pipes of the Pretoria district. This paper is of special interest. In the Premier pipe a remarkable bar of purple quartzite, locally known as floating reef, occurs. It appears to be a mass of Waterberg sandstone that has dropped into the pipe. The blue ground is considered to be a serpentinised peridotite breccia with a specific gravity of 2·757. That of the Kimberley blue is 2·734.

OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A NOVA.—A telegram from the Kiel Centralstelle, dated September 1, announces the discovery of a new star, by Mrs. Fleming at Harvard, on August 12. Its position, referred to the equinox of 1900, is given as follows:—

R.A. = 284° 2′ = 18h. 56·1m.
Dec. = −4° 34′,

and, although the magnitude is not mentioned, the Nova is said to be fading rapidly.

The position given above is near to that of λ Aquilæ, the Nova apparently forming the apex of an equilateral

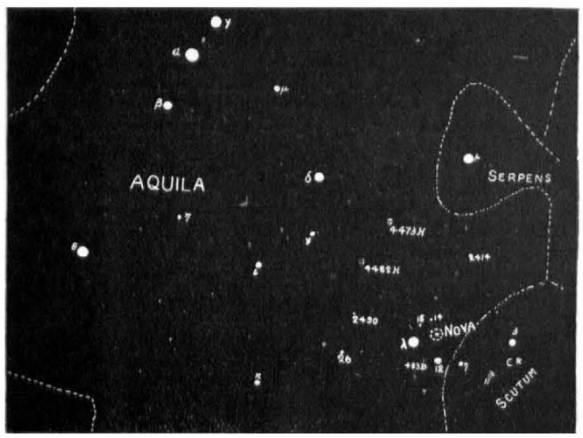

FIG. 1.—Chart of region about Nova discovered by Mrs. Fleming, August, 1905.

triangle which is completed by λ and 12 Aquilæ. The accompanying chart of the surrounding region shows the approximate position of the object.

A later telegram from Prof. Pickering gives the value R.A. = 18h. 57m. 8s. as being more correct for the right ascension of this object.

WATER VAPOUR IN THE MARTIAN ATMOSPHERE.—In Bulletin No. 17 of the Lowell Observatory, Mr. Lowell describes a new spectroscopic method for testing the presence of water vapour in the atmosphere of Mars, and Mr. Slipher discusses the results obtained from an experimental trial of the method. The principles involved are as follows:—Cosmically considered, the earth's atmosphere is at rest as regards a terrestrial observer, whilst the Arean atmosphere partakes of the planet's motion relative to the earth. This relative motion should be reflected in the solar spectrum, as obtained on a spectrogram of Mars, by a displacement of the lines due to the selective absorption common to both atmospheres. But in the terrestrial atmosphere water vapour accounts for a great deal of this absorption; therefore, if water vapour also exists in the Martian atmosphere the lines due to it should show a displacement, or at least a broadening, of such lines as those in the α band of the solar spectrum, or, with small dispersion, an extension on one side or the other of the band itself. The spectrum of the sunlight reflected by the moon, the approach or recession of which is negligible, is taken as the comparison spectrum, in which the earth's atmospheric absorption appears alone.

Mr. Slipher obtained several spectrograms of Mars and of the moon, the exposures being made when the respective bodies were at the same altitude. An examination of the α band and of the water vapour lines near D in both spectra seemed to indicate a slight shift, but the measurements made were uncertain and discordant, and no definite conclusion could be arrived at. So far as selective absorption is concerned, the spectrum of Mars seems to be the same as that of the equally high moon. Similar experiments on the planet Venus, using direct sunlight for the comparison spectrum, were equally inconclusive.

REAL PATHS OF LYRID METEORS.—The real paths of forty April meteors, recorded during the period 1889–1903 by different observers, are given by Mr. Denning in the *Observatory* (August). Many of the objects observed were Lyrids, and Mr. Denning emphasises the importance of this shower and its contemporaries, and, further, gives a daily ephemeris for the Lyrid radiant, based on his own observations of 703 meteors (186 Lyrids) during the years 1873–1904. This ephemeris covers the period April 15–April 25, but its author is doubtful of the radiant's activity on April 15, 16, and 25. On April 15 the computed position is $\alpha = 263\frac{1}{2}°$, $\delta = 33°$, and the latter value is constant. The right ascension, however, increases at the uniform rate of one and a quarter degrees per day.

OBSERVATIONS OF SATELLITES.—In No. 4035 of the *Astronomische Nachrichten* Dr. C. W. Wirtz publishes the results of a series of observations of various satellites made with the 49 cm. (about 19½-inch) refractor of the Strassburg Observatory during 1902, 1903, 1904, and 1905. The results are given in a tabulated form, showing the differences between the calculated and observed position angles and distances. Dealing with Neptune's satellite, Dr. Wirtz found that it exhibits a marked variation of apparent brightness according to its position in its orbit. In longitude 40° (or position angle 60°) it is brightest, in longitude 240° (*i.e.* position angle 180°) it is least bright. Saturn's satellites, iii.–viii. inclusive, are also dealt with, the positions with regard to the planet and then to each other being given.

THE BRITISH ASSOCIATION.

SECTION G.

ENGINEERING.

OPENING ADDRESS BY COLONEL SIR C. SCOTT MONCRIEFF, K.C.S.I., K.C.M.G., R.E., LL.D., PRESIDENT OF THE SECTION.

SCIENCE has been defined as the medium through which the knowledge of the few can be rendered available to the many; and among the first to avail himself of this knowledge is the engineer. He has created a young science, the offspring, as it were, of the older sciences, for without them engineering could have no existence.

The astronomer, gazing through long ages at the heavens and laying down the courses of the stars, has taught the engineer where to find his place on the earth's surface.

The geologist has taught him where he may find the stones and the minerals which he requires, where he may count on firm rock beneath the soil to build on, where he may be certain he will find none.

The chemist has taught him of the subtle gases and fluids which fill all space, and has shown him how they may be transformed and transfused for his purposes.

The botanist has taught him the properties of all trees and plants, "from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall."

And all this knowledge would be as nothing to the engineer had he not reaped the fruits of that most severe of all pure and noble sciences—the science of numbers and dimensions, of lines and curves and spaces, of surfaces and solids—the science of mathematics.

Were I to attempt in the course of a single address to touch on all the many branches of engineering, I could do no more than repeat a number of platitudes, which you know at least as well as I do. I think, then, that it will be better to select one branch, a branch on which comparatively little has been written, which has, I understand, a special interest for South Africa, and which has occupied the best years of my life in India, Southern Europe, Central Asia, and Egypt—I mean the science of irrigation. My