required by the "Kinemacolor" process, it does not need to be passed through the exhibiting lantern at double the usual speed, and it is claimed that the difficulty of colour fringes in the case of quickly moving objects is eliminated.

AN account of the Temple submarine stud driver appears in *Engineering* for September 30. The function of this appliance is to fix studs into ships' plates or other steelwork under water, so that patching plates or attachments for lifting may be bolted on. The studs used at a demonstration at Caxton Hall were of tool steel, tempered to a dark blue colour. One end of the stud is bluntly pointed and the other end has a screw thread cut on it. The studs are shot from the muzzle of a gun held in contact with the plate, and pierce the plate so that about an equal length of the stud is left projecting on both sides. The operation of driving the stud is instantaneous, and the noise is scarcely more than that of an airgun. The explosive charge may consist of any ordinary propellent explosive, and in quantity is about the same as in a standard 0·303 rifle cartridge. It is stated that studs can be driven into solid steel by the Temple gun, and that two ⅝ in. plates can be pinned together by studs shot through them; also a pin of only ⅛ in. diameter can be driven through a 1¼ in. plate. This appliance, which has been invented by Mr. Robert Temple, is certainly a very remarkable one. The process is in the hands of the Temple Cox Research Company, Dacre House, Dean Farrar Street, Westminster.

SIR THOMAS HEATH considers that of all the manifestations of the Greek genius none is more impressive, and even awe-inspiring, than that which is revealed by the history of Greek mathematics. The Oxford University Press is publishing immediately in two volumes "A History of Greek Mathematics," by Sir Thomas Heath.

Our Astronomical Column.

THE LUNAR ECLIPSE OF SUNDAY, OCTOBER 16.—This eclipse, which will be nearly total, begins at 9h. 14m. (position angle 45°), reaches its greatest phase (0·938 of the diameter, the south limb being uneclipsed) at 10h. 54m., and ends at 12h. 34m. (position angle 283°). As there is not another large lunar eclipse visible at a convenient altitude in the British Isles until September, 1932, this occasion should be utilised. The chief work during lunar eclipses is the observation of occultations, both phases being visible under similar conditions. Such observations facilitate the determination of the moon's diameter, and serve to test the suggestion that the lunar atmosphere may have more refractive power by day than by night. Six stars in the Bonn Durchmusterung will be occulted during eclipse. The details are given in the following list (computed for Greenwich):—

B.D. number °	Mag.	Disappearance h. m.	Angle °	Reappearance h. m.	Angle
7·218	9·2	10 3	24	10 59	292
7·222	9·3	10 19	56	11 35	258
7·224	9·0	10 20	100	11 25	214
7·225	9·5	10 28	70	11 46	243
7·228	9·3	10 57	90	12 10	225
7·227	9·1	11 6	41	12 17	273

The angles are measured from the north point towards the east.

The occultation of 263 B Piscium, mag. 6·4, may also be mentioned, though it does not occur at the eclipsed limb; the times and angles are 8h. 55m., 90°, and 10h. 3m., 224°.

It is also of interest to study the colour and amount of illumination of the region in shadow; probably the variations from one eclipse to another arise from differences in the transparency of the earth's atmosphere. It would be well to examine some of the regions, such as Aristillus, in which Prof. W. H. Pickering has observed changes during the lunation, as it is possible that their appearance might be affected by the passage of the shadow.

MORNING STARS.—Before sunrise on clear mornings, during the last half of October, there will be an unusual and striking display of four brilliant planets. Venus, Mars, Jupiter, and Saturn will all be visible, and will continue to be so during the remaining months of the present year.

Their variations of position will induce a number of interesting conjunctions and configurations, both amongst themselves and with the waning crescent of the moon as she passes them in her monthly round.

On October 16 Venus will rise at 3.43 a.m., Mars at 3.0 a.m., Jupiter at 4.41 a.m., and Saturn at 4.19 a.m. On this date, an hour before sunrise, the four planets named will form an almost perpendicular line over the east by south horizon.

The following conjunctions will occur:—

	h. m.				
Oct. 22	7 55 a.m.	Venus and Saturn	Venus	0 35	South
,, 25	4 12 p.m.	Venus and Jupiter	Venus	0 31	North
,, 28	1 18 a.m.	Mars and Moon	Mars	3 38	,,
,, 28	3 24 p.m.	Saturn and Moon	Saturn	3 41	,,
,, 28	10 0 p.m.	Jupiter and Moon	Jupiter	2 14	,,
,, 29	3 56 a.m.	Venus and Moon	Venus	2 25	,,
,, 30	11 58 p.m.	Mercury and Moon	Mercury	2 36	South

These occurrences will not be all visible, as they take place at unsuitable times, but the objects mentioned may be observed in proximity on the mornings before and after the events named.

In November, during the last fortnight of the month, the planet Mercury will also be favourably visible and add another interesting object to the unusual assemblage of brilliant planets in the morning sky.

LARGE FIREBALL.—Mr. W. F. Denning writes:— "On October 6, 9h. 25m. G.M.T., a fireball of unusual brilliancy was observed by Mr. J. P. M. Prentice at Stowmarket. It was of a beautiful orange colour, with a thick streak, and burst in the middle of its flight, leaving a blue-green cloud of gaseous material which was visible for eight seconds. The fireball was also seen by the writer at Bristol, and he rated it as much more brilliant than Venus, but it was unfavourably seen right through a cloud, which it rather brightly illuminated. The nucleus could be distinctly traced as it pursued its path, and the position could be accurately recorded from a few bright stars which were not obscured at the moment. The radiant point of the object was near β-Aurigæ at 87°+40°, and the height of the object from 86 to 48 miles from over the mouth of the Thames to Littlehampton in Sussex."