic Clover-dodder and Flax-dodder, which are so destructive to those crops. It is described as being a beautiful plant, with clear orange leafless stems, and abundant pure white and exquisitely-scented flowers.

THE magnificent "Flora Crasiliensis," the *magnum opus* of the late Von Martius, published under the auspices of the Bavarian and Brazilian Governments, is not likely to suffer by the death of that distinguished botanist. Under the able editorship of Dr. Eichler, of Münich, two new parts have recently been published, a most valuable and beautifully illustrated dissertation on the curious parasitic *Balanophoræ* by the Editor, and a monograph of the Brazilian *Convolvulaceæ* by the veteran Meissner. In the course of the ensuing winter we are promised a volume on the Ferns, about 350 species, with nature-printed illustrations, by Mr. J. G. Baker, of the Kew Herbarium; and the most eminent European botanists are engaged on other orders which still remain to complete the work. A. W. B.

CHEMISTRY

Italian Mineral Waters

THE following analyses of Italian Mineral Waters have been made by Prof. Purgotti of Perugia [Ann. di Chim. app. July, 1869, p. 59.]

I. Bromo-ioduretted water which collects in a reservoir, five kilometres from the station of Assisi:—

Carbon dioxide	0·44110
Silica	0·01500
Magnesium bromide	0·00124
Magnesium chloride	0·18830
Magnesium sulphydrate	0·07750
Sodium chloride	0·86370
Sodium sulphate	0·15630
Calcium bicarbonate	0·35800
Magnesium bicarbonate	0·25190
Extractive organic matters	0·02150
Total mineral constituents	2·37454
Water	997·62546
	1000·00000

This water likewise contained free oxygen, ozone, ferrous bicarbonate, and alumina (and iodine?), but in quantities too small for estimation.

II. A ferruginous water collected in a square reservoir about half a kilometre from Cannara, near Collemancio, was found to contain:—

Ferrous bicarbonate . 0·0300 grm.	Magnesium bicarbonate
Manganous bicarbonate 0·0036	Magnesium chloride
Free carbon dioxide	Magnesium sulphate
Atmospheric air	Silica
Calcium bicarbonate	Calcium sulphate

The temperature of this water is considerably lower than that of the surrounding air.

Sal-ammoniacum Martiale

ANGELO BANIERI has made the following observations on the ammonio-ferric sulphate (*sal ammoniacum martiale*) collected on the lava of Vesuvius. Many naturalists believe that the hydrochloric acid evolved by lavas in their course, unites with the iron of the same lavas, forming ferric chloride, which, together with the ammonia of the air, gives rise to the compound of sal-ammoniac and ferric chloride found in the fumaroles. This view, however, does not appear to the author to be in harmony with facts observed in the Vesuvian lava-current of 1850. It was only in that part of the lava which had overwhelmed a cultivated and manured soil that fumaroles existed, and there they were so numerous as to yield more than 100 measured quintals of sal-ammoniac, whereas, on the other part of the igneous current, which had passed over an older lava of the year 1834, in which there was nothing but dry rock and sterile sand, there were no fumaroles of sal-ammoniac. The silica of the lavas acts at very high temperatures on the common salt contained in the manured soil, liberating hydrochloric acid, which, on the one hand, reacts on the ferric hydrate