range, there seem to be short-period oscillations, more or less irregular, of a somewhat greater magnitude, varying altogether between 1·8 and 2·0 calories, but over any single short period the range not exceeding five per cent. It is easy to correlate the long period changes with the variation of the solar activity but as to their actual fundamental cause, we are as much at sea as in the case of other solar phenomena. It will be interesting to see whether these changes in radiation, especially the short-period ones, can be connected with meteorological changes and whether they can be used in weather prediction.

If the sun is emitting energy at the rate of 2 calories per square centimetre per minute at the distance of the earth, it is evident that its total emission will be twice the area in square centimetres of the surface of a sphere 186,000,000 miles in diameter or that the sun radiates 525 followed by 25 ciphers calories per minute.

If the sun were a body cooling without any means of replenishing its stores of heat, this radiation would cause it to fall in temperature about 1°·4 C. per year, which would be about 3000° C. within historic times. As the radiation varies with the fourth power of the temperature, the earth 2000 years ago would have been receiving five times as much heat as at present, which is manifestly not the case.

What then maintains the energy of the sun at a constant or nearly constant rate of emission? Some idea of the enormous quantity of heat given out will be evident when it is stated that it would require the burning over the whole solar surface of a layer of anthracite coal 23 feet thick every hour. At this rate, if the sun were made entirely of carbon, it would not have lasted five thousand years.

A theory brought forward by Mayer, about the middle of the last century, assumed that the solar energy was maintained by the falling of meteorites into the sun. Such bodies would reach the sun with a velocity of about 400 miles per second and would generate on impact more than 6000 times the heat of an equal weight of coal. To maintain the sun's heat there should