Fourth Year (S6).—The scale of maps generally, illustrated by some one or two maps, as of England, Australia, India; distances and areas computed therefrom; a few distances measured on the globe. Ice; experiments with ice; temperature of melting ice; volume and density of ice; fracture of rocks; easy to make two surfaces of ice freeze together, &c.; snow; glaciers; the work of ice in shaping the surface of the land; icebergs. Formation of deltas and alluvial plains—*e.g.*, the Canterbury Plains. Winds, more fully than in S5. Radiation; specific heat of water and air; the principal causes of the differences of climates; continental climates; island climates. Rise and fall of the land-surface; earthquakes; volcanoes.

The following portions of mathematical and physical geography should be taken in a connected logical order, but the lessons may be spread over the third and fourth years of the Senior Division (S5 and S6) in some such way as is indicated below. The instruction may be founded in every case directly upon observation and experiment, inferences from which should be explained by means of globes and other models, and by diagrams. Should teachers from any cause, however, find themselves unable to base their teaching directly upon the observation of the stars and other phenomena, simple models may be used and diagrams drawn therefrom; in no case can the teaching of mathematical geography be regarded as satisfactory if it is taught from books and diagrams alone.

The common "proofs" that the earth is nearly spherical may be used—as, by inference, from what is seen when ships go away from land; the circular form of the offing or horizon; the shape of the earth's shadow on the moon; the circumnavigation of the world.

The movements of the earth should be explained in a simple way; if the children have not done the work suggested in S4, intended to convince them of the daily rotation of the earth, they should do it now. They should be led to infer the daily rotation of the earth from their own observation of the sun and moon and of stars in the northern and southern skies. The reason for the differences of local time may easily be inferred from the fact of the earth's rotation, as it is always noon on the meridian directly under the sun. With the aid of two globes, one for the earth and one for the sun, it may be shown that if the earth moves round the sun during the year the part of the heavens seen at night will vary according to the time of year. Hence the observed fact that different stars are seen on or near the meridian in the northern sky at different times of the year (say, at 8 p.m.) will lead to the inference that the earth does move round the sun. (Useful stars for this purpose are the constellation of Orion, first week in February, 40 degrees to 60 degrees above the northern horizon; Sirius, the brightest star in the sky, end of February, high up; Regulus, in the constellation Leo, fourth week in April, in lower part of northern sky; the bright star Antares, in the constellation Scorpio, end of July, high up in the sky; Altair, in the constellation Aquila, middle of September, lower part of sky.)

The children should be taught how to identify the chief stars and star-groups in the southern sky, such as the "Pointers" in Centaurus, the Southern Cross, Canopus, and Achernar. They may then be led to see from their own observation that a point in the sky about half-way between Achernar and the Southern Cross is always over the same house or tree or other terrestrial object, and at the same height. If the globe representing the earth be fitted with an axis, it may easily be shown that the axis must always point nearly in the same direction.

Using the observed facts that the altitude of the sun is much greater in summer than in winter, and employing the models already referred to, the teacher can readily explain that the axis of the earth is not at right angles, but is tilted to the plane of its orbit. If a small piece of paper be fixed on the globe to mark the position of the school, and the globe made to revolve (keeping the southern pole uppermost), the length of time the paper is visible from the position of the sun will explain the varying length of the day at different times of the year. The actual length of the day should be observed, and should also be calculated from the times of sunrise and sunset given in an almanac. The six months' night at the poles may be explained from the models.

The explanation of the seasons naturally follows. The mean temperature at different times of the year should be found. It is recommended that the temperature in the shade should be recorded each day (say, at 9 a.m., at noon, and at 3 p.m., or, if possible, at 5 p.m.), and also the temperature in the sun at noon; and that the corresponding mean temperatures for each week and each month should then be found.

Each teacher must decide for himself whether he can clearly and usefully cover the whole of the ground indicated above. It is absolutely essential that the various steps should be taken at reasonable intervals,