8. Describe some of the simple experiments which are usually made with the electricity from a battery of five Grove's cells.
9. How was the identity of lightning and electricity proved? What experiments can be made to prove that frictional and voltaic electricity are the same?
10. Give an account of an ordinary multiplying galvanometer. How does it differ from an astatic galvanometer?
11. Give an account of the process of electro-plating with silver.
12. Describe and explain all the parts necessary for a Wheatstone needle telegraph.

CLASS D.—SOUND AND LIGHT (OPTIONAL).

Wednesday, March 31st.—Afternoon, 2.30 *to* 5.30.

[NOTE.—Candidates are not to attempt more than ten questions.]

1. How is it proved that sound is due to a movement of the air? What kind of movement is it?
2. In a pianoforte, some of the strings are long and heavy, and some are short and thick: what is the object of this arrangement? Two strings alike in all respects produce notes the one an octave above the other: what is the ratio of their tensions?
3. How is a musical note produced in an organ-pipe? Draw a sectional diagram through one, and state the difference in the pitch produced by closing the open end.
4. Explain the meanings of the following terms: Timbre, pitch, intensity, chord, and discord.
5. How are the intensities of two lights compared?
6. Draw a diagram to show the mode in which an image is produced in a concave lens.
7. A concave lens is placed between a point of light and a white wall: state exactly the appearance presented on the wall.
8. What are the laws of the refraction of light? Illustrate your answer by a diagram.
9. Explain the principle of any form of telescope.
10. Explain exactly how to throw a clear spectrum on a screen by means of sunlight.
11. Give a general account of spectrum analysis.
12. Give a clear account of how a photograph is taken.

CLASS D.—HEAT (OPTIONAL).

Tuesday, March 30th—Afternoon, 2.30 *to* 5.30.

[NOTE.—Candidates are not to attempt more than ten questions.]

1. Give six examples of essentially different kinds of "potential energy." What is the kind of energy possessed by (*a*) gunpowder, (*b*) a moving cannon-ball, (*c*) a red-hot poker?
2. Explain how it is that a fire produces a draught in a chimney. Draw a section through a good fireplace.
3. Describe experiments which prove water to be a very bad conductor of heat.
4. Describe the production of clouds, rain, snow, and hail.
5. What is supposed to be the cause of the light of meteors and shooting stars?
6. How does heat travel from the sun to the earth? What becomes of it on the earth? And how does it escape the earth again?
7. What is meant by the term "latent heat"? Is the term a satisfactory one? If one pound of ice at 0° C. and two pounds of water at 100° C. be mixed, what will be the result on the temperature?
8. Explain the action of "freezing mixtures." How may mercury be frozen?
9. Describe three kinds of thermometers. What do you know of absolute zero?
10. Give an account of all the circumstances which influence the boiling point of liquids.
11. Give a clear account of any form of steam-engine. What is meant by the term "the mechanical equivalent of heat"? How many units of work must be employed to raise 10 lb. of water 5°C.?

CLASS D.—BOTANY (OPTIONAL).

Tuesday, March 30th.—Morning, 10 *to* 1.

1. Describe the plans of venation in Dicotyledons and in Monocotyledons.
2. What part of the floral whorl is the pappus of a thistle-seed?
3. In what part of the plant is the pollen developed?
4. Explain the difference between the terms "fruit" and "seed."
5. What is bast? For what purposes is it used in the arts?
6. From whence is the sap in plants derived?
7. Explain the difference in function between the cotyledons of the bean and those of the radish.
8. Why can fungi live and grow in the dark, while light is necessary for other plants?

CLASS D.—ZOOLOGY (OPTIONAL).

Tuesday, March 30th.—Morning, 10 *to* 1.

1. State what you know as to the structure of the Foraminifera.
2. What are the differences between a sea-anemone and a coral?
3. Describe the development of a tape-worm, from the egg to the sexually mature individual.
4. To what class of animals does the cheese-mite belong? State the reasons for your opinion.
5. Contrast the nervous system of the mollusca with that of the annulose animals.
6. What is the swim-bladder of a fish, and what does it correspond to in other vertebrates?
7. Describe the structure of a complete feather.
8. What are the four different kinds of teeth in man, and how are they situated with regard to each other?