be situated, however the position of the plane of the mirror be changed : find this space.

5. Give an account of "Frauenhofer's lines" in the Solar Spectrum.

Sodium introduced into the flame of a Bunsen burner produces the well known yellow line in the spectrum of the flame. If, however, the yellow light is made to pass through sodium vapour before it can reach the prism, no yellow light is seen : explain fully the cause of this result. What inference would you draw from this concerning the material constitution of the sun?

6. Describe the construction and explain the action of Holtz's electric machine, in which a small initial charge of electricity is made to give rise to an indefinite supply of electricity of a high tension, and show how its effects can be reconciled with the principle of the Conservation of Energy.

7. Describe the construction of a Grove's galvanic cell, and the nature of the chemical action which takes place in it during the passage of the current.

The current from a battery of 6 Grove's cells, connected in a series, passes through a voltameter containing acidulated water : what is the weight of zinc dissolved in the battery while .36 of a gramme of water is decomposed in the voltameter ?

8. How would you compare the magnetic intensities of two places on the earth's surface ?

9. Describe the construction of the Induction Coil, explaining the special functions of each of its principal parts.

10. Describe the Astronomical Telescope; trace the course of a pencil of rays from any point of a distant object, and find the magnifying power.

If the focal lengths of the lenses be 22 inches and 1 inch, how far must the eye-glass be moved for viewing an object at a distance of 40 feet from the object-glass ?

EUCLID.

Time—Three Hours.

N. B.—Algebraic symbols must not be used.

1. (*a*) The straight line drawn at right angles to the diameter of a circle from the extremity of it, falls without the circle ; and no straight line can be drawn from the extremity, between that straight line and the circumference, so as not to cut the circle. (III. 16).

(*b*) Draw a common tangent to two given circles. How many can be drawn ? *Apollonius.*)

2. (*a*) The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles. (III. 22.)

(*b*) If straight lines drawn from any point on the circumference of a circle perpendicular to the sides of an inscribed triangle their feet are in the same straight line. (*M. F. Jacobi.*)

3. (*a*) If the chord of a circle be divided into two segments by a point in the chord or in the chord produced, the rectangle contained by these segments will be equal to the difference of the squares on the radius and on the line joining the given point with the centre of the circle. What propositions in Euclid follow immediately from this ?

(*b*) Describe a circle which shall pass through a given point and touch two straight lines given in position. (*Appollonious.*)

4. (*a*) To describe an isosceles triangle, having each of the angles at the base double of the third angle. (IV. 10.)

(*b*) Construct a triange having each of the angles at the base equal to seven times the third angle.

5. (*a*) If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the segments of the base have the same ratio which the other sides of triangle have to one another ; and, the straight line drawn from the vertex to the point of section, shall bisect the vertical angle (VI. 3.)

(*b*) The points in which the bisectors of the external angles of a triangle meet the opposite sides, lie in a straight line.

ENGLISH GRAMMAR AND ETYMOLOGY.

Time—Three Hours.

Lady Macbeth,— * * * * * * * * * * Art thou afraid
To be the same in thine own act and valor,
As thou art in desire ? Would'st thou have that
Which thou esteem'st the ornament of life,
And live a coward in thine own esteem ;
Letting I dare not wait upon I would,
Like the poor cat i' the adage ?