

Review

The Flight of Thunderbolts by B.F.J. Schonland, pp. 152, 33 figures, price 15 sh. (London: Oxford University Press, 1950).

Lightning is one of the most spectacular natural phenomena and man has always been afraid of its destructive power. A book on the subject tracing its development from myth to science, particularly from Dr. Schonland, who has made material contribution to our knowledge regarding the matter, is welcome.

The author begins with an account of the beliefs of the primitive and other people regarding the cause and nature of "thunder magic", and a history of the damage caused by lightning before modern protective methods were introduced. He, then deals with the experiments of Franklin regarding electricity and electric charge of thunderbolts which resulted in the invention of the lightning rod, the various types of early lightning conductors and the application of these conductors to buildings and wooden ships.

The forms taken by lightning and some of its effects (Cloud flashes, bolts from the blue, forked lightning, recurrent and triggered strokes, width of channel, St. Elmo's fire, glows from tops of thunder clouds, lightning flashes to aircraft and their effect, unlikelihood or extreme rarity of the phenomena of ball lightning), spread of lightning discharge through the ground and colour of lightning are then dealt with. At any moment there are 1800 thunderstorms in progress in different parts of the world and about 100 lightning flashes take place every second.

Boys invented the camera for photographing lightning but though he tried for 30 years he could not get satisfactory pictures. The author and his collaborators, however, succeeded in getting some good pictures with the help of a Boys camera of improved design. Based on their photographs the author gives an account of the mechanism of lightning flash, the slow pilot streamer and the fairly luminous leader streamer starting from the cloud, the steps and forking of the leader and the brilliant return

streamer from the earth. According to the author the most frequent quantity discharged in a flash is about 20 coulombs and the most frequent peak value of current in the return streamer is 30,000 amperes. The highest values observed being 160 coulombs and 200,000 amperes, and that a cloud giving one flash every twenty seconds dissipates electrical energy at the rate of a million continuous kilovolts.

An account of protective installations against lightning is given. It is stated that 52% of the lightning fatalities occur in the open, 38% in houses or barns and 10% under trees, and that the most dangerous places out of doors are small sheds, isolated trees, wire fences and hill tops, the safest being depressions in the ground, deep valleys, foot of hills and groves of trees. Inside a properly protected house there is little electric hazard, though telephones should not be used, radio sets should be earthed and water taps avoided during a thunderstorm. Lightning and electric power and telephone lines are also dealt with.

A very brief account follows of electrification of thunder-clouds, the mechanism of electrification (theories of Frenkel, Simpson and Wilson), development of thunderstorms and artificial rain-making. It is interesting to note that 24 out of 28 seeded cumulus clouds in South Africa responded definitely to seeding.

Finally the author deals with indirect and direct effects of thunderstorms, atmospheric and lightning waves, locating of thunderstorms by direction finding of atmospheric and the negative charging of the earth.

The book is well-written and will be useful to the general reader and those who have a concern with lightning. There is an index but no bibliography. It would have added to the value of the book if details about the work of Simpson, Wilson, Appleton, Watson-Watt and the author himself, and a bibliography had been included.

S.K.P.