

From the Imperial Indian Government's Agricultural Research Station at Pusa has been issued Bulletin No. 28 on "The Cultivation of Lac in the Plains of India," by C. S. Misra, a well-illustrated account of the insect (*Tachardia lacca*), the trees on which it thrives, their culture, the collection of the product, the manufacture of shellac, and its economic uses. The most dangerous enemies of the lac insect appear to be the predaceous caterpillars of four species of moth.

FORESTS AND CLIMATE.

THE very general belief in the influence of forests upon climate, and especially upon rainfall, is discussed by Prof. R. de Courcy Ward in an interesting article in the April number of *The Popular Science Monthly*. The subject is very complicated, and the author points out that we must be careful not to put the cart before the horse; in other words, the forests are the result of the rainfall, and not *vice versa*.

The various questions involved are discussed in detail, the following being among the points dealt with:—(1) The historical method; (2) why forests should influence climate; (3) influence upon (a) temperature, (b) humidity and evaporation; (4) the cases frequently cited as showing an influence upon rainfall; (5) recent European studies. Among the authorities quoted, Hellmann has shown that the increase in the rainfall over a forest is accompanied by a lessened fall to leeward—simply a slight difference in distribution. Both Voeikof (Russia) and Hann (the leading authority on climate) believe that the vast tropical forests may increase the amount of rainfall. But as regards our own latitudes the author considers that there is at present no conclusive evidence that forests have a significant effect upon the amount of rainfall, as distinguished from the amount of the rain-catch in the gauge.

There is comparatively little popular interest in the possible influence of forests upon temperature; the forest is a little cooler than the open in summer, and possibly very slightly warmer in winter. Supan sums up the case as follows:—"No one will care to maintain that the system of isotherms would be radically altered if Europe and Asia were one great forest from ocean to ocean." With regard to moisture, the author thinks that the local supply from forests cannot play any considerable part in the great rain-producing processes.

SYSTEMS OF LONG-DISTANCE WIRELESS TELEGRAPHY.

THE Advisory Committee appointed by the Postmaster-General to consider and report on the merits of existing systems of long-distance wireless telegraphy has made its report. The Committee heard evidence in private from representatives of the Marconi, the Telefunken, the Poulsen, the Goldschmidt, and the Galetti interests, and of the Admiralty, and the members visited a number of stations.

The report is strictly limited to practical considerations, and deals with matters of engineering rather than of scientific interest. From the point of view of the building of stations for immediate operation in the Imperial wireless chain, the report is overwhelmingly in favour of the Marconi Company, not only on account of its plant, but also on account of its experience; though the Committee points out that it would be possible for the Government to get together a highly trained staff and erect the stations, using any desirable patents under the provisions of section 29 of the Patents and Designs Act, 1907. The Marconi spark plant was tested by the

Committee as to duplex working, and as to automatic transmission at the rate of sixty words per minute, across the Atlantic, a distance of 2300 miles. The Committee found Transatlantic communication practically continuous, though there are periods when the signals become very weak; and there are occasional periods when no signals at all can get through. These weak periods are due to natural causes, and can probably only be overcome by the use of high powers.

The Committee received no evidence supporting the reported transmission from San Francisco to Honolulu (2100 miles) by the Poulsen arc, but witnessed transmission over a relatively short distance at seventy words per minute. The members also saw the Goldschmidt alternator transmit at the rate of sixty words per minute. It is interesting to note that the Marconi Company and the Telefunken Company are both experimenting with generators of continuous waves. The Marconi machine consists essentially of a rapidly rotating contact-maker in a direct-current circuit with special dispositions of other circuits to give continuous oscillations in the antenna. The Telefunken machine is an alternator constructed to give as high a fundamental frequency as may be convenient in the first instance, the frequency being doubled or quadrupled by a polarised transformer method. The Marconi machine was witnessed working across the Atlantic.

SOME FURTHER APPLICATIONS OF THE METHOD OF POSITIVE RAYS.¹

THE method to which I shall refer this evening is the one I described in a lecture I gave here two years ago. The nature of the method may be understood from the diagram given in Fig. 1. A is a vessel containing the gases at a very low pressure; an electric discharge is sent through these gases, passing from the anode to the cathode C. The positively electrified particles move with great velocity towards the cathode; some of them pass through a small hole in the centre, and emerge on the other side as a fine pencil of positively electrified particles.

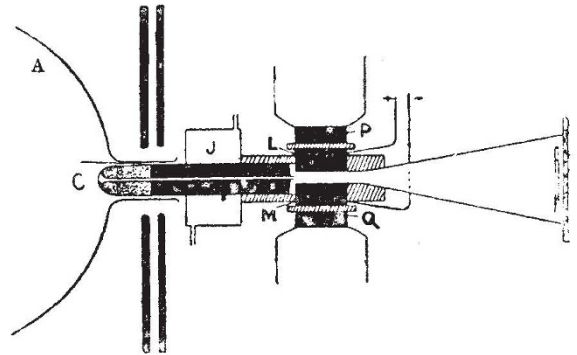


FIG. 1.

This pencil is acted on by electric forces when it passes between the plates L and M, which are connected with the terminals of a battery of storage cells, and by a magnetic force when it passes between P and Q, which are the poles of an electromagnet. In the pencil before it passed under the influence of these forces there might be many kinds of atoms or molecules, some heavy, others light, some moving quickly, others comparatively slowly, but these would all be mixed up together. When they are acted on by the electric and magnetic forces, however, they get sorted out, and instead of travelling along the

¹ Discourse delivered at the Royal Institution on Friday, January 17, by Sir J. J. Thomson, O.M., F.R.S.